

MINISTRY OF PUBLIC HEALTH OF UKRAINE
MINISTRY OF EDUCATION AND SCIENCE OF UKRAINE
SUMY STATE UNIVERSITY
MEDICAL INSTITUTE

TEST ITEMS ON MEDICAL BIOLOGY

**Training for Tests “Krok-1”
of the 1st Stage of Integrated
State Qualifying Examination**

For unassisted work of medical students



Version 2.2

Sumy – 2019

Test Items on Medical Biology: Training for Tests “Krok-1” of the 1st Stage of Integrated State Qualifying Examination. For unassisted work of medical students / Compiler O. Yu. Smirnov. – Sumy: Electronic Edition, 2019 (version 2.2). – 3239 pp.

Physiology and Pathophysiology Department
Medical Institute of the Sumy State University

<http://physiology.med.sumdu.edu.ua/>



This book includes **1618** test items in cytogenetics, classical genetics, molecular genetics, medical genetics, population genetics, general biology, and parasitology. These questions were proposed by teachers from medical institutes for the database of medical license examination "Krok-1", were used during license examinations from 2001 till 2019; some questions are used from IFOM textbook and are developed by the compiler; **1616** test items are included into the main text. The book has been developed for students and teachers of medical, pediatric, medical-and-prophylactic, and stomatological faculties.

For all test items, correct answers are indicated.

Comments and notes are given to some test problems. Special attention is given to errors in tests.

O. Yu. Smirnov: compiling, translation, revision, and comments.

o.yu.smirnov@ukr.net

CONTENTS

Introduction	4
Cytology and Cytogenetics	5
Classical Genetics	437
Molecular Genetics	728
Medical Genetics	1196
Population Genetics and Evolution	1889
General Biology	1941
Protozoans	2267
Helminths	2571
Arthropods	3039
Mixed Questions on Parasitology	3189

INTRODUCTION

Exam test "Krok-1" contains 200 question on medical biology, human anatomy, cytology&histology, microbiology, human physiology, pathophysiology, pathologic anatomy, pharmacology, and biochemistry; approximately 16–18 of them are questions on medical biology. Students have 200 minutes for answering.

All tests on medical biology were selected from open sources: books named *Збірник завдань для підготовки до тестового екзамену із природничо-наукових дисциплін "Крок-1. Загальна лікарська підготовка"* (К.: Медицина, 2004), *Collection of tasks for preparing for test examination in natural science "Krok-1 General Medical Training"* (V. F. Moskalenko et al., eds. – К.: Medicine, 2006), *Збірник задач і вправ з біології* (за ред. А. Д. Тимченка, К.: Вища школа, 1992), *Медицина біологія: Посібник з практичних занять* (за ред. О. В. Романенка, К.: Здоров'я, 2005), also tests were chosen from a database of Testing Center of Ministry of Public Health of Ukraine (<http://testcentr.org.ua/>) (they were sent by this Center in 2000–2005) and from exam booklets (2001–2019); questions are used from IFOM textbook and are developed by the compile.

All tests were reviewed and reorganized. Many mistakes in these tests were corrected (for example, we use the term "DNA repair" in this book instead of "reparation", "Edwards' syndrome" instead of "Edward's syndrome" etc.).

Five answers from which only one answer is correct are given to each test. Choose the answer (or finished statements) that fits best and then check your answer.

Comments and notes are given to some test problems. Special attention is given to errors in tests.

Information about new edition of this book can be found here:
<http://physiology.med.sumdu.edu.ua>

Oleg Smirnov

CYTOLOGY AND CYTOGENETICS

1. Cells of red marrow were taken for laboratory researches. They belong to cellular complexes which are updated. Define a set of chromosomes and quantity of DNA (number of chromatids) which are characteristic for G_1 period in these cells:

- $2n, 4c$
- $2n, 1c$
- $2n, 2c$
- $1n, 1c$
- $1n, 2c$

Correct answer:

- $2n, 2c$

2. One can see under a microscope that the nucleus envelope in a cell is destroyed, short chromosomes in the form of a letter X are evenly placed on all the cell. At what stage of division the cell is?

- Prophase
- Anaphase
- Interphase
- Metaphase
- Telophase

Correct answer:

- Metaphase

3. Golgi complex is removed from a cell by means of the micromanipulator. How it will affect further cell activity?

- Process of mitosis will be broken
- Formation of lysosomes, their maturing and exocytosis of cellular secretory products will be broken
- Formation of ribosomes and synthesis of proteins will be broken
- Autolysis will develop that can lead to the cell death
- Processes of energy metabolism will be broken

Correct answer:

- Formation of lysosomes, their maturing and exocytosis of cellular secretory products will be broken

4. The scraping of mucous of a mouth of a man was made by means of the spatula. Oval nuclei unequal in the size are well visible in non-destroyed epithelial cells of the painted smear. In what way division of these cells occurred?

- Mitosis
- Meiosis
- Binary division
- Schizogony
- Amitosis

Correct answer:

- Amitosis

5. Chromosomal analysis of a 33-year-old woman showed that a part of a short arm of the 16th chromosome joined the 22nd chromosome. How this phenomenon is called?

- Transduction
- Translocation
- Inversion
- Deletion
- Deficiency

Correct answer:

- Translocation

6. A single fragment, which came off a long arm of a chromosome of the group C, was revealed in a metaphase plate from culture of lymphocytes of a patient with flu. During what period of mitotic cycle this mutation occurred?

- G₁ period
- G₂ period
- Telophase
- Anaphase
- S period

Correct answer:

- S period

7. An additional chromosome from the group E was revealed in a metaphase plate from the culture of lymphocytes of a child vaccinated against smallpox. Analyse this fact and choose what type this mutation belongs to:

- translocation
- inversion
- deletion
- polyploidy
- heteroploidy

Correct answer:

- heteroploidy

8. Tissue of testes was taken for laboratory investigations. According to one of classifications, cells of this tissue belong to the renewed cellular complexes. Analyse probable states of cells in this tissue:

- cells divide only mitotically
- cells divide by meiosis only
- cells increase in sizes only
- cells divide at first mitotically, and then meiotically
- cells divide at first meiotically, and then mitotically

Correct answer:

- cells divide at first mitotically, and then meiotically

9. Strong linkage between two X chromosomes was formed in oocytes under the influence of a mutagen. Formation of what set of chromosomes in an ovum it can lead to?

- 47 chromosomes
- 23 or 24 chromosomes
- 24 or 25 chromosomes
- 22 or 24 chromosomes
- 46 chromosomes

Correct answer:

- 22 or 24 chromosomes

10. Microorganisms that belong to prokaryotes, have such structures:

- mitochondria
- nucleoid
- chloroplasts
- lysosomes
- endoplasmic reticulum

Correct answer:

- nucleoid

11. During chromosome disjunction at a stage of maturing of spermatogenesis, the X chromosome did not separate from the Y chromosome. What can be a karyotype of future individual if the normal ovum will be fertilized by such spermatozoon?

- 45, XO
- 46, XX
- 46, XY
- 47, XYY
- 47, XXY

Correct answer:

- 47, XXY

12. In order to analyse a karyotype, a cell culture was influenced by colchicine, which destroys the spindle of division. At what stage was mitosis stopped?

- Metaphase
- Prophase
- Anaphase
- Telophase
- Prometaphase

Correct answer:

- Metaphase

13. A somatic cell of a man, which is in metaphase of mitotic division, is visible on the histologic preparation. How many chromosomes are the part of a metaphase plate, if we will consider that each chromosome contains two sister chromatids?

- 46 chromosomes
- 92 chromosomes
- 48 chromosomes
- 23 chromosomes
- 24 chromosomes

Correct answer:

- 46 chromosomes

14. Thymine with radioactive label was added to a nutrient medium with cells capable to divide by mitosis. About what large amount of thymine, which is determined in nuclei of cells at autoradiographic investigation, can indicate?

- About small number of cells that are in interphase
- About large number of cells that are in the synthetic period of interphase
- About high mitotic activity
- About small number of cells that are in the pre-synthetic period of interphase
- About a large number of cells that are in interphase

Correct answer:

- About large number of cells that are in the synthetic period of interphase

15. One of the reasons of rheumatism in a man at the cellular level is self-damage of cartilage cells through destruction of organoid structure. What is the organoid?

- Golgi complex
- Cell center
- Lysosome
- Mitochondrion
- Ribosome

Correct answer:

- Lysosome

16. After mitosis, some organelles in daughter cells are formed *de novo*, others are formed only by doubling of existing organelles. Specify what organelles from given below have ability to self-doubling:

- granular endoplasmic reticulum
- ribosomes
- lamellar complex
- agranular endoplasmic reticulum
- mitochondria

Correct answer:

- mitochondria

17. It is necessary for successful fertilization that acrosome reaction occurs due to which the nucleus of spermatozoon enters inside the egg. Name the organelle that takes the greatest part in formation of an acrosome:

- ribosome
- mitochondrion
- endoplasmic reticulum
- Golgi complex
- cell center

Correct answer:

- Golgi complex

18. Culture of tumor cells was influenced by colchicine that blocks synthesis of protein tubulin forming a division spindle. What stages of cell cycle will be broken?

- Mitosis
- G0 period
- Pre-synthetic period
- Post-synthetic period
- Synthetic period

Correct answer:

- Mitosis

19. In a cell, enzymes are located in organelles in such a way that they provide performance of functions of certain organelles. Name enzymes that are located in lysosomes:

- enzymes of synthesis of fatty acids
- hydrolases
- enzymes of protein synthesis
- enzymes of urea synthesis
- enzymes of glycogen synthesis

Correct answer:

- hydrolases

20. Abnormal biopolymers were revealed in cells of an organism of a 7-year-old child with a congenital disease. About malfunction of what organelles one can talk?

- Lysosomes
- Mitochondria
- Peroxisomes
- Ribosomes
- Granular endoplasmic reticulum

Correct answer:

- Lysosomes

21. Throughout life (from division to death), a cell is on different phases of cell cycle – interphase passes into mitosis. What protein is produced in a cell and regulates the entering of a cell into mitosis?

- Desmin
- Cyclin
- Keratin
- Vimentin
- Tubulin

Correct answer:

- Cyclin

22. Cytochemical investigation revealed high content of hydrolytic enzymes in cytoplasm. About activity of what organelles from listed below this fact indicates?

- Cell center
- Endoplasmic reticulum
- Lysosomes
- Polysomes
- Mitochondria

Correct answer:

- Lysosomes

23. Cortisone, which stimulates protein synthesis, was prescribed to a patient. What changes will happen in nuclei of cells at stimulation of protein synthesis?

- Perinuclear space will increase
- Perinuclear space will decrease
- The amount of heterochromatin will increase
- The amount of euchromatin will increase
- The amount of nuclear pores will decrease

Correct answer:

- The amount of euchromatin will increase

24. On diffraction patterns of liver cells of a rat, two-membrane structures of an oval form are well noticeable; their internal membrane forms cristae. What are these organelles?

- Peroxisomes
- Mitochondria
- Centrosomes
- Ribosomes
- Lysosomes

Correct answer:

- Mitochondria

25. A specimen of an onion rootlet includes a cell in which the fully condensed chromosomes are located in the equatorial plane making the monaster. What phase of the mitotic cycle is the cell in?

- Interphase
- Metaphase
- Prophase
- Late telophase
- Early telophase

Correct answer:

- Metaphase

Note.

In the book "Collection of tasks...", this question is written as follows: "During the analysis of the mitotic stage in the onion root cells, a cell, in which spiralized chromosomes were placed in the equatorial zone, was revealed. What mitotic stage is the cell at?"

Other variants of incorrect answers:

- Anaphase
- Telophase

26. According to the rule of constancy of chromosomes number, each animal species can be characterized by a specific and constant number of chromosomes. What mechanism provides this feature during sexual reproduction?

- Repair
- Schizogony
- Meiosis
- Mitosis
- Cytokinesis

Correct answer:

- Meiosis

27. Organelles with one or two membranes are present among membrane organelles of a cell. What organelles have two-membrane structure?

- Mitochondria, Golgi apparatus
- Cell center, ribosomes
- Mitochondria, plastids
- Golgi apparatus, ribosomes
- Endoplasmic reticulum, plastids

Correct answer:

- Mitochondria, plastids

28. Mitotic division of diploid somatic cell began. Mitosis was disturbed, and uninuclear polyploid cell was formed. At what stage mitosis was interrupted?

- Prophase
- Telophase
- Anaphase
- Cytokinesis
- Metaphase

Correct answer:

- Anaphase

29. The structure of ribosomes is broken in a cell. What processes will suffer first of all?

- Synthesis of nucleic acids
- Synthesis of protein
- Synthesis of carbohydrates
- Synthesis of lipids
- Synthesis of mineral substances

Correct answer:

- Synthesis of protein

30. A somatic diploid cell entered mitosis, and then normal process of mitosis was interrupted with colchicine. At what stage process of mitosis was interrupted, and what set of chromosomes will be present in the nucleus?

- Anaphase, $2n$
- Anaphase, $4n$
- Metaphase, $2n$
- Metaphase, $4n$
- Telophase, $2n$

Correct answer:

- Metaphase, $2n$

31. A cell organelle has its own protein synthesizing system. Name it:

- Golgi apparatus
- lysosome
- vacuoles
- endoplasmic reticulum
- mitochondrion

Correct answer:

- mitochondrion

32. Products of metabolism are excreted from a cell through Golgi complex as a result of connection of its membrane structure with plasmalemma. What is the process?

- Osmosis
- Diffusion
- Endocytosis
- Exocytosis
- Active transport

Correct answer:

- Exocytosis

33. Nucleoli of nuclei in tissue culture have been damaged by nuclear irradiation. Restoring of what organelles in cytoplasm of cells becomes problematic?

- Ribosomes
- Lysosomes
- Golgi complex
- Microtubules
- Endoplasmic reticulum

Correct answer:

- Ribosomes

34. During mitotic cell division, a scientist can see the phase when the nuclear envelope and nucleolus disappear, centrioles are placed on the opposite poles of a cell and chromosomes are in the form of a thread ball freely placed in the cytoplasm. What stage of mitotic cycle is the cell at?

- Metaphase
- Prophase
- Anaphase
- Interphase
- Telophase

Correct answer:

- Prophase

35. Salts of heavy metals introduced into experimental animals during 24 days. Study of preparations of liver under electronic microscope revealed destruction of mitochondria in hepatocytes. With large confidence it is possible to claim that in hepatocytes such processes are broken:

- protein synthesis
- energy metabolism
- lipid metabolism
- synthesis of carbohydrates
- water absorptions

Correct answer:

- energy metabolism

36. In a cytogenetic laboratory, a karyotype of a healthy man was studied. 46 chromosomes were seen in each somatic cell. How many autosomes does each cell include?

- 23
- 22
- 44
- 46
- 92

Correct answer:

- 44

37. It is established that human karyotype is presented by 46 chromosomes, each consisting of two chromatids. At what stage of mitosis the karyotype is defined?

- Telophase
- Metaphase
- Prometaphase
- Anaphase
- Prophase

Correct answer:

- Metaphase

38. A cell of laboratory animal was overdosed with Roentgen rays. As a result, albuminous fragments formed in the cytoplasm. What cell organoid will take part in their utilization?

- Lysosomes
- Endoplasmic reticulum
- Ribosome
- Golgi complex
- Cells centre

Correct answer:

- Lysosomes

39. 46 chromosomes were revealed on karyotype examination of a 5-year-old girl. One of the 15th pair of chromosomes is longer than usual due to joining a part of the chromosome of the 21st pair. What type of mutation does this girl have?

- Insufficiency
- Deletion
- Duplication
- Inversion
- Translocation

Correct answer:

- Translocation

Note:

During exam in 2012, this question contained the phrase "One of the 15th pair of chromosomes is longer than usual due to connected chromosome from the 21 pair"; such question is incorrect, because after fusion of two chromosomes total chromosome number must be 45. In the book "*Collection of tasks...*", this question (question No. 103) has correct phrase "due to joining a part of chromosome of the 21 pair"; such correct question was present during exam in 2016 (in Russian).

Another variant of incorrect answer:

- Aneuploidy

40. In the histologic preparation stained by iron hematoxylin, a cell resembling dumbbells is presented; spiral chromosomes are visible in its poles. In what phase of cell cycle there is a cell?

- Anaphase
- Metaphase
- Prophase
- Telophase
- Interphase

Correct answer:

- Telophase

41. Process of synthesis of ATP in human cells was sharply increased during physical activity; this process occurs in:

- lysosomes
- mitochondria
- Golgi complex
- chromosomes
- ribosomes

Correct answer:

- mitochondria

42. After influence of a mutagen, the number of chromosomes in a metaphase plate of a man was revealed to be less than normal on three chromosomes. The specified mutation belongs to:

- polyploidy
- translocation
- inversion
- polyteny
- aneuploidy

Correct answer:

- aneuploidy

43. Specific cellular proteins are continuously synthesized in growing tissues of human body. This process happens due to work of:

- lysosomes
- ribosomes
- cell center
- smooth ER
- nucleolus

Correct answer:

- ribosomes

44. A cell of an ovary is in the S period of interphase. At this time such event occurs:

- spiralization of chromosomes
- DNA replication
- ATP accumulation
- division of chromosomes
- synthesis of nuclear membrane

Correct answer:

- DNA replication

45. Oogenesis is divided into three periods: reproduction, growth and maturing. Cells that entered growth period are called:

- oogonia
- primary oocytes
- ovum
- secondary oocytes
- primary polocytes

Correct answer:

- primary oocytes

46. A cell was affected by a substance which broke the integrity of lysosome membranes. What can happen with a cell as a result?

- Specialization
- Differentiation
- Reproduction
- Transformation
- Autolysis

Correct answer:

- Autolysis

47. To diagnose human chromosomal disorders in order to analyse the karyotype, a cell culture is influenced by colchicine – a substance which destroys a spindle of division. At what mitotic stage is the karyotype studied?

- Telophase
- Interphase
- Prophase
- Metaphase
- Anaphase

Correct answer:

- Metaphase

48. Mitosis is the basic mechanism of a cell that provides the development of organisms, their regeneration and reproduction. It is possible because this mechanism is responsible for:

- Formation of polyploid cells
- Crossing-over
- Equal distribution of chromosomes between daughter cells
- Irregular distribution of chromosomes between daughter cells
- Change of genetic information

Correct answer:

- Equal distribution of chromosomes between daughter cells

Note.

In the book *"Collection of tasks..."*, incorrect term "divergency" is used ("equal divergency", "irregular divergency").

49. Transcription in a cell occurs in euchromatin sites. What changes in cytoplasm of cells appear in the case of increase in amount of euchromatin?

- Number of polysomes decreases
- Part of agranular endoplasmic reticulum increases
- Activity of a cell center decreases
- Number of ribosomes increases
- Activity of lysosomes increases

Correct answer:

- Number of ribosomes increases

50. A patient has an acute pancreatitis which can develop into pancreas autolysis. Dysfunction of what organelles can cause this pathology?

- Lysosomes
- Mitochondria
- Ribosomes
- Centrioles
- Microtubules

Correct answer:

- Lysosomes

51. In course of practical training students studied a stained blood smear of a mouse with bacteria phagocytosed by leukocytes. What cell organella completes digestion of these bacteria?

- Ribosomes
- Lysosomes
- Granular endoplasmic reticulum
- Golgi apparatus
- Mitochondrions

Correct answer:

- Lysosomes

52. Studying highly condensed chromosomes of the dividing cell is carried out. At what stage of mitotic cycle process of cell division was interrupted for this purpose?

- Interphase
- Anaphase
- Telophase
- Metaphase
- Prophase

Correct answer:

- Metaphase

53. During cell cycle, chromosomes can be both one-chromatid and two-chromatid. In the dividing cell, one-chromatid chromosomes are revealed. In this case, such phase of cell cycle was studied:

- interphase – the post-synthetic period
- metaphase
- anaphase
- prometaphase
- prophase

Correct answer:

- anaphase

54. Human cell is studied under a microscope during anaphase of mitosis. At this stage under sufficient magnification, it is possible to see:

- conjugation of chromatids
- formation of tetrads
- spiralization of chromosomes
- disjunction of chromatids
- despiralization of chromosomes

Correct answer:

- disjunction of chromatids

55. A zone of reproduction of woman's sex gland is analyzed. In this zone, cells divide by:

- meiosis
- schizogony
- oogamy
- mitosis
- amitosis

Correct answer:

- mitosis

56. During the postsynthetic period of mitotic cycle, synthesis of proteins – tubulins, which take part in the mitotic spindle formation, was destroyed. It can cause the impairment of:

- duration of mitosis
- spiralization of chromosomes
- despiralization of chromosomes
- chromosome's separation
- cytokinesis

Correct answer:

- chromosome's separation

Note.

Another possible variant of correct answer is "disjunction of daughter chromosomes". In the book "*Collection of tasks...*", incorrect term "divergence" is used ("divergence of daughter chromosomes").

Another variant of correct answer:

- Formation of spindle

Other variants of incorrect answers:

- Formation of ribosome subunits
- Formation of nucleolus

57. On practical class in cell biology, students studied plasma membrane. In the electronic photo of a cell, macromolecules that bind specific receptors on its surface are noticeable. In what way they enter a cell?

- Through ionic channels
- Due to endocytosis
- By means of protein transmitters which move like revolving doors
- By passive transport
- Due to work of sodium-potassium pump

Correct answer:

- Due to endocytosis

58. Scraping of mucous of a mouth was taken by a spatula for laboratory investigations. Analyse probable conditions of these cells:

- divide only mitotically
- only increase in sizes
- divide by meiosis and amitosis
- divide mitotically and by amitosis
- divide mitotically; polyteny is observed

Correct answer:

- divide mitotically and by amitosis

59. The study of female karyogram shows that a centromere of the X chromosome is placed near the centre. What do we call such chromosome?

- Telocentric
- Subacrocentric
- Submetacentric
- Acrocentric
- Metacentric

Correct answer:

- Submetacentric

Note.

The term "subacrocentric" is not used in the world.

60. Indicator of intensity of mutational process in human is the sister chromatid interchange – SCI. This process happens at a stage:

- interphase before meiosis
- prophase of mitosis
- metaphase of mitosis
- metaphase of the first meiotic division
- anaphase of the second meiotic division

Correct answer:

- prophase of mitosis

Note.

In a database of the Testing Center, the phrase "sister chromatid exchange – SCE" was used.

61. One of characteristics of a cell for anaphase of mitosis is $4n\ 4c$. It is caused by fact that in this phase such event occurs:

- association of sister chromatids
- formation of tetrads
- despiralization of chromosomes
- chromatid disjunction to the cell poles
- exchange of regions of sister chromatids

Correct answer:

- chromatid disjunction to the cell poles

62. Feature of meiosis in oogenesis is existence of a specific stage, which is absent in spermatogenesis. How this stage is called?

- Zygotene
- Leptotene
- Diplotene
- Pachytene
- Diactyotene

Correct answer:

- Dictyotene

63. What cell division leads to formation of diploid set of chromosomes?

- Meiosis
- Mitosis
- Amitosis
- Schizogony
- Endomitosis

Correct answer:

- Mitosis

64. After exposure to colchicine, the number of chromosomes in human metaphase plate was revealed to exceed the norm on twenty three chromosomes. This mutation is called:

- polyploidy
- aneuploidy
- polyteny
- inversion
- translocation

Correct answer:

- polyploidy

65. High-molecular compounds – proteins and carbohydrates – enter a cell by phagocytosis. Fermental systems of a cell split this material into low molecular compounds. They were used in further anabolic processes. A cell synthesized own compounds – proteoglycans – and excreted them in the form of the formed secret drops. What cell organelles were involved into into the operation at the final stage that takes part in formation of drops of secret?

- Lamellar Golgi complex
- Granular endoplasmic reticulum
- Lysosomes
- Free ribosomes of cytoplasm
- Smooth endoplasmic reticulum

Correct answer:

- Lamellar Golgi complex

66. Remember value of processes of mitosis and meiosis in life cycles of organisms reproducing by asexual and sexual was and specify, what of the statements formulated below is correct:

- gametes are always formed in the process of meiosis
- gametes are always haploid
- mitosis occurs in diploid cells only
- as a result of mitosis, diploid cells are always formed
- as a result of meiosis, only gametes are formed

Correct answer:

- gametes are always haploid

67. In the first half of the XX century, many authors described more intensively painted sites of polytene chromosomes, which alternated with poorly painted sites. Some researchers assumed that intensively painted sites contain genes. What are modern views on their function?

- They are genetically inert sites of chromosomes that contain spiral chromatin
- They are sites where transcription occurs
- They are sites of decondensed chromatin
- They are sites that are invisible in interphase under a light microscope
- They are genetically active sites

Correct answer:

- They are genetically inert sites of chromosomes that contain spiral chromatin

68. During examination of a cell structure, a globular monomembranous organelle, which contains hydrolytic enzymes, was found. This organelle is known to provide intracellular digestion and protective reactions of a cell. What organelle is it?

- Endoplasmic reticulum
- Centriole
- Lysosome
- Ribosome
- Mitochondrion

Correct answer:

- Lysosome

Note.

In the book "Collection of tasks...", another similar question is present: "In a cell a ball-shaped monomembranous organelle that contains hydrolytic enzymes has been studied. What organelle is it?"

69. Chromosomes of eukaryotic cells consist generally of chromatin – a complex of double-stranded DNA and five fractions of histone proteins forming nucleosomes. What histone stabilizes nucleosome structure?

- H2A
- H3
- H2B
- H1
- H4

Correct answer:

- H1

70. Human karyotype is studied when a cell is at metaphase. What do we call the substance that can stop cell division at this stage?

- Methanol
- Iodine
- Colchicine
- Potassium chloride
- Ethanol

Correct answer:

- Colchicine

71. During examination of pancreatic gland cells under an electronic microscope, an organelle has been found which consists of cisterns, canals, closets and is connected with plasmalemma. What organelle is it?

- Centriole
- Mitochondrion
- Endoplasmic reticulum
- Lysosome
- Peroxisome

Correct answer:

- Endoplasmic reticulum

72. In one of phases of spermatogenesis, changes of a nucleus and cytoplasm of spermatids causing formation of mature sex cells are observed. Name the gametogenesis phase:

- proliferation
- maturing
- growth
- reproduction
- formation

Correct answer:

- formation

73. Microfilaments and microtubules are known to include tubulin proteins, which take part in the formation of the division spindle. In what period of the mitotic cycle are tubulin proteins synthesized?

- Postmitotic period of interphase
- Mitosis
- Synthesis period (S) of interphase
- Postsynthesis period (G_2) of interphase
- Presynthesis period (G_1) of interphase

Correct answer:

- Postsynthesis period (G_2) of interphase

74. There is an organelle near a nucleus which consists of two cylinders built of microtubules. Cylinders are situated perpendicularly to each other. The organelle is a component of the mitotic spindle of division in animal cells. What organelle is this?

- Mitochondrion
- Ribosome
- Endoplasmic reticulum
- Centrosome
- Lysosome

Correct answer:

- Centrosome

Note.

There is a mistake in this question in the book "*Collection of tasks...*" – the term "centriole" is used in this book instead of "centrosome". But structure that contains a pair of cylinders (i. e. a pair of centrioles) is called a **centrosome**.

75. An intensive aerobic process of energy formation and accumulation in the form of high energy ATP bonds takes place in the cells of muscular tissue. In which organelle does this process occur?

- In the peroxisome
- In the endoplasmic reticulum
- In the lysosome
- In the mitochondrion
- In the centriole

Correct answer:

- In the mitochondrion

76. Nuclei of cells were affected by a substance which destroyed the histone structure. What components of the cells will change as a result of this intervention in the first place?

- Mitochondria
- Nuclear membrane
- Ribosomes
- Chromosomes
- Cell membranes

Correct answer:

- Chromosomes

77. During an experiment, a culture of cells divided by mitosis was influenced by substance which destroyed the spindle of division. Which substance was used in the experiment?

- Penicillin
- Colchicine
- Histamine
- Methanol
- Iodine

Correct answer:

- Colchicine

78. It is known that the growing old epithelial cells die. What cell organoids provide their digestion and removal in an internal?

- Ribosomes
- Mitochondria
- Plastids
- Lysosomes
- Golgi complex

Correct answer:

- Lysosomes

79. Enlargement of thyroid gland was revealed in an 18-year-old student. He had the raised metabolism and the increased pulse rate. These signs are observed in the case of hypersecretion of thyroxin hormone. What organelles of cells of thyroid gland are responsible for secretion and release of hormones most of all?

- Golgi complex
- Mitochondria
- Ribosomes
- Centrosomes
- Lysosomes

Correct answer:

- Golgi complex

80. During preparation to the final round of the Ukrainian competition in biology, members of a study group argued concerning the term cybrids. Find correct answer and solve their dispute:

- degree of mutability of a genome
- fused eukaryotic cells, cellular hybrids
- cells which are transformed by foreign DNA
- hybrids that are received as a result of crossing
- hybrids of species of citrus plant

Correct answer:

- fused eukaryotic cells, cellular hybrids

81. Karyotyping of healthy man cells is carried out. A small acrocentric odd chromosome was found in the karyotype. What chromosome is it?

- Group A chromosome
- Group B chromosome
- X chromosome
- Y chromosome
- Group C chromosome

Correct answer:

- Y chromosome

82. What process in a cell provides constancy of chromosome number?

- Amitosis
- Mitosis
- Endomitosis
- Meiosis
- Polyteny

Correct answer:

- Mitosis

83. In one of cell organoids, completion of the creation of protein molecule and formation of a complex of protein molecules with carbohydrates and fats occur. What is the organoid?

- Endoplasmic reticulum
- Lysosomes
- Golgi complex
- Ribosomes
- Mitochondria

Correct answer:

- Golgi complex

84. Number of what structures is increased in polytene chromosomes?

- Chromatids
- Microfibrils
- Chromonemata
- Neurofibrilla
- Myofibrils

Correct answer:

- Chromonemata

85. Influenced by some chemical substances, the process of ribosome subunits formation has been impaired in a cell. In consequence this will stop the synthesis of:

- carbohydrates
- proteins
- lipids
- DNA
- RNA

Correct answer:

- proteins

86. In one of meiosis phases in a man, nuclei containing 23 chromosomes with diploid set of DNA are formed. How this phase of meiosis is called?

- Telophase I
- Interphase
- Anaphase I
- Telophase II
- Metaphase II

Correct answer:

- Telophase I

87. It is known that cell cycle consists of several consecutive transformations in a cell. On one of stages there are processes preparing DNA synthesis (the content of RNA and protein increases). During what period of cell life it occurs?

- Synthetic
- Mitotic
- G₁ (pre-synthetic)
- Premitotic
- Post-synthetic

Correct answer:

- G₁ (pre-synthetic)

88. Organoids are constant differentiated cytoplasm regions, which have certain structure and functions: endoplasmic reticulum, ribosomes, lysosomes, mitochondria, lamellar complex, cell center, microtubules, and plastids. What cellular components are discovered by means of an electronic microscope?

- Nucleus
- Lamellar Golgi complex
- Lysosomes
- Hyaloplasm, endoplasmic reticulum, ribosomes
- Mitochondria

Correct answer:

- Hyaloplasm, endoplasmic reticulum, ribosomes

89. Cytogenetic investigations showed that each chromosome is differentiated on two types of sites, different in coloring. Sites which are poorly painted by nuclear dyes, received the name:

- kinetochores
- centromere
- heterochromatin
- nucleolar organizer
- euchromatin

Correct answer:

- euchromatin

90. Mitochondria are two-membrane organoids; lysosomes and Golgi complex are one-membrane organoids. What organoids of a cell have no membrane?

- Lysosomes, mitochondria
- Ribosomes, centrosome
- Peroxisomes, ribosomes
- Golgi complex
- Plastids

Correct answer:

- Ribosomes, centrosome

91. Under influence of colchicine solution on the cell culture, a large number of metaphase plates appears; it indicates stopping of mitosis at a metaphase stage. What organoid is exposed to destruction and does not carry out its function during mitosis?

- Golgi apparatus
- Lysosomes
- Mitochondria
- Microtubules
- Endoplasmic reticulum

Correct answer:

- Microtubules

92. During the whole life of a human, in some adult cells mitosis is not observed, and the quantity of DNA stays permanent. What do we call these cells?

- Neurons
- Hepatocytes
- Eye cornea epitheliocytes
- Red bone marrow cells
- Germinal epithelium

Correct answer:

- Neurons

93. Under the influence of gamma-radiation a fragment of a chromosome was lost. What chromosomal mutation is it?

- Deletion
- Duplication
- Inversion
- Intrachromosomal translocation
- Interchromosomal translocation

Correct answer:

- Deletion

94. Protein and ribosomal RNA (RNP, ribonucleoprotein) are a part of ribosomes. Where subunits of ribosomes are formed?

- In mitochondria
- In Golgi complex
- On tubules of endoplasmic reticulum
- In a nucleolus
- In lysosomes

Correct answer:

- In a nucleolus

95. Prokaryotes are anucleate organisms, which have no typical nucleus and nuclear membrane. Genetic material is presented in them by one ring thread of DNA molecule. How genetic material of prokaryotes is called?

- Genophore
- Nucleus
- Virion
- Mycoplasma
- Nucleolus

Correct answer:

- Genophore

96. In the presynthesis period (G_1) of a cell cycle, DNA synthesis doesn't occur, therefore the number of DNA molecules is equal to the number of chromosomes. How many DNA molecules does any human somatic cell in the presynthesis period (G_1) have?

- 23
- 92
- 46
- 69
- 48

Correct answer:

- 46

97. A cell includes ball-shaped mono-membranous organelles that include proteolytic enzymes. Organelles size is 0.2–1 micrometers. Their formation is connected with Golgi apparatus. What organelles are these?

- Centrioles
- Ribosomes
- Plastids
- Mitochondria
- Lysosomes

Correct answer:

- Lysosomes

98. In cells capable to division, there are processes of growth, formation of organelles and their accumulation due to active synthesis of proteins, RNA, lipids, and carbohydrates. How the period of mitotic cycle in which such processes occur, but DNA is not synthesized, is called?

- G_1 (pre-synthetic)
- Synthetic
- Premitotic
- Telophase
- Anaphase

Correct answer:

- G₁ (pre-synthetic)

99. In a nucleus, there are non-constant structures that disappear at the beginning of cell division and appear again at the end of it. They include protein and RNA. They take part in the formation of ribosome subunits. What are these structures called?

- Nucleoli
- Nucleosomes
- Polysomes
- Microfibrils
- Microtubules

Correct answer:

- Nucleoli

100. Large cells with paired homologous chromosomes and points of crossing-over in some of these chromosomes were found in a sample of ovary tissue. In what period of gametogenesis these cells are?

- Differentiation
- Maturing
- Growth
- Reproduction
- Formation

Correct answer:

- Maturing

101. Chromosomes are pair structures in all species. Such set of chromosomes is called diploid. How the diploid set of chromosomes of a cell is called?

- Locus
- Genome
- Idiogram
- Karyotype
- Genotype

Correct answer:

- Karyotype

102. During a cell cycle, regular changes in the amount of genetic material occurs. How is the period, when DNA doubles, called?

- Anaphase
- Prophase
- Metaphase
- Interphase
- Telophase

Correct answer:

- Interphase

Note.

During exam in 2017, such question was used: "In the life cycle of a cell during mitosis a natural change in the amount of genetic material occurs. The DNA doubles at the following stage:", but interphase is NOT a part of mitosis.

103. On the preparation painted by hematoxylin and eosin, dark blue grains and clots of chromatin are visible in the nucleus. In what phase of cellular cycle the nucleus is?

- Interphase
- Prophase
- Metaphase
- Anaphase
- Telophase

Correct answer:

- Interphase

104. During anaphase, chromosomes (each containing one chromatid) are placed on the poles of a cell. How many chromosomes does the cell have during anaphase?

- 96
- 46
- 23
- 69
- 92

Correct answer:

- 92

Note.

There is a mistake in this question in the book "*Collection of tasks...*" – incorrect word combination "monochromatic chromosomes" is used in this book. We propose to write that chromosomes contain one chromatid.

105. In intensively functioning cells (for example, of liver), the increase in chromosome number is often observed. What process happens in a cell?

- Endomitosis
- Polyteny
- Amitosis
- Mitosis
- Meiosis

Correct answer:

- Endomitosis

106. There is an organelle in human cells. Functions of this organelle are the formation of lysosomes, secretion of glycoproteins, carbohydrates, lipids, and the formation of yolk granules during the oocytes maturation. What is this organelle called?

- Lysosome
- Endoplasmic reticulum
- Golgi apparatus
- Peroxisome
- Ribosome

Correct answer:

- Golgi apparatus

107. The second division of meiosis resembles mitosis very much. But there are some differences. In what features metaphase of mitosis differs from metaphase of the second division of meiosis in a man?

- Additional DNA synthesis occurs in metaphase of meiosis
- Chromosomes move to opposite poles in metaphase of meiosis, and chromatids move in metaphase of mitosis
- Additional DNA synthesis occurs in metaphase of mitosis
- There are 46 chromosomes in the metaphase plate of the second division of meiosis, and there are 23 chromosomes in the metaphase plate of mitosis
- There are 23 chromosomes in the metaphase plate of the second division of meiosis, and there are 46 chromosomes in a metaphase plate of mitosis

Correct answer:

- There are 23 chromosomes in the metaphase plate of the second division of meiosis, and there are 46 chromosomes in a metaphase plate of mitosis.

108. Secretion of glycoprotein mucin that forms mucus is reduced in a patient. Disturbance of functions of what organoids can cause this phenomenon?

- Endoplasmic reticulum (ER)
- Lysosomes
- Mitochondria
- Golgi complex
- Nuclei

Correct answer:

- Golgi complex

109. Among microorganisms, prokaryotes and eukaryotes differ in features of cellular structure. What microorganisms among mentioned below are prokaryotes?

- Protozoans
- Viruses
- Bacteria
- Mushrooms
- Prions

Correct answer:

- Bacteria

110. Long cylinders with diameter about 24 nanometers are present in animal cells. They are formed from dimers of protein tubulin and play an important role in maintenance of a certain form of the whole cell and its organoids, and also take part in transport of macromolecules and organelles. They provide chromosome disjunction during cell division. Define these organelles:

- plastids
- microtubules
- mitochondria
- microfilaments
- endoplasmic reticulum

Correct answer:

- microtubules

111. In a medical genetic center, a doctor applied a method of differential painting according to Giemsa for identification of chromosomes of each pair; then all chromosomes got specific alternation of light and dark bands. Graphic representation of chromosomes taking into account their form and coloring has the name:

- ideogram
- genotype
- gene pool
- karyotype
- genome

Correct answer:

- ideogram

112. Moving of daughter chromatids to the poles of a cell is observed in the mitotically dividing cell. At what stage of the mitotic cycle is this cell?

- Telophase
- Anaphase
- Prophase
- Metaphase
- Interphase

Correct answer:

- Anaphase

Note.

In the book "Collection of tasks...", this question is written as follows: *During the mitotic division in a cell we can observe the separation of chromatids towards the opposite poles. What stage of the cell cycle takes place in the cell?*

113. Different cellular organelles are characterized by an unequal set of enzymes that is associated with specificity of the functions, which are carried out by them. What organelle contains digestive enzymes only?

- Lamellar complex
- Mitochondrion
- Lysosome
- Endoplasmic reticulum
- Ribosome

Correct answer:

- Lysosome

114. At some diseases, changes that are followed by damages of integrity of membranes of lysosomes occur in cells. What changes will happen in cells?

- Process of mitosis will be broken
- Process of translation will be broken
- Damage of the process of transcription will occur
- Autolysis will occur
- Accumulation of substances by cell will occur

Correct answer:

- Autolysis will occur

115. Three new mutant genes appeared in an oocyte I. Name the maximum number of zygotes which can receive these genes:

- one
- two
- three
- four
- none

Correct answer:

- one

116. A patient with poisoning got to a clinic. It is established that detoxication mechanisms are disturbed in his organism. With change of functions of what listed organoids this defect is associated?

- Endoplasmic reticulum (ER)
- Golgi complex
- Lysosomes
- Mitochondria
- Nucleus

Correct answer:

- Endoplasmic reticulum (ER)

117. Destruction of mitochondria was revealed in a cell at investigation of the diffraction pattern. What process in a cell can be broken thereof?

- Nuclear division
- Crossing-over
- Photosynthesis
- Synthesis of carbohydrates
- Oxidation of organic substances

Correct answer:

- Oxidation of organic substances

118. Four phases are distinguished in mitosis. In what phase human cell has 92 chromosomes, each of them containing one chromatid?

- Interphase
- Prophase
- Metaphase
- Anaphase
- Telophase

Correct answer:

- Anaphase

119. The number of cells, which entered a phase of DNA synthesis of a mitotic cycle within a day, was 20% less, than the number of cells that entered the previous mitosis. Where cells got to?

- Remained in mitosis
- Died in the process of apoptosis
- Remained in the G_1 period or entered G_0 phase
- Entered G_2 phase
- Were lost owing to necrosis

Correct answer:

- Remained in the G_1 period or entered G_0 phase

120. Name organoids that are present in cells of bacteria:

- mitochondria
- chloroplasts
- digestive vacuoles
- ribosomes
- nucleus

Correct answer:

- ribosomes

121. Glycogen and proteins are actively synthesized in cells of healthy liver. What types of organelles are well developed?

- Cell center
- Granular and agranular ER
- Lysosomes
- Golgi complex
- Peroxisomes

Correct answer:

- Granular and agranular ER

122. By means of electronic microscopy, it is recorded that the surface of the majority of cells forms numerous microscopic outgrowths of cytoplasm. What process actively happens in these cells?

- Protein biosynthesis
- Biological oxidation
- Phagocytosis
- Diffusion
- ATP synthesis

Correct answer:

- Phagocytosis

123. Somatic cells of a man are diploid ($2n$ chromosomes). Nevertheless, polyploid cells of red marrow (megakaryocytes) can have up to $64n$ chromosomes. What is the mechanism of their appearance?

- Amitosis
- Endomitosis
- Mitosis
- Meiosis
- Polyteny

Correct answer:

- Endomitosis

124. There are cellular and noncellular forms of life. What of the forms, which are listed below, belong to the noncellular forms?

- Viruses
- Bacteria
- Blue-green algae
- Mycoplasmas
- Protozoans

Correct answer:

- Viruses

125. Colchicine, which blocks "assembling" of proteins of achromatinic spindle, influenced a cell. What stage of mitotic cycle will be broken?

- Anaphase
- Prophase
- Cytokinesis
- G₁ period of interphase
- G₂ period of interphase

Correct answer:

- Anaphase

126. Decrease in level of albumine and fibrinogen was revealed in the patient's blood. Decrease of the activity of what organelles of hepatocytes most possibly causes this phenomenon?

- Lysosomes
- Granular ER
- Mitochondria
- Agranular ER
- Golgi complex

Correct answer:

- Granular ER

127. Synthesis of histone proteins is artificially blocked in a cell. What cell structure will be damaged as a result?

- Nucleolus
- Nuclear chromatin
- Golgi apparatus
- Cellular envelope
- Nuclear envelope

Correct answer:

- Nuclear chromatin

128. During inspection of a girl's karyotype, a shortened arm of the 20th pair chromosome was found. What do we call this mutation?

- Duplication
- Deletion
- Inversion
- Translocation
- Monosomy 20

Correct answer:

- Deletion

129. Cells of human liver and kidneys contain numerous organelles of 0.1–1.5 microns in size which are surrounded by one membrane and filled with enzymes providing H_2O_2 -dependent breath and biosynthesis of bilious acids. How these organelles are called?

- Peroxisomes
- Lysosomes
- Ribosomes
- Digestive vacuoles
- Golgi apparatus

Correct answer:

- Peroxisomes

130. During studying a karyotype of an aborted embryo, it was revealed that one of the chromosomes of the number 1 has one arm and terminal placement of a centromere. How such type of a chromosome is called?

- Acrocentric
- Submetacentric
- Telocentric
- Metacentric
- Isochromosome

Correct answer:

- Telocentric

131. When students studied structures of a cell, there was such question: "What are biological membranes in their structure?"

- Bimolecular protein layer
- Bimolecular lipidic layer with protein components
- Bimolecular lipidic layer
- Monomolecular lipidic layer
- Bimolecular protein layer with lipidic components

Correct answer:

- Bimolecular lipidic layer with protein components

132. Cell cycle is known to consist of several subsequent stages. At one of the stages, DNA synthesis happens. What do we call this period of the cell cycle?

- Presynthesis period (G_1) of interphase
- Synthesis period (S) of interphase
- Mitosis
- Premitotic period of interphase
- Postsynthesis period (G_2) of interphase

Correct answer:

- Synthesis period (S) of interphase

133. At what variant of a karyotype one Barr body is determined in nuclei of somatic cells?

- 45, XO
- 46, XY
- 47, XY, 21+
- 48, XXXY
- 47, XX, 15+

Correct answer:

- 47, XX, 15+

134. The tumor of a uterus was removed in a 60-year-old woman. At investigation of tumor cells, multipolar mitoses with chromosome disjunction to many poles were found. What organelles were damaged?

- Secondary lysosomes
- Centrosomes
- Peroxisomes
- Ribosomes
- Rough ER

Correct answer:

- Centrosomes

135. During preparation of a metaphase plate, a doctor who is cytogenetics treated the culture of leukocytes with hypotonic (0.56%) solution of potassium chloride. After such treatment, swelling of cells and a rupture of a cellular membrane occurred due to water inflow to a cell. What mechanism of transport takes place in this case?

- Phagocytosis
- Pinocytosis
- Diffusion
- Endosmosis
- Facilitated diffusion

Correct answer:

- Endosmosis

136. Autolysis occurred in a cell owing to damage of integrity and functions of membranes. What organoids were damaged?

- Lysosomes
- Nucleus
- Mitochondria
- Endoplasmic reticulum
- Golgi apparatus

Correct answer:

- Lysosomes

137. The mature viral part consists of fibrous envelope and nucleocapsid in which genetic material is concentrated. What name the mature part of a virus has?

- Prokaryote
- Virion
- Genophore
- Nucleoid
- Phage

Correct answer:

- Virion

138. Diseases, which are associated with accumulation of carbohydrates, lipids etc. in cells, often are present in a man. The reason of developing of these hereditary diseases is lack of the appropriate enzymes in:

- lysosomes
- mitochondria
- endoplasmic reticulum
- Golgi apparatus
- nucleus

Correct answer:

- lysosomes

139. Amitosis is a direct nuclear fission of a cell at which the interphase condition of the nucleus remains, nucleoli and nuclear membrane are well noticeable. During amitosis, chromosomes do not visible, and their uniform distribution is not occurred. As a result of amitosis, genetically different cells are formed. In what human cells amitosis is the normal phenomenon?

- Blastomeres
- Spermatogonia
- Oocytes
- Cells of skin epithelium
- Gametes

Correct answer:

- Cells of skin epithelium

140. Mitotic division of cells of epithelium of oral cavity is studied. It has been established that a cell contains a diploid set of chromosomes. Each chromosome consists of two most spiralized chromatids. Chromosomes are located in the plane of the cell's equator. This picture is characteristic for such stage of mitosis:

- prophase
- telophase
- metaphase
- anaphase
- prometaphase

Correct answer:

- metaphase

141. Under the influence of gamma-radiation a fragment of a chromosome has turned by 180° . What chromosomal mutation has taken place?

- Duplication
- Deletion
- Inversion
- Intrachromosomal translocation
- Interchromosomal translocation

Correct answer:

- Inversion

142. Animal cells are capable to active movements, for example, to the ameboid movements. What structures of a cell provide such mobility of cells?

- Cytoplasm microtubules
- Intermediate microfilaments
- Actin microfilaments
- Cell center and microtubules of a spindle of division
- Myofibrils

Correct answer:

- Actin microfilaments

143. At a certain stage of cell cycle, homologous chromosomes reach cell poles, undergo despiralization; nuclear membranes are being formed around them, nucleoli are restored. At what phase of mitosis the cell is?

- Metaphase
- Anaphase
- Prometaphase
- Telophase
- Prophase

Correct answer:

- Telophase

144. Examination of a patient with hepatolenticular degeneration revealed that synthesis of ceruloplasmin protein has a defect. What organelles is this defect connected with?

- Agranular endoplasmic reticulum
- Mitochondrions
- Golgi complex
- Granular endoplasmic reticulum
- Lysosomes

Correct answer:

- Granular endoplasmic reticulum

145. In a medical genetic center when studying the metaphase plate of a sick child, a circular chromosome was revealed; it was formed due to connection of end sites of the 16th autosome. Damage of what structure of a chromosome became the reason of this anomaly?

- Long arm
- Short arm
- Centromeres
- Telomeric region
- Secondary constriction

Correct answer:

- Telomeric region

146. Action of electromagnetic radiation on epithelial cells of intestines and kidneys was studied in radiological laboratory. What of the listed conditions cells will be the most sensitive to this damaging factor in?

- Specific work of cells
- Pinocytosis
- Excretion
- Mitosis
- Phagocytosis

Correct answer:

- Mitosis

147. Organoids, which have no membranous structure and consist of two particles of different size, are present in cells of all organisms. They have microscopic sizes and carry out function of protein synthesis. How these organoids are called?

- Ribosomes
- Lysosomes
- Leukocytes
- Chromosomes
- Mitochondria

Correct answer:

- Ribosomes

148. Malarial plasmodium has a set of chromosomes $1n = 12$, its cells propagate in human body by schizogony. The number of chromosomes in a nucleus of plasmodium, which reproduces in cells of human liver, will make:

- 12
- 24
- 36
- 60
- 72

Correct answer:

- 12

149. Small cells are found in a sample of tissue of embryonic ovary. Some of them divide mitotically. What stage of oogenesis is observed?

- Formation
- Growth
- Maturing
- Multiplication
- Differentiation

Correct answer:

- Multiplication

150. Colchicine (the substance isolated from the plant *Colchicum* L.) stops process of mitosis. What exactly in the mechanism of mitosis is broken by colchicine?

- Division of centrioles of a centrosome
- Formation of mitotic spindle
- Dissolution of a nuclear membrane
- Doubling of chromosomes
- Cytoplasm division

Correct answer:

- Formation of mitotic spindle

151. A tissue sample of benign tumor was studied under the electron microscope. A lot of small (15–20 nm) spherical bodies, consisting of two unequal subunits were detected. These are:

- microtubules
- Golgi complex
- mitochondria
- ribosomes
- smooth endoplasmic reticulum

Correct answer:

- ribosomes

152. A culture of tumor cells shows fast cellular division by direct cleavage of a nucleus. Formation of threads of a spindle and condensation of chromatin are not revealed. How this type of cell division is called?

- Cytokinesis
- Karyokinesis
- Amitotic division
- Mitosis
- Endomitosis

Correct answer:

- Amitotic division

153. At the laboratory experiment, a leukocyte culture was mixed with staphylococci. Neutrophile leukocytes engulfed and digested bacterial cells. This process is termed:

- facilitated diffusion
- diffusion
- osmosis
- phagocytosis
- pinocytosis

Correct answer:

- phagocytosis

154. Granular endoplasmic reticulum and Golgi apparatus are well developed in some cells. What main function is carried out by these cells?

- Protein secretion
- Phagocytosis and digestion of engulfed particles
- Energy development
- Transfer of nervous stimulation
- Production of protein

Correct answer:

- Protein secretion

155. Golgi complex exports substances from a cell due to the fusion of the membrane saccule with the cell membrane. The saccule contents flows out. What process is it?

- Active transport
- All answers are false
- Facilitated diffusion
- Exocytosis
- Endocytosis

Correct answer:

- Exocytosis

156. Life cycle of a cell includes the process of DNA autoreduplication. As a result of this process, monochromatid chromosomes become bichromatid. This phenomenon is observed within the following period of the cell cycle:

- G_1
- G_2
- S
- G_0
- M

Correct answer:

- S

157. On an electron micrograph a scientist has identified a structure formed by eight histone proteins and a part of DNA molecule which makes about 1.75 revolutions around the molecules. Which structure has been identified?

- Chromosome
- Elementary fibril
- Nucleosome
- Chromatid
- Half-chromatid

Correct answer:

- Nucleosome

158. While studying maximally spiralized chromosomes of human karyotype, the process of cell division was stopped in the following phase:

- prophase
- anaphase
- interphase
- metaphase
- telophase

Correct answer:

- metaphase

Note.

In the book "Collection of tasks...", this question is written as follows: *During the cell division we can see the maximum amount of condensed chromosomes. At what stage of the cell cycle is the process of the cell division stopped?*

159. A cell at the stage of mitotic anaphase was treated by colchicine that inhibits chromosome separation to the poles. What type of mutation will be caused?

- Duplication
- Inversion
- Translocation
- Polyploidy
- Deletion

Correct answer:

- Polyploidy

Note.

In the exam booklet, the phrase "A cell... was stimulated by colchicine..." was used. But colchicine does not stimulate cellular processes!

160. Normal actively dividing cells of human red bone marrow are analyzed. What number of cell's chromosomes is typical for G_1 period?

- 46
- 48
- 23
- 45
- 47

Correct answer:

- 46

161. It is established that toxic effect of cyanides is shown in inhibition of cellular respiration. What organoid of a cell is sensitive to these poisons?

- Ribosomes
- Mitochondria
- Cell center
- Golgi complex
- Lysosomes

Correct answer:

- Mitochondria

162. Human karyotype is studied at metaphase stage of mitosis. At this stage it is possible to see, under appropriate magnification, that each chromosome consists of such number of chromatids:

- one
- two
- three
- four
- eight

Correct answer:

- two

163. One of two centrioles of a centrosome (cell center) was withdrawn from hepatocyte (liver cell) by means of the micromanipulator. What process will not take place in this cell?

- Division
- Energy metabolism
- Synthesis of glycogen
- Biosynthesis of proteins
- Synthesis of lipids

Correct answer:

- Division

164. In the electronic microphoto of a cell, a scientist revealed supramolecular structure – glycosyl groups of glycocalix, which have an appearance of the short chains that are closely bound with membrane proteins and lipids. What function is carried out by these structures?

- Structural
- Transport
- Receptor
- Barrier
- Enzymatic

Correct answer:

- Receptor

165. Eukaryotic cells contain membrane organelles, which are formed in Golgi complex and have enzymes for destruction of hydrogen peroxide that is formed during oxidation of some organic substances. What other important function is carried out by these organelles?

- Synthesis of complex carbohydrates
- Formation of ATP
- Synthesis of polypeptides
- Proteolysis
- Oxidation of fatty acids

Correct answer:

- Oxidation of fatty acids

166. Signal molecules – protein receptors – are located on plasmatic membranes of cells. They bind molecules and initiate the answer. How receptors, which perceive neurotransmitters, work?

- Strengthen passive diffusion
- Assist formation of open channels in membranes
- Strengthen active diffusion
- Activate pinocytosis
- Slow down transport of substances

Correct answer:

- Assist formation of open channels in membranes

167. Specific membrane bubbles were formed in a cell after absorption of dissolved substances. How this type of transport of molecules through a membrane is called?

- Phagocytosis
- Pinocytosis
- Diffusion
- Facilitated diffusion
- Exocytosis

Correct answer:

- Pinocytosis

168. Each species of organisms has certain constant number of chromosomes. The mechanism, which maintains this constancy during asexual reproduction, is:

- meiosis
- reduplication
- mitosis
- repair
- transcription

Correct answer:

- mitosis

169. It is possible to see bacteria and leukocytes in the cytoplasm of mouth amoeba at different stages of digestion. How absorption of solid particles by a cell is called?

- Pinocytosis
- Osmosis
- Exocytosis
- Diffusion
- Phagocytosis

Correct answer:

- Phagocytosis

170. During formation of teeth, cell fission of a nipple of human epidermis occurs. Thus new cells with identical number of chromosomes and equivalent volume of genetic information are formed. These cells divide by:

- amitotic division
- endomitosis
- schizogony
- mitosis
- meiosis

Correct answer:

- mitosis

171. How fibers of intestines absorb amino acids as products of proteolysis?

- By means of transport proteins
- By phagocytosis
- By pinocytosis
- By means of diffusion (on a concentration gradient)
- By means of osmosis

Correct answer:

- By means of transport proteins

172. In a laboratory, a group of researchers experimentally received mutant cells without nucleoli. Synthesis of what compounds will be broken in them first of all?

- Polysaccharides
- Lipids
- Transport RNA
- Monosaccharides
- Ribosomal RNA

Correct answer:

- Ribosomal RNA

173. The system of intracellular tubules and tanks, which is divided on rough and smooth, is revealed in eukaryotic cell under electronic microscope. It provides isolation of fermental systems and is necessary for their subsequent involvement in the coordinated reactions. What organelles are continuations of this system and directly depend on its functioning because convert the substances synthesized in it into more complex compounds?

- Golgi complex
- Mitochondria
- Microtubules
- Centrosome
- Lysosomes

Correct answer:

- Golgi complex

174. In what sequence the following processes happen during mitosis in animals and plants: 1. Nuclear envelope destroys. 2. Chromosomes move to the middle part of a cell (equator). 3. Microtubules attach to kinetochores. 4. Daughter chromosomes separate?

- 1, 2, 3, 4
- 2, 3, 1, 4
- 4, 3, 2, 1
- 1, 3, 2, 4
- 3, 1, 2, 4

Correct answer:

- 1, 3, 2, 4

175. When studying cells of a pancreas at the subcellular level, disturbances of functions of concentration, dehydration and compaction of products of intracellular secretion, and also of synthesis of polysaccharides, lipids, and enzymes are revealed. What organelles are responsible for these processes?

- Ribosomes
- Lysosomes
- Golgi complex
- Mitochondria
- Endoplasmic reticulum

Correct answer:

- Golgi complex

176. For studying heredity at the molecular level, parasitic forms, which can invade bacterial cell without causing its lysis during certain time, are used. They are often similar to tadpoles, consist of a head and a tail, they cannot be seen under light microscope. What forms of the organization of living things these parasites belong to?

- Plasmids
- Bacteriophages
- Cyanobacteria
- Protozoans
- Mycoplasmas

Correct answer:

- Bacteriophages

177. During investigation of culture of tissue of malignant tumor, cell fission that happened by formation of constriction of a nucleus without achromatinic apparatus was revealed; also nuclear envelope and nucleoli remained. What type of cell division occurred in the studied malignant tumor?

- Endomitosis
- Mitosis
- Amitotic division
- Polyteny
- Meiosis

Correct answer:

- Amitotic division

178. Substances are excreted from a cell as a result of connection of membrane structure of Golgi apparatus with a plasmatic membrane. Content of such structure is thrown out of cell borders. This process has the name:

- exocytosis
- osmosis
- endocytosis
- diffusion
- transport

Correct answer:

- exocytosis

179. Experimental studying a new medical preparation revealed its blocking effect on assembly of proteins tubulins, which are the basis of spindle in dividing cells. What stage of a cellular cycle is broken by this preparation?

- Synthetic period
- Telophase of mitosis
- Postmitotic period of interphase
- Premitotic period of interphase
- Anaphase of mitosis

Correct answer:

- Anaphase of mitosis

180. A cell underwent influence of the ionizing radiation at deficiency of vitamin E. It promoted the strengthened exit of hydrolytic enzymes into cytoplasm, and it has led to total destruction of intracellular structures. Define, what organelles of a cell are richest with hydrolytic enzymes, and autolysis occurs as result of destruction of their membranes.

- Endoplasmic network
- Lysosomes
- Golgi complex
- Microbodies
- Mitochondria

Correct answer:

- Lysosomes

181. Mutual attraction of chromosomes is called "conjugation" or "synapsis". Conjugation occurs very precisely. The ends of chromosomes or the whole chromosomes join at all the length. At what stage of the first prophase of meiosis conjugation occurs?

- Diakinesis
- Dietyotene
- Diplonema
- Zygonema
- Leptonema

Correct answer:

- Zygonema

182. Violations, which appear in mitosis, lead to formation of cells with different karyotypes that is one of mechanisms of somatic aneuploidy. What is the name of such mitosis?

- Abnormal
- Chromosomal
- Genomic
- Pathological
- Genic

Correct answer:

- Pathological

183. Example of what type of transport through a membrane is the H pump, which exerts hydrogen ions from a cell by means of ATP?

- Osmosis
- Passive transport
- Facilitated diffusion
- Exocytosis
- Active transport

Correct answer:

- Active transport

184. Spindle is formed during mitosis. What cellular structure takes the most active part in formation of a spindle?

- Nucleus
- Cytoskeleton
- Ribosomes
- Mitochondria
- Agranular ER

Correct answer:

- Cytoskeleton

185. During oögamy, one ovum ripens, grows, then the follicle bursts and the ovum (an oocyte of the II order) comes to uterine tubes. What number of chromosomes and DNA the ovum has at this time?

- $1n\ 1c$
- $2n\ 2c$
- $1n\ 2c$
- $2n\ 4c$
- $4n\ 4c$

Correct answer:

- $\ln 2c$

186. A mutagen influenced a cell and partially destroyed a spindle of division. The karyological analysis was carried out. Calculation of chromosomes in a metaphase plate showed existence of 49 chromosomes. How this mutation is called?

- Polyploidy
- Mosaicism
- Heteroploidy
- Triploidy
- Duplication

Correct answer:

- Heteroploidy

187. The important role in the process of protein biosynthesis belongs to the ribosomal RNA forming a structural skeleton of ribosomes. And where formation of ribosomal RNA occurs?

- In cytoplasm
- In nucleoli
- In mitochondria
- In lysosomes
- In a cell center

Correct answer:

- In nucleoli

188. Three periods are distinguished in interphase of cellular cycle. During S phase of cellular cycle occurs:

- meiosis
- cytokinesis
- mitosis
- DNA replication
- amitotic division

Correct answer:

- DNA replication

189. In experiment, a preparation destroying a spindle influenced on culture of mitotically dividing cells. It has led to damage of:

- postsynthetic period
- formations of a nuclear envelope
- doubling of chromatids
- despiralization of chromosomes
- chromosome disjunction to cell poles

Correct answer:

- chromosome disjunction to cell poles

190. Cells of human red marrow relating to a cellular complex that constantly renews are investigated. How these cells are formed in norm?

- By binary division
- By schizogony
- By mitosis
- By meiosis
- By amitotic division

Correct answer:

- By mitosis

191. Microscopic analysis of human heart cells revealed some oval organelles, their envelope being formed by two membranes: the external one is smooth, and the internal one forms cristae. Biochemical analysis determined the presence of ATP synthetase enzyme. What organelles were analysed?

- Mitochondria
- Lysosomes
- Ribosomes
- Endoplasmic reticulum
- Centrosomes

Correct answer:

- Mitochondria

Note.

In the book "Collection of tasks...", this question is written as follows: *The electronograms of the rat's liver cells demonstrate some bi-membraneous oval structures, the internal membrane of which forms cristae. What organelles are these?*

192. Cells with 44 and 48 chromosomes were found in culture of leukocytes of peripheral blood of liquidators of the Chernobyl accident that can indicate to disturbance of mitotic cycle at a stage:

- synthetic period of interphase
- prophase
- telophase
- anaphase
- G_1 period of an interphase

Correct answer:

- anaphase

193. Formation of subunits of ribosomes in a cell was broken experimentally (by influence of mutagenic factors). What metabolic process will be affected?

- Biosynthesis of carbohydrates
- ATP synthesis
- Protein biosynthesis
- Photosynthesis
- Biological oxidation

Correct answer:

- Protein biosynthesis

194. It was established that cells of organisms lack membrane organelles and their hereditary material has no nucleosome organization. What are the organisms?

- Eukaryotes
- Prokaryotes
- Viruses
- Protozoans
- Ascomycetes

Correct answer:

- Prokaryotes

195. At a meeting of student scientific circle, first-year students decided to investigate their karyotype by method of studying sex chromatin. What material is used most often for these investigations?

- Erythrocytes
- Skin epidermis
- Mouth epithelium
- Nervous cells
- Sex cells

Correct answer:

- Mouth epithelium

196. Buccal swab of the mucous of man's mouth was taken by a spatula for laboratory investigations. Probable ways of cell fission of this tissue:

- cells divide mitotically and by amitotic division
- cells divide only mitotically
- cells divide only by amitotic division
- cells divide by meiosis and amitotic division
- cells divide mitotically, and endomitosis is observed

Correct answer:

- cells divide mitotically and by amitotic division

197. During mitotic division of diploid somatic cell, it was influenced by colchicine. Mitosis was disturbed, and the uninuclear polyploid cell was formed. Mitosis was suspended at a stage:

- metaphase
- anaphase
- prophase
- telophase
- cytokinesis

Correct answer:

- metaphase

198. Increase in permeability of membranes of lysosomes is observed in a cell as a result of ionizing radiation or avitaminosis E. What consequences such pathology can lead to?

- Intensive synthesis of proteins
- Intensive synthesis of energy
- Restoration of cytoplasmatic membrane
- Partial or total destruction of a cell
- Formation of a spindle of division

Correct answer:

- Partial or total destruction of a cell

199. When carrying out scientific experiment, a researcher destroyed structure of one of parts of a cell that disturbed ability of a cell to division. What structure was destroyed most likely?

- Mitochondria
- Glycocalix
- Centrosome
- Microfibrils
- Golgi complex

Correct answer:

- Centrosome

200. Students study the stages of gametogenesis. They analyze a cell having haploid number of chromosomes, and each chromosome consists of two chromatids. Chromosomes are located in the equatorial plane of a cell. Such situation is typical for the following stage of meiosis:

- metaphase of the second division
- prophase of the first division
- anaphase of the first division
- metaphase of the first division
- anaphase of the second division

Correct answer:

- metaphase of the second division

201. The organisms to be identified have a nucleus surrounded by a nuclear membrane. Genetic material is concentrated predominantly in chromosomes that consist of DNA strands and protein molecules. These cells divide mitotically. Identify these organisms:

- bacteriophages
- viruses
- eukaryotes
- prokaryotes
- bacteria

Correct answer:

- eukaryotes

202. Long influence of toxicants on an organism led to considerable decrease in protein synthesis in hepatocytes. What organelles suffered from intoxication most of all?

- Golgi complex
- Mitochondria
- Microtubules
- Lysosomes
- Granular endoplasmic reticulum

Correct answer:

- Granular endoplasmic reticulum

203. Analysis of an electron diffraction pattern of a cell revealed mitochondrion destruction. This might result in abnormal course of the following cell process:

- nuclear division
- oxidation of organic substances
- crossing over
- cleavage
- protein hydrolysis

Correct answer:

- oxidation of organic substances

204. Cytogenetic analysis established that a patient had the 47, XYY karyotype. An extra chromosome in the karyotype has a centromere located very close to one of the chromosome ends so that one chromosomal arm is much shorter than the other one. Such a chromosome is called:

- acrocentric
- metacentric
- submetacentric
- telocentric
- submetacentric with a satellite

Correct answer:

- acrocentric

205. Recombination of genetic material is achieved via several mechanisms one of which is crossing over. At what stage of prophase of the first meiotic division it occurs?

- Leptonema
- Zygonema
- Diplonema
- Pachynema
- Diakinesis

Correct answer:

- Pachynema

206. During the period of presynthesis of mitotic cycle, synthesis of the enzyme DNA-dependent DNA polymerase in a cell was broken. What effects it can lead to?

- Disturbance of spindle formation
- Disturbance of cytokinesis
- Disturbance of DNA replication
- Reduction of duration of mitosis
- Disturbance of chromosome disjunction to poles

Correct answer:

- Disturbance of DNA replication

207. A chromosome, which has p and q arms with equal length, was revealed in female set of chromosomes. What morphological type does this chromosome belong to?

- Telocentric
- Submetacentric
- Subacrocentric
- Acrocentric
- Metacentric

Correct answer:

- Metacentric

Note.

The term "subacrocentric" is not used in the world.

208. What group of organisms has the ring and linear molecules of DNA creating chromosomes of a simple structure (having no histones)?

- Fungi
- Bacteriophages
- Viruses
- Protozoa
- Bacteria

Correct answer:

- Bacteria

Note.

The answer "viruses" is bad because bacteriophages (the previous answer) are viruses too.

209. Cells of human red marrow, which belong to a cellular complex that constantly divides, are investigated. What process provides genetic identity of these cells?

- Meiosis
- Mitosis
- Transplantation
- Mutation
- Repair

Correct answer:

- Mitosis

210. Under the influence of radioactive radiation in a dose of 5 Grey, red marrow was damaged. What determines sensitivity of red marrow to ionizing radiation?

- Intensive cell fission
- High level of free radicals in cells
- High level of peroxides in cells
- Presence of the radiosensitizing substances in cells
- Destructive effect of radiotoxic substances on DNA synthesis

Correct answer:

- Intensive cell fission

211. In a tissue specimen of the endometrium, separate epithelial cells are visible in which chromosomes create a "plate" located in the equatorial plane. In what period of cell cycle are these cells?

- Metaphase
- Interphase
- Prophase
- Anaphase
- Telophase

Correct answer:

- Metaphase

212. Molecular-level-process of spontaneous passive transport of water-soluble molecules across a cell membrane is modeled. The molecules move across cell membranes from an area of higher concentration toward an area of lower concentration via specific transmembrane integral proteins. This transport does not directly require chemical energy from ATP hydrolysis. Which of the following transport mechanisms is most likely mentioned?

- Facilitated diffusion
- Active transport
- Osmosis
- Pinocytosis
- Phagocytosis

Correct answer:

- Facilitated diffusion

213. A team of medical students is performing research on phases of cell cycle. During one of the mitotic phases, the cell is nearly done dividing, the chromosomes decondense and two nuclei begin to form around them. Which of the following phases most likely takes place in the cell?

- S-period of interphase
- Anaphase
- Prophase
- Metaphase
- Telophase

Correct answer:

- Telophase

214. Long-term taking of medicines can affect cells of the liver. Particularly, it can cause marked hypertrophy of agranular endoplasmic reticulum due to the following function of this organelle:

- Formation of maturation spindle
- Detoxication of harmful substances
- Protein synthesis
- Nucleic acid synthesis
- Intracellular digestion

Correct answer:

- Detoxication of harmful substances

215. In which of the following nuclear structures is DNA actively transcribed to rRNA?

- Envelope
- Lamina
- Matrix
- Nucleolus
- Pore

Correct answer:

- Nucleolus

216. Beginning with protein synthesis in membrane-bound ribosomes, hepatocytes secrete proteins into the circulation via which of the following mechanisms?

- Active transport through the cell membrane
- Diffusion through the cell membrane
- Transport by microtubules and exocytosis
- Transport in vesicles and exocytosis
- Transport through pores in the cell membrane

Correct answer:

- Transport in vesicles and exocytosis

CLASSICAL GENETICS

I. A woman with I (O) rh^- blood type married a man with IV (AB) Rh^+ blood type. What variant of blood type and Rhesus factor can be expected in their children?

- III (B) Rh^+
- I (O) rh^-
- IV (AB) Rh^+
- I (O) Rh^+
- IV (AB) rh^-

Correct answer:

- III (B) Rh⁺

2. Phenotypically identical anomalies can be caused by genotypical as well as environmental factors influencing an embryo. For example, congenital cataract can be autosomal recessive disease or the result of infection of German measles or influence of ionizing radiation during the early period of pregnancy. How changes, which occur under the influence of environmental factors and repeat the traits of an organism with another genotype, are called?

- Multiple alleles
- Genocopies
- Incomplete penetrance
- Phenocopies
- Pleiotropic action of genes

Correct answer:

- Phenocopies

3. In what of marriages rhesus incompatibility of mother and a fetus is possible?

- $rr \times RR$
- $RR \times rr$
- $Rr \times Rr$
- $Rr \times rr$
- $Rr \times RR$

Correct answer:

- $rr \times RR$

4. A blind girl, whose parents, brothers and sisters were blind too, married a blind young man, whose brother and sister were blind too, but other family members – mother, father, two sisters and brother – were able to see. From this marriage 8 children were born, which were able to see. Analyse a pedigree and name the reason of the birth of children, who are able to see, in blind parents:

- pleiotropic action of genes
- genocopies
- multiple alleles
- incomplete penetrance
- phenocopies

Correct answer:

- genocopies

5. Endemic goiter is widespread among Transcarpathian population due to iodine deficiency in food. What form of variability is this case based on?

- Mutational
- Modification
- Combinative
- Hereditary
- Genotypical

Correct answer:

- Modification

Note.

Other variants of incorrect answers:

- Ontogenetic
- Correlative

6. Development of any traits in a man is result of complex interactions between genes and products of translation at the molecular level. It is established that one pair of alleles controls permeability of capillaries, development of a trunk of brain and cerebellum, and one of functions of thymus. What phenomenon it can belong to?

- Codominance
- Complementarity
- Pleiotropy
- Overdominance
- Polymery

Correct answer:

- Pleiotropy

7. A group of Caucasians men settled in South Africa, and marriages happened only between them throughout several generations. Their skin became darker, like skin of Negroids. However, children of these people continued to be born as white. About what phenomenon one can talk?

- Modification variation
- Genocopies
- Phenocopies
- Genotypical variation
- Combinational variation

Correct answer:

- Modification variation

8. Woman with Rh-positive (Rh^+) blood is pregnant; her fetus is Rh-negative (rh^-). Whether developing of rhesus incompatibility in this case is possible?

- Rhesus incompatibility does not arise
- Rhesus incompatibility arises at the third and other pregnancies
- Rhesus incompatibility does not arise at the first pregnancy, but appears at the second pregnancy
- Rhesus incompatibility will arise surely
- Rhesus incompatibility arises if before pregnancy Rh-negative blood was transfused

Correct answer:

- Rhesus incompatibility does not arise

9. These mutations are not transferred to descendants at sexual reproduction, nevertheless, in individual development they can influence formation of a trait, leading to formation of organisms as mosaics. About what mutations there is a talk?

- Gene mutations
- Generative mutations
- Translocations
- Transgenation
- Somatic mutations

Correct answer:

- Somatic mutations

10. A wife is blind owing to anomaly of a crystalline lens, and her husband is blind owing to anomaly of a cornea (both types of blindness are transferred as recessive traits that are not linked). They have two children: blind child and child that is able to see. What is the highest probability that their third child will be able to see?

- 12%
- 37.5%
- 25%
- 50%
- 0%

Correct answer:

- 50%

11. Familial hypercholesterolemia is inherited on autosomal recessive type. In heterozygotes, this disease is shown by the increased content of cholesterol in blood. In homozygotes, besides, xanthomas (benign tumors of skin and tendons) and early atherosclerosis develop. What is the probability of the birth of healthy child in a family, where one of parents has only high content of cholesterol in blood, and the second parent has all complex of manifestation of this hereditary disease?

- 75%
- 0%
- 25%
- 100%
- 50%

Correct answer:

- 0%

12. A child who is sick with phenylketonuria (autosomal recessive hereditary disease) was born to clinically healthy parents. What are genotypes of parents?

- $aa \times aa$
- $AA \times AA$
- $AA \times Aa$
- $Aa \times aa$
- $Aa \times Aa$

Correct answer:

- $Aa \times Aa$

13. Rh-negative mother has the first blood type; father has the third blood group and is Rh-positive. What blood types are possible in children if the father is heterozygous for the first trait?

- The first and second Rh-positive
- The first and third Rh-negative
- The first and second Rh-negative
- The first and third Rh-positive
- The second and third Rh-positive

Correct answer:

- The first and third Rh-positive

14. Inheritance of blood types is defined by a type of gene interaction. Parents have the second and third blood types, and their child has the first blood type. What type of interaction of genes is the cornerstone of this phenomenon?

- Complete dominance
- Incomplete dominance
- Codominance
- Polymery
- Complementary interaction of genes

Correct answer:

- Complete dominance

15. A married couple consulted a specialist at the genetic consultation about probability of having children with haemophilia. Both spouses are healthy, but the wife's father has haemophilia. In this family hemophilia may be passed to:

- daughters only
- all the children
- half of daughters
- half of sons
- both sons and daughters

Correct answer:

- half of sons

16. Genes *A* and *B* are linked incompletely. What recombinant gametes are formed by *Drosophila* female with *AB//ab* genotype?

- *Ab, aB*
- *B, b*
- *AB, ab*
- *A, a*
- *Aa, Bb*

Correct answer:

- *Ab, aB*

17. A female albino (trait is inherited on autosomal recessive type), who has normal blood clotting and I (O) blood type, addressed in genetic consultation. What of the listed genotypes is the most probable for this woman?

- $AA\ ii\ X^H X^h$
- $aa\ ii\ X^H X^H$
- $Aa\ I^A i\ X^H X^H$
- $aa\ I^A I^A\ X^h X^h$
- $AA\ I^A I^B\ X^H X^H$

Correct answer:

- $aa\ ii\ X^H X^H$

18. Some erythrocytes of a man has crescent shape; he did not know about it before conscription. What type of interaction of genes describes this pathology?

- Codominance
- Incomplete dominance
- Complementarity
- Complete dominance
- Overdominance

Correct answer:

- Incomplete dominance

19. At parents with what genotypes children with all blood types of ABO system can be born?

- $I^B I^B \times I^B i$
- $I^A i \times I^A I^B$
- $I^B i \times I^A I^A$
- $I^A i \times I^B i$
- $ii \times I^A I^B$

Correct answer:

- $I^A_i \times I^B_i$

20. Brown eyes of man is dominant trait, blue eyes is recessive trait. A blue-eyed man, which parents had brown eyes, married a brown-eyed woman, whose father had blue eyes and mother had brown eyes. What the most exact ratio can be present in their children?

- 1:2:1 in genotype
- 3:1 in phenotype
- 2:1 in phenotype
- 1:2:1 on in phenotype
- 1:1 in genotype

Correct answer:

- 1:1 in genotype

21. Significant role in human pathology belongs to so-called phenocopies, which resemble genetically caused changes on the manifestation and are caused by an adverse effect of any factors. At what stage phenocopies arise?

- During spermatogenesis in a father
- During oogenesis in a mother
- During fertilization
- At the time of delivery
- During implementation of genetic information

Correct answer:

- During implementation of genetic information

22. The phenomenon of interaction of polymeric genes, as one of kinds of interaction of nonallelic genes, consists in dependence of the degree of trait manifestation on different dominant genes. What of the genotypes given below best of all corresponds to interaction of polygenes?

- *AaBbcc*
- *AABBCC*
- *Aabbcc*
- *A₁A₁A₂A₂a₃a₃*
- *AaBbCc*

Correct answer:

- $A_1A_1A_2A_2a_3a_3$

23. The child's father is Rh-positive with the second blood type and homozygous, the mother is Rh-negative with the first blood type. What phenotypes and genotypes can be present in children?

- Homozygous Rh-negative with the first blood type
- Heterozygous Rh-positive with the second blood type
- Homozygous Rh-positive with the second blood type
- Homozygous Rh-negative with the second blood type
- Heterozygous Rh-positive with the first blood type

Correct answer:

- Heterozygous Rh-positive with the second blood type

24. Albinism is inherited as autosomal recessive trait. Albino child was born in a family where both parents are healthy. What is the probability of the birth of the normal child?

- 25%
- 100%
- 75%
- 10%
- 50%

Correct answer:

- 75%

25. Two boys were mixed in maternity hospital. Parents of one of them had I and IV blood types, parents of the second had II and IV blood types. Investigations showed that children have I and IV blood types. Forensic medical examination established that one of boys is the extramarital. What genotypes parents of the child with I blood type should have?

- $I^A I^A \times I^B I^O$
- $I^A I^O \times I^A I^B$
- $I^A I^A \times I^A I^B$
- $I^O I^O \times I^A I^O$
- $I^O I^O \times I^A I^B$

Correct answer:

- $I^{\circ}I^{\circ} \times I^{\Delta}I^{\circ}$

26. Red hairs is recessive trait, black hairs is dominant trait. At what marriages children with red hairs will be born with probability of 25%?

- $aa \times aa$
- $Aa \times aa$
- $AA \times AA$
- $AA \times aa$
- $Aa \times Aa$

Correct answer:

- $Aa \times Aa$

27. Normal pigmentation of human skin (C) dominates over albinism (c); existence of freckles (P) dominates over their absence (p). Define probability of the birth of the children similar to parents if the father and mother are diheterozygous:

- $1/16$
- $2/16$
- $3/16$
- $6/16$
- $9/16$

Correct answer:

- $9/16$

28. X-linked recessive lethal gene causes re-sorption of human embryo at early stages of development. What of possible zygotes that is the carrier of such gene is not capable to develop?

- None
- $X^A X^a$
- $X^A Y$
- $X^a Y$
- $X^A X^A$

Correct answer:

- X^aY

29. Inclination to diabetes mellitus is provoked by the autosomal recessive gene. This gene becomes apparent only in 30% of homozygous individuals. What genetic regularity is observed in this case?

- Discontinuity
- Complementarity
- Gene expressiveness
- Incomplete penetrance
- Pleiotropy

Correct answer:

- Incomplete penetrance

30. Healthy young spouses have a son with hemophilia. The grandfather on the mother's side is sick with hemophilia. What are genotypes of parents?

- $X^H X^H, X^H Y$
- $X^H X^h, X^h Y$
- $X^H X^H, X^h Y$
- $X^H X^h, X^H Y$
- $X^h X^h, X^H Y$

Correct answer:

- $X^H X^h, X^H Y$

31. The children's form of amaurotic familial idiocy (Tay–Sachs disease) is inherited as an autosomal recessive trait and ends with death until 4–5 years. The first child in a family died of this disease when the second had to be born. What is the probability that the second child will have the same disease?

- 0%
- 100%
- 50%
- 25%
- 75%

Correct answer:

- 25%

32. A daughter of the color-blind man marries a son of other color-blind man, and these spouses distinguish colors normally. What is the greatest probability of appearance of daltonism in their children?

- 25%
- 100%
- 50%
- 0%
- 75%

Correct answer:

- 25%

33. Healthy parents have a son with phenylketonuria, but owing to a special diet he has normal development. What type of variability is his normal development connected with?

- Mutational variability
- Combinative variability
- Modificative variability
- Genotype variability
- Inherited variability

Correct answer:

- **Modificative variability**

Note.

There is a mistake in this question in the book "*Collection of tasks...*": incorrect phrase "Parents with normal health have an ill with phenylketonuria son" is used in this book.

34. A father suffers from migraine (dominant trait), and a mother is healthy. Father has normal hearing, mother also is normal, but she has recessive allele of deafness. What is the probability of the birth of children with both diseases if the father is heterozygous for both genes?

- $1/8$
- $2/8$
- $3/8$
- $4/8$
- $8/8$

Correct answer:

- $\frac{1}{8}$

35. A bud appeared from a plant cell in which a mutation occurred, and then shoot with new properties was formed. At what reproduction new properties will be inherited by descendants?

- Sexual with fertilization
- Sexual without fertilization
- Budding
- Vegetative
- Spore formation

Correct answer:

- Vegetative

36. One of parents of healthy husband has diabetes, and both parents of wife are sick. What percent of children will be similar phenotypically to the father if this disease is known to be recessive?

- 50%
- 25%
- 100%
- 75%
- 0%

Correct answer:

- 50%

37. In a large family, there are four sons and three daughters who differ phenotypically from each other on many traits. This results from the fact that different combinations of chromosomes get to each gamete during the process of gametogenesis in parents. At what stage of meiosis it happens?

- Metaphase of meiosis I
- Anaphase of meiosis I
- Anaphase of meiosis II
- Prophase of meiosis I
- Prophase of meiosis II

Correct answer:

- Anaphase of meiosis I

38. What is the probability of the birth of a boy in a family, where mother is the carrier of recessive lethal allele that is sex-linked and causes death of an embryo at early stages of development?

- $\frac{1}{4}$
- $\frac{1}{3}$
- $\frac{2}{3}$
- $\frac{1}{2}$
- $\frac{3}{4}$

Correct answer:

- $\frac{1}{3}$

39. As a result of iodine deficiency in foodstuff, Transcarpathian people often have endemic goiter. What form of variation is the cornerstone of this disease?

- Mutational
- Combinational
- Modification
- Hereditary
- Genotypical

Correct answer:

- Modification

Note:

Another variant of incorrect answer:

- Ontogenetic

40. Synthesis of interferon (the protein) in human cells is determined by complementary interaction of dominant alleles of different genes *A* and *B*. Ability to form interferon in one of parents is inhibited due to lack of gene *B*; the second parent is healthy and all his relatives are healthy too. What is the probability of appearance of healthy progeny?

- 0%
- 100%
- 25%
- 75%
- 50%

Correct answer:

- 100%

41. Deafness can be caused by different recessive alleles "a" and "b", which are located in different pairs of chromosomes. A deaf man with *aaBB* genotype married a deaf woman with *AAbb* genotype. Four children were born in this family. How many children from them were deaf?

- None
- Two
- Four
- One
- Three

Correct answer:

- None

42. Pigmentation of human skin is controlled by several pairs of genes, which are not linked and interact as additive polymeric genes. A person with genotype $a_1a_1a_2a_2a_3a_3$ will have such pigmentation of skin:

- an albino (pigmentation is absent)
- black (Negroid)
- yellow (Mongoloid)
- white (Caucasian)
- brown (mulatto)

Correct answer:

- white (Caucasian)

43. A young man from the Central Africa arrived to Ukraine to get the higher medical education. He suffers from easy form of sickle-cell anemia. On the third year of training, he married the Ukrainian girl who was healthy on this trait. They gave birth to a daughter. What is the highest probability that this child will be sick (gene of sickle-cell anemia is inherited as incompletely dominant)?

- 0%
- 50%
- 25%
- 100%
- 75%

Correct answer:

- 50%

44. Two organisms are crossed. One of them is heterozygous for a dominant gene, and the second is homozygous for a recessive gene. What is this crossing?

- Complementary
- Dihybrid
- Analyzing
- Not linked
- Polyhybrid

Correct answer:

- Analyzing

45. Four blood types of ABO system in human are defined by interaction of three genes of one locus: i , I^A , and I^B . How many genotypes and phenotypes they form?

- Three genotypes and three phenotypes
- Three genotypes and four phenotypes
- Four genotypes and four phenotypes
- Six genotypes and four phenotypes
- Six genotypes and six phenotypes

Correct answer:

- Six genotypes and four phenotypes

46. In human population of the city N, among all people who has dominant gene of schizophrenia, 35% have an apparent clinical picture. This characteristic of a gene is called:

- penetrance
- stability
- expressivity
- specificity
- mutability

Correct answer:

- penetrance

47. In numerous experiments, homozygous or heterozygous organisms are crossed between themselves. Then quantitative manifestations of traits are analyzed in progeny. Define, what the method is used:

- genealogical
- cytogenetic
- selective
- hybrid
- population-statistical

Correct answer:

- hybrid

48. There is a unicellular organism, which is characterized by a set of chromosomes $2n=8$ and breeds in the asexual way. Genetic variety of individuals in population will make (without mutations):

- 1 type
- 8 types
- 128 types
- 32 types
- 256 types

Correct answer:

- 1 type

49. IV blood type was revealed in a donor. Phenotypically it is characterized by existence of:

- antigens A and antibodies beta
- antigens B and antibodies alpha
- antigens A and B
- antigens A and antibodies alpha
- antibodies alpha and beta

Correct answer:

- antigens A and B

50. Owing to viral infection, one person had changes of a phenotype, which are similar to mutations, but did not change a genotype. This phenomenon is called:

- phenocopy
- mutation
- recombination
- genocopy
- long modification

Correct answer:

- phenocopy

51. In a family, there were 7 healthy children who were born at different times. They differ phenotypically. Their differences are caused by:

- penetrance
- combinational variation
- frequency of occurrence of a dominant gene
- different karyotypes
- frequency of occurrence of a recessive gene

Correct answer:

- combinational variation

52. The mass of a man is controlled by several pairs of genes that are not linked. The more dominant genes in a genotype, the more body weight of a man. It is an example of:

- monogenic inheritance
- overdominance
- polymery
- epistasis
- complete dominance

Correct answer:

- polymery

53. Blood types of Rh system in man are defined by interaction of two alleles of one gene. These alleles form and define:

- three genotypes and four phenotypes
- four genotypes and two phenotypes
- six genotypes and four phenotypes
- six genotypes and six phenotypes
- three genotypes and two phenotypes

Correct answer:

- three genotypes and two phenotypes

54. Choose an autosomal recessive trait of a man among listed below:

- right-handedness
- polydactyly
- pigmentation of skin
- hemophilia
- blood type I of ABO system

Correct answer:

- blood type I of ABO system

55. A monocellular parasite with a set of chromosomes $2n = 24$, which reproduces by schizogony, is studied. A genetic variety of individuals in a population will make (without mutations):

- 1 type
- 256 types
- 24 types
- 128 types
- 32 types

Correct answer:

- 1 type

56. A family of healthy students who have arrived from Africa gave birth to a child with anemia signs. The child has died shortly after. Examination has revealed that child's erythrocytes have abnormal semilunar shape. Specify genotypes of the child's parents:

- $Aa \times AA$
- $Aa \times aa$
- $AA \times AA$
- $Aa \times Aa$
- $aa \times aa$

Correct answer:

- $Aa \times Aa$

Note.

In the book "Collection of tasks...", this question is written as follows: *In a family of students from Africa a child with signs of anemia was born. The child died within a short time. It was found that the child's erythrocytes were shaped like a sickle. What genotypes may the parents have if they have a light form of anemia?*

57. A husband is a homozygote by a dominant gene which causes polydactyly. His wife is a healthy homozygote by recessive allele of this gene. Which of the below mentioned genetic regularities can be apparent in their children as for their having polydactyly?

- The law of segregation
- The law of dominance
- The law of independent assortment
- Linkage of genes
- Sex-linked inheritance

Correct answer:

- The law of dominance

Note.

In the book "*Collection of tasks...*", a mistake is present in correct answer: incorrect phrase "The law of unit characters" is used.

Another variant of incorrect answer:

- Purity of gametes

58. A husband is brown-eyed and homozygous for a dominant gene, and a wife is blue-eyed. Such regularity will be shown in their children as:

- independent inheritance
- hypothesis of purity of gametes
- segregation of hybrids
- linked inheritance
- uniformity of hybrids of the first generation

Correct answer:

- uniformity of hybrids of the first generation

59. Human skin color is controlled by several pairs of genes, which are not linked and interact as additive polygenes. What skin pigmentation will be present in a man with genotype $A_1A_1A_2A_2A_3A_3$?

- Yellow (Mongoloid)
- White (Caucasian)
- Brown (mulatto)
- Black (Negroid)
- An albino (pigmentation is absent)

Correct answer:

- Black (Negroid)

60. Human height is controlled by several pairs of genes that are not linked; very small men are dominant homozygotes, and very tall men are recessive homozygotes. What type of this phenomenon belongs to?

- Polymery
- Pleiotropy
- Codominance
- Overdominance
- Complementarity

Correct answer:

- Polymery

61. Spouses gave birth to a child with bright blue eyes. In some months, color of an iris of the eye changed and became greenish-gray. Parents consulted a pediatrician, suspecting possibility of pathology, but a doctor calmed them; he explained that this is:

- consequence of changing of feeding of a baby from maternal milk to dairy mixes
- result of teething
- manifestation of norm of reaction of appropriate genes
- the phenomenon inherited from one of parents
- usual feature of the period of ontogenesis

Correct answer:

- manifestation of norm of reaction of appropriate genes

62. Intensity of human skin pigmentation is controlled by a few pairs of nonallelic dominant genes. It was found that if the number of the genes increases, pigmentation becomes more intensive. What do we call this type of interaction of these genes?

- Epistasis
- Pleiotropy
- Polymery
- Codominance
- Complementary

Correct answer:

- Polymery

63. The same genotype in a human can cause the development of a feature with different degrees of manifestation that depends on the interaction of this gene with the others and on the influence of environmental conditions. What do we call the degree of phenotypic manifestation of a character controlled by a definite gene?

- Inheritance
- Penetrance
- Gene expression
- Mutation
- Polymery

Correct answer:

- Gene expression

Note.

The answer "gene expression" (in the book "*Collection of tasks...*") is not good. The answer "expressivity" is better.

64. At what blood types of parents on Rhesus factor system, Rhesus factor incompatibility is possible during pregnancy?

- Wife is Rh^+ (homozygote), husband is Rh^+ (homozygote)
- Wife is Rh^+ (heterozygote), husband is Rh^+ (heterozygote)
- Wife is rh^- , husband is Rh^+ (homozygote)
- Wife is rh^- , husband is rh^-
- Wife is Rh^+ (heterozygote), husband is Rh^+ (homozygote)

Correct answer:

- Wife is rh^- , husband is Rh^+ (homozygote)

65. Chromosome aberrations and changes of chromosome number can arise at different stages of individual development. What can be the reason that an organism, which can be called a full mutant, was formed?

- Mutant gametes of parents
- Mutant gametes of father
- Mutant gametes of mother
- Gametes of parents are normal
- Wrong second division of a zygote

Correct answer:

- Mutant gametes of parents

66. Deaf-mute parents with genotypes $DDee$ and $ddEE$ gave birth to children with normal hearing. What is the type of gene interaction between the genes D and E ?

- Complementarity
- Polymery
- Incomplete dominance
- Epistasis
- Overdominance

Correct answer:

- Complementarity

Note.

Another variant of incorrect answer:

- Complete dominance

67. Some clinically healthy people can feel anemia symptoms in the conditions of high mountains. Blood test can reveal sickle-shaped erythrocytes. What is the genotype of such people?

- X^cX^c
- aa
- AA
- Aa
- X^cY

Correct answer:

- *Aa*

Note.

Other variants of incorrect answers:

- $X^C X^c$
- $X^c Y$

68. A woman who needs in urgent blood transfusion got to a hospital. Analysis showed that the woman has I blood type, rh^- . What blood type and Rhesus factor her husband should have that her son could become a donor for her?

- I (O) rh^-
- Any
- IV (AB) rh^+
- Correct answer is not present
- IV (AB) rh^-

Correct answer:

- I (O) rh⁻

69. One of the parents is suspected of having phenylketonuria recessive gene, What is the risk of giving birth to a child with inborn phenylketonuria?

- 50%
- 0%
- 100%
- 25%
- 75%

Correct answer:

- 0%

70. It is known that the gene responsible for development of blood groups according to ABO system has three allelic variants. If a man has IV blood group, it can be explained by the following variability form:

- phenocopy
- phenotypic
- genocopy
- mutational
- combinative

Correct answer:

- combinative

71. Spouses, where a wife has normal structure of a hand and a husband has polydactyly, consulted a doctor with such question: whether inheritance of this anomaly by their future child is possible, if their first child has normal structure of a hand? The gene for polydactyly is known to be dominant. What is the probability of the birth of the six-fingered child at these spouses?

- 25%
- 75%
- 0%
- 100%
- 50%

Correct answer:

- 50%

72. Rhesus incompatibility occurs during transfusion to the recipient of Rh-positive blood of the same group on ABO system if blood of this recipient:

- contains agglutinin A
- is Rh-positive
- contains beta agglutinin
- contains agglutinin B
- contains no Rh factor

Correct answer:

- contains no Rh factor

73. Woman applied to a medical genetic consulting centre for information about the risk of haemophilia in her son. Her husband has been suffering from this disease since birth. Woman and her parents are healthy (don't have haemophilia). Is a boy likely to have the disease in this family?

- 25% of boys will be ill
- All boys will be ill
- All boys will be healthy
- 50% of boys will be ill
- 75% of boys will be ill

Correct answer:

- All boys will be healthy

74. Changes of chemical structure of a gene can appear in its different sites. If such changes are compatible to life, i.e. do not lead to death of organisms, they remain in gene pool of the species. How different variants of one gene are called?

- Genocopies
- Phenocopies
- Multiple alleles
- Plasmids
- Cistrons

Correct answer:

- Multiple alleles

75. Phenylketonuria that, as a rule, leads to death at six-month age is inherited as an autosomal recessive trait. Achievements of modern medicine allow to prevent serious consequences of disturbance of phenylalanine metabolism. A woman, who was cured of phenylketonuria, married healthy man. Define the highest probability of the birth of the viable child with phenylketonuria in this family:

- 6.25%
- 18.75%
- 25%
- 50%
- 100%

Correct answer:

- 50%

76. Mutagenic factors can have specific form of influence. For example, acridines induce shift of reading frame due to inserts or losses of nucleotides. How mutations, which are associated with increase in or reduction of genetic material, are called?

- Genocopies and phenocopies
- Leading and lagging behind
- Duplications and deletions
- Spontaneous and induced
- Hereditary and nonheritable

Correct answer:

- Duplications and deletions

77. There are two children in a family. A daughter has O blood type, a son has AB blood type. What genotypes their parents have?

- $I^A i \times I^B i$
- $I^A I^A \times I^B I^B$
- $I^A I^B \times I^B I^B$
- $ii \times I^A I^A$
- $ii \times I^A I^B$

Correct answer:

- $I^A_i \times I^B_i$

78. A woman with O (I) blood group has born a child with AB blood group. Woman's husband has A blood group. What genetic interaction explains this phenomenon?

- Recessive epistasis
- Polymery
- Complementation
- Codominance
- Incomplete dominance

Correct answer:

- Recessive epistasis

79. A number of mechanisms (for example, endomitosis), which increase amount of hereditary material and intensity of metabolism in cells with keeping constant number of cells, evolve from mitotic cycle. What are these mutations?

- Chromosome mutations
- Genomic generative mutations
- Genomic somatic mutations
- Heteroploidy
- Gametopathy

Correct answer:

- Genomic somatic mutations

80. A couple came for medical genetic counseling. A man has hemophilia, a woman is healthy and there were no cases of hemophilia in her family. What is the risk of having a sick child in this family?

- 25%
- 0%
- 100%
- 75%
- 50%

Correct answer:

- 0%

81. Lack of sweat glands in man is coded by the recessive gene localized in the X chromosome. Future spouses addressed to genetic consultation: healthy young man marries a girl whose father suffered from lack of sweat glands, and mother and her relatives were healthy. What is the probability of manifestation of this trait in sons from this marriage?

- 0%
- 25%
- 50%
- 75%
- 100%

Correct answer:

- 50%

82. The mutation – inversion of one of chromosomes – takes place in a patient owing to pathogenic influence of the ionizing radiation. How the pathogenic factor, which led to such pathological changes, is called?

- Chemical mutagen
- Carcinogen
- Physical mutagen
- Biological mutagen
- Virus

Correct answer:

- Physical mutagen

83. A father has alkaptonuria, a mother is homozygous for the normal gene. The probability of appearing of alkaptonuria in children makes:

- 75%
- 100%
- 25%
- 0%
- 50%

Correct answer:

- 0%

84. Heterozygous father has astigmatism; mother is healthy. The probability of appearance of astigmatism in children makes:

- 75%
- 25%
- 0%
- 100%
- 50%

Correct answer:

- 50%

85. A father of a pregnant woman suffers from hemeralopia, which is inherited as the recessive X-linked trait. This disease did not happen among the husband's relatives. What is the probability that the born child will have hemeralopia if it was established that fetus is a male?

- 50%
- 0%
- 25%
- 100%
- 75%

Correct answer:

- 50%

86. Phenylketonuria is inherited on autosomal recessive type. At what genotypes of phenotypically healthy wife and husband, the child with phenylketonuria can be born?

- AA and AA
- Aa and Aa
- AA and Aa
- Aa and aa
- aa and aa

Correct answer:

- *Aa and Aa*

87. Violation of formation of collagenic fibers is the cornerstone of a number of hereditary diseases. Formation of collagenic fibers is broken also at deficiency of vitamin C in an organism. How traits, which are caused by environmental factors and resemble hereditarily traits, are called?

- Mobile genetic elements
- Plasmids
- Suppressors
- Genocopies
- Phenocopies

Correct answer:

- Phenocopies

88. A woman with Rh-negative blood of III group gave birth to a child with IV blood type who had hemolytic disease of newborns owing to rhesus incompatibility. What genotype on a blood type and Rhesus factor is the most probable at the father?

- $I^0 I^0 Rr$
- $I^A I^0 rr$
- $I^A I^A RR$
- $I^A I^A rr$
- $I^B I^B Rr$

Correct answer:

- $I^A I^A RR$

89. Healthy girl was born to parents sick with hemoglobinopathy (autosomal dominant type of inheritance). What are genotypes of parents?

- Mother is heterozygous for the gene of hemoglobinopathy, father has no this gene
- Father is heterozygous for the gene of hemoglobinopathy, mother has no this gene
- Both are heterozygous for the gene of hemoglobinopathy
- Both are homozygous for the gene of hemoglobinopathy
- Both parents have no gene of hemoglobinopathy

Correct answer:

- Both are heterozygous for the gene of hemoglobinopathy

90. A family has a child with blood type O (I). What are possible genotypes of parents of this child?

- $I^A i$ and $I^B i$
- $I^A I^A$ and ii
- $I^A I^B$ and ii
- $I^A I^B$ and $I^A i$
- $I^A i$ and $I^B I^B$

Correct answer:

- I^A_i and I^B_i

91. There are two healthy children in a family, and the third was born with phenylketonuria which is inherited on autosomal recessive type. What is the probability of the birth of the child with PKU in this family?

- $\frac{1}{2}$
- $\frac{1}{3}$
- $\frac{1}{4}$
- $\frac{1}{6}$
- $\frac{3}{4}$

Correct answer:

- $\frac{1}{4}$

92. Celiac disease is inherited on autosomal recessive type. Treatment consists in withdrawal of cooked cereals and bread, which contain gliadin, from a diet of children. What form of variation is caused by treatment of a child with celiac disease by means of withdrawal certain products from a diet?

- Phenotypic
- Combinational
- Gene
- Chromosomal
- Genomic

Correct answer:

- Phenotypic

93. Violation of chromosome disjunction or change of their structure during cleavage of a zygote leads to appearance of cellular clones with different karyotypes among normal blastomeres. How this phenomenon is called correctly?

- Chromosome aberration
- Aneuploidy
- Polyploidy
- Genetic mosaic
- Gene mutation

Correct answer:

- Genetic mosaic

94. Hemoglobin molecule consists of two α chains and two β chains. Genes coding both chains are located in different pairs of homologous chromosomes. What type of interaction exists between these genes?

- Epistasis
- Polygenic inheritance
- Codominance
- Complete dominance
- Complementarity

Correct answer:

- Complementarity

95. Deaf child was born to a woman who had German measles during pregnancy. This disease is a consequence of:

- chromosome aberration
- modification variation
- gene mutation
- genomic mutation
- combinational variation

Correct answer:

- modification variation

96. A husband has IV (AB) blood type, and a wife has III (B) blood type. The wife's father has I (O) blood type. They gave birth to 5 children. Choose a genotype of the child who can be considered illegitimate:

- $I^A I^B$
- ii
- $I^B I^B$
- $I^A i$
- $I^B i$

Correct answer:

- *ii*

97. Hartnup disease is caused by point mutation of only one gene, which results in disturbance of tryptophane absorption in the intestine and its abnormal reabsorption in the renal tubules. It is the reason for disorder of both digestive and urination systems. What genetic phenomenon is observed in this case?

- Pleiotropy
- Semidominance
- Complementary interaction
- Codominance
- Polymery

Correct answer:

- Pleiotropy

Note.

During exam in 2009 (among students studying stomatology), incorrect name "Hurtnup" was used. Semidominance is the same as incomplete dominance.

98. A boy has I (I^0I^0) blood group and his sister has IV (I^AI^B) blood group. What blood groups do their parents have?

- II (I^AI^0) and III (I^BI^0)
- II (I^AI^A) and III (I^BI^0)
- I (I^0I^0) and III (I^BI^0)
- I (I^0I^0) and IV (I^AI^B)
- III (I^BI^0) and IV (I^AI^B)

Correct answer:

- II ($I^A I^0$) and III ($I^B I^0$)

99. Cystinuria in humans manifests itself as cystine stones in kidneys (homozygous individuals) or increased cystine concentration in the urine (heterozygous individuals). Cystinuria is a monogenic disease. Determine the type of interaction between the genes of cystinuria and normal cystine concentration in the urine.

- Epistasis
- Complete dominance
- Semidominance
- Complementarity
- Codominance

Correct answer:

- Semidominance

100. Features of inheritance of blood types in man in the case of "Bombay phenomenon" are caused by recessive epistasis. What genotype a man with blood type I can have?

- $I^A I^A HH$
- $I^B I^B HH$
- $I^A I^0 Hh$
- $I^B I^0 Hh$
- $I^A I^B hh$

Correct answer:

- $I^A I^B hh$

101. Five married couples addressed to clinic for women. They want to know, whether there is a threat of development of hemolytic disease in their children. In what case the risk of developing of rhesus incompatibility is the highest?

- Wife is *DD* (first pregnancy); husband is *Dd*
- Wife is *Dd* (second pregnancy); husband is *Dd*
- Wife is *Dd* (third pregnancy); husband is *DD*
- Wife is *dd* (second pregnancy); husband is *DD*
- Wife is *dd* (third pregnancy); husband is *dd*

Correct answer:

- Wife is *dd* (second pregnancy); husband is *DD*

102. A child, who is sick with sickle-cell anemia, has some pathological signs: anemia, increased spleen, damages of skin, heart, kidneys, and brain. How multiple action of one gene is called?

- Polygenic inheritance
- Complementarity
- Pleiotropy
- Codominance
- Epistasis

Correct answer:

- Pleiotropy

103. In the case when one of parents has blood type O, and the other has AB, their child can have a blood type:

- O, AB
- AB
- O, AB, A, B
- A, B
- O, A, B

Correct answer:

- A, B

104. Young couple gave birth to a child with different color of the right and left eyes. How this phenomenon is called?

- Chromosome aberration
- Somatic mutation
- Heteroploidy
- Modification variation
- Combinational variation

Correct answer:

- Somatic mutation

105. It is known that the gene responsible for development of an abnormal shape of teeth is dominant and is not sex-linked. Sick guy has big teeth which project forward. The brother and the sister of this guy have teeth of usual form and position. What variation is observed in this family?

- Ontogenetic
- Combinational
- Modification
- Mutational
- Cytoplasmatic

Correct answer:

- Combinational

106. Rh-positive heterozygous woman with IV (AB) blood type and Rh-negative homozygous man with II (A) blood type (antigenic ABO system) get married. What is the probability of the birth of Rh-positive child with III (B) blood type in this family?

- 0%
- 25%
- 50%
- 75%
- 100%

Correct answer:

- 0%

107. At what interaction of genes the inhibitory gene only inhibits action of other gene and does not determine development of a certain trait?

- Dominance
- Epistasis
- Incomplete dominance
- Codominance
- Complementarity

Correct answer:

- Epistasis

108. Hypoplasia of enamel is inherited as the dominant X-linked trait. In a family, a mother suffers from this anomaly and a father is healthy. What is the probability of the birth of a son with normal teeth?

- 0%
- 25%
- 50%
- 75%
- 100%

Correct answer:

- 25%

109. A woman with Rh-negative blood of II group gave birth to a child with IV group for whom hemolytic disease was diagnosed owing to rhesus incompatibility. What blood type is possible for the child's father?

- I (O), Rh-positive
- II (A), Rh-positive
- IV (AB), Rh-negative
- III (B), Rh-negative
- III (B), Rh-positive

Correct answer:

- III (B), Rh-positive

110. There are two dominant genes in human X chromosome, which take part in blood clotting. The same role is also carried out by an autosomal dominant gene. Lack of any of these genes leads to hemophilia. Name a form of interaction between three genes.

- Complementarity
- Epistasis
- Polymery
- Codominance
- Pleiotropy

Correct answer:

- Complementarity

111. Symptoms of anemia were observed in clinically healthy thirty-year-old woman when she climbed Goverla mountain (Ukraine). During carrying out the general blood test, crescent erythrocytes along with normal red cells were revealed. What is genotype of this woman?

- AA
- aa
- Aa
- $X^A X^A$
- $X^a X^a$

Correct answer:

- *Aa*

112. An 18-year-old male has been diagnosed with Marfan syndrome. Examination revealed a developmental disorder of connective tissue and eye lens structure, abnormalities of the cardiovascular system, arachnodactylia. What genetic phenomenon does this disease illustrate?

- Codominance
- Incomplete dominance
- Complementarity
- Pleiotropy
- Multiple allelism

Correct answer:

- Pleiotropy

113. A woman with III (B) Rh⁻ blood group gave birth to a child with II (A) blood group. The child is diagnosed with hemolytic disease of newborn caused by rhesus incompatibility. What blood group can the child's father have?

- III (B), Rh⁻
- III (B), Rh⁺
- II (A), Rh⁻
- IV (AB), Rh⁻
- II (A), Rh⁺

Correct answer:

- II (A), Rh⁺

Note.

Other variants of incorrect answers:

- I (0), Rh⁻
- I (0), Rh⁺

114. In the process of cell division, the approaching of homological chromosomes happened; as a result of this event, parental and maternal chromosomes exchanged allelic genes. How the process of recombination of genetic material at the gene level, which along with other types of variation provides a variety of the organic world, is called?

- Conjugation
- Crossing-over
- Copulation
- Diakinesis
- Cytokinesis

Correct answer:

- Crossing-over

115. A father is Rh-negative. A mother is Rh-positive. She gave birth to the Rh-positive child. Whether the hemolytic disease, as a result of rhesus incompatibility, can develop in this family?

- No, it cannot
- Only in a child
- Only in a mother
- Only in a father
- In a father and a child

Correct answer:

- No, it cannot

116. Genes of a locus *L*, which are responsible for development of blood types in MN system, give three genotypes and also three phenotypes. With what phenomenon it is possible to explain appearance in man of MN blood type?

- Combinational variation
- Mutational variation
- Genocopy
- Phenocopy
- Modification variation

Correct answer:

- Combinational variation

117. Mother has II blood type, and father has IV blood type of ABO system. Father and mother are Rh-positive, and both grandfathers are Rh-negative. What blood type is impossible in their children?

- The second
- The third
- Rh-negative
- The first
- The fourth

Correct answer:

- The first

118. What type of regulation of sex by means of sex chromosomes is characteristic for man?

- XO type
- ZW type
- ZO type
- XY type
- WO type

Correct answer:

- XY type

119. Rh-negative woman with IV (AB) blood type and Rh-negative man with I (O) blood type (antigenic ABO system) get married. What is the probability of the birth of Rh-negative homozygous child with III (B) blood type in this family?

- 25%
- 0%
- 100%
- 50%
- 75%

Correct answer:

- 0%

120. Four blood types of ABO system are determined by inheritance of three alleles of one gene (I^O , I^A , and I^B). Alleles of I^A and I^B in heterozygotes define the fourth group. Name a form of interaction between genes, which takes place in the case of inheritance of the fourth blood type.

- Codominance
- Complete dominance
- Polymery
- Overdominance
- Epistasis

Correct answer:

- Codominance

Another variant of incorrect answer:

- Complementarity

121. During a surgery, there was a need of massive blood transfusion. Blood type of injured person is III (B) Rh⁺. What donor needs to be chosen?

- IV (AB) Rh⁺
- IV (AB) rh⁻
- II (A) Rh⁺
- III (B) rh⁻
- I (0) rh⁻

Correct answer:

- III (B) rh⁻

122. Let us assume that one pair of alleles controls development of crystalline lens, and the second pair – development of retina. In this case, normal sight will be result of interaction of genes which is called:

- incomplete dominance
- codominance
- polymerism
- complementation
- overdominance

Correct answer:

- complementation

123. In what of the given cases, danger for a patient can arise during blood transfusion?

- Rh⁺ recipient will receive Rh⁻ blood
- Rh⁻ recipient will receive Rh⁺ blood
- Rh⁺ recipient will receive Rh⁺ blood
- Rh⁻ recipient will receive Rh⁻ blood
- In none of the listed cases

Correct answer:

- Rh⁻ recipient will receive Rh⁺ blood

124. Environmental factors can cause changes of phenotype, which copy traits of another genotype. Such changes are shown with high frequency at certain (critical) stages of ontogenesis and are not inherited. What name such changes have?

- Modifications
- Long modifications
- Mutations
- Genocopies
- Phenocopies

Correct answer:

- Phenocopies

125. A child was born in heterozygous parents with II (A) and III (B) blood types according to the ABO system. What is the probability that the child has I (O) blood group?

- 100%
- 75%
- 0%
- 25%
- 50%

Correct answer:

- 25%

126. A wide cleft between incisors of both mother and father is the dominant feature. They are both homozygous. What genetic regularity will their children have?

- Uniformity of first generation hybrids
- Hybrid segregation by phenotype
- Independent inheritance of traits
- Non-linked inheritance
- Linked inheritance

Correct answer:

- Uniformity of first generation hybrids

127. Secretion of breast milk at women is caused by polymeric genes, and the amount of milk increases with increase in number of dominant alleles of these genes in the woman's genotype. What genotype the woman in labor with lack of milk can have?

- $m_1m_1M_2m_2$
- $M_1m_1M_2m_2$
- $M_1M_1m_2m_2$
- $M_1m_1m_2m_2$
- $m_1m_1m_2m_2$

Correct answer:

- $m_1m_1m_2m_2$

128. Alcaptonuria is inherited as an autosomal recessive feature. Parents with a normal phenotype have a baby with alcaptonuria. What genotype do parents have?

- *aa* and *aa*
- *AA* and *AA*
- *AA* and *Aa*
- *Aa* and *aa*
- *Aa* and *Aa*

Correct answer:

- *Aa and Aa*

Note.

In the book "*Collection of tasks...*", another similar question is present: *Galactosemia is an autosomal recessive character. What genotypes may healthy parents have if their baby has galactosemia?*

129. Phenylketonuria is the disease caused by recessive gene, which is localized in an autosome. Parents are heterozygous for this gene. They already have two sick sons and one healthy daughter. What is the probability that the fourth expected child also will be born sick?

- 0%
- 25%
- 50%
- 75%
- 100%

Correct answer:

- 25%

130. Parents with a normal phenotype gave birth to an albino child (the feature that is inherited by the autosomal recessive type). What genotype do the parents have?

- AA and aa
- AA and AA
- AA and Aa
- Aa and Aa
- aa and aa

Correct answer:

- *Aa and Aa*

131. A boy has large fissure between cutters. It is known that the gene that is responsible for development of such anomaly is dominant. A sister of this boy has teeth of usual position. This girl according to her genotype will be:

- diheterozygote
- dominant homozygote
- heterozygote
- recessive homozygote
- triheterozygote

Correct answer:

- recessive homozygote

132. A man with color blindness addressed to genetic consultation. It is X-linked recessive trait. What is the probability of appearance of color-blind children in his family, if such allele is absent in the genotype of his wife?

- 75%
- 50%
- 100%
- 25%
- 0%

Correct answer:

- 0%

133. One of variants of coloring of tooth enamel in men is defined by interaction of two allelic genes as incomplete dominance. These genes form and define:

- three genotypes and four phenotypes
- four genotypes and four phenotypes
- six genotypes and four phenotypes
- three genotypes and three phenotypes
- six genotypes and six phenotypes

Correct answer:

- three genotypes and three phenotypes

134. Formation in human cells of interferon, which is a protein produced for protection against viruses, is associated with interaction of genes. What of the listed types of gene interaction causes synthesis of interferon?

- Complementary action
- Complete dominance
- Interaction of polygenes
- Codominance
- Epistasis

Correct answer:

- Complementary action

135. It is known that the gene responsible for the development of the MN blood groups has two allelic states. If the gene *M* is considered as the initial gene, the allelic gene *N* appeared due to:

- DNA repair
- DNA replication
- crossing over
- gene combination
- mutation

Correct answer:

- mutation

Note.

Genes for MN blood system must be written as L^M and L^N .

136. One of variants of coloring of tooth enamel in men is defined by interaction of two allelic genes as incomplete domination. How many phenotypes are defined by these genes?

- Two
- Four
- Five
- Three
- Six

Correct answer:

- Three

137. Examination of newborns in one of the Ukrainian cities revealed a baby with phenylketonuria. The baby's parents don't suffer from this disease and have two other healthy children. Specify the most likely parents' genotype with phenylketonuria gene:

- $AA \times aa$
- $Aa \times AA$
- $Aa \times aa$
- $Aa \times Aa$
- $aa \times aa$

Correct answer:

- $Aa \times Aa$

138. A woman was infected with rubella virus during pregnancy. A child was born with developmental malformations, namely cleft lip and palate. The child's genotype is normal. These malformations are manifestation of:

- polyploidy
- modification variability
- combinative variability
- chromosomal mutation
- aneuploidy

Correct answer:

- modification variability

Note.

Another possible variant of the question: *"A female suffered rubella during pregnancy."*

139. An underage patient has signs of achondroplasia (dwarfism). It is known that this is a monogenic disease and the gene that is responsible for the development of such abnormalities is a dominant one. The development of that child's brother is normal. Specify the genotype of the healthy child:

- *AaBb*
- *AABB*
- *Aa*
- *aa*
- *AA*

Correct answer:

- *aa*

140. The antigen A, which is controlled by I^A allele, and the antigen B, which is a product of expression of I^B allele, are present at the same time in erythrocytes of a person with the fourth blood group ($I^A I^B$ genotype). What example of gene interaction this phenomenon represents?

- Incomplete dominance
- Polymerism
- Epistasis
- Codominance
- Complementarity

Correct answer:

- Codominance

Note.

Incomplete dominance is semidominance. Polymerism is polymery.

141. If a trait is determined mostly by genetic factors, the percentage of concordance between twins is much higher in monozygotic twins than in dizygotic ones. What is the percentage of blood group concordance in monozygotic twins?

- 100%
- 75%
- 50%
- 25%
- 0%

Correct answer:

- 100%

142. Parents are deaf-mute, but deafness of a wife depends on an autosomal recessive gene and in a husband arises owing to long reception of antibiotics in the childhood. What probability of the birth of the deaf child in this family, if the father is homozygous for the allele of normal hearing?

- 25%
- 100%
- 50%
- 75%
- 0%

Correct answer:

- 0%

143. Primary microcephaly, which is a monogenic autosomal recessive disease, is diagnosed for a girl. A brother of this girl has normal development. What are genotypes of parents of these children?

- $Aa \times Aa$
- $AA \times AA$
- $aa \times aa$
- $AA \times aa$
- $AABB \times AABB$

Correct answer:

- $Aa \times Aa$

144. Parents have normal hearing, their two daughters and son have congenital deafness, and other 5 children are healthy. What is the pattern of deafness inheritance?

- X-linked dominant
- Autosomal recessive
- Y-linked
- X-linked recessive
- Autosomal dominant

Correct answer:

- Autosomal recessive

145. In a chromosome region, genes are located in such sequence: *ABCDEFGG*. As a result of radioactive radiation, rearrangement occurred, then a chromosome region has the following structure: *ABDEFG*. What mutation occurred?

- Deletion
- Duplication
- Insertion
- Inversion
- Trisomy

Correct answer:

- Deletion

Note.

This question was used during examination in 2019, and it had such version of the incorrect answer: "mutation". We replaced it by the answer "trisomy".

Questions that are not included into the main text

Question. *Premolar teeth absence is inherited as an autosomal dominant factor. Parents with normal dental system gave birth to a child with lacking premolar teeth. What is the probability of giving birth to children without this pathology (%) in this family?* Answers: a) 0; b) 12.5; c) 25; d) 50; e) 75. This question was used during examination for stomatologists in 2011; answer "75%" was proposed as a correct one, but this is a mistake. Normal parents must have aa genotype, and all children will have no this pathology (correct answer must be 100%). Child with dominant trait can appear as a result of gametic mutation or in the case of incomplete penetrance (when one of parents can have Aa genotype but recessive trait).

MOLECULAR GENETICS

1. During biochemical analysis of human cells, DNA that differs in its structure from chromosomal DNA was received. This nucleic acid was received from:

- ribosomes
- Golgi complex
- smooth endoplasmic network
- mitochondria
- lysosomes

Correct answer:

- mitochondria

2. Solution of radioactively labelled leucine was added to nutrient medium where cells of animals are grown up. After a while, high concentration of this labelled amino acid was found by radioautography method near certain organoids. These organoids can be:

- smooth endoplasmic network
- Golgi apparatus
- cell center
- ribosomes
- lysosomes

Correct answer:

- ribosomes

3. Under the influence of mutagen, the composition of some triplets in a gene was changed but a cell continued the synthesis of the same protein. What characteristics of the genetic code can it be connected with?

- Specificity
- Universality
- Triplet nature
- Degeneracy
- Collinearity

Correct answer:

- Degeneracy

Note.

Collinearity and colinearity are synonyms.

4. Spiralization of chromosomes has great biological value, as:

- reactions of transcription are accelerated
- activation of DNA occurs
- process of chromatid disjunction is facilitated
- DNA inactivation occurs
- reactions of transcription are slowed down

Correct answer:

- process of chromatid disjunction is facilitated

5. Part of the DNA chain turned 180 degrees as a result of gamma radiation. What type of mutation took place in the DNA chain?

- Inversion
- Deletion
- Translocation
- Doubling
- Replication

Correct answer:

- Inversion

6. Human cells were influenced by ultraviolet radiation, and DNA molecules had been changed as a consequence of this. Nevertheless, DNA structure was renewed by means of specific enzymes. What do we call this phenomenon?

- Replication
- Translation
- Repair
- Reverse transcription
- Transcription

Correct answer:

- Repair

Note.

In the book *"Collection of tasks..."*, the phrase "DNA molecules had been destroyed" is used; in this case, DNA repair is impossible. During exams in 2016 and 2019, such question was present: *"Cells of a person working in the Chernobyl Exclusive Zone have undergone a mutation in DNA molecule. However, with time the damaged interval of DNA molecule has been restored to its initial structure with a specific enzyme. In this case the following occurred..."* This question is bad. First, the term "damaged fragment" is correct, but "damaged interval" is very bad translation from Ukrainian or Russian. Second, if a mutation has occurred, it can NOT be repaired because no enzymes can recognize a mutation. Only new reverse mutations can restore previous phenotype.

Other variants of incorrect answers:

- initiation
- termination
- duplication

7. Process of translation has a direct bearing on mechanisms of implementation of hereditary information – on gene expression. The beginning of this process in prokaryotes is associated with binding of specific amino acid to the peptide center of ribosome. What of the listed below amino acids is the first in a molecule of the synthesized protein?

- Methionine
- Arginine
- Formylmethionine
- Lysine
- Proline

Correct answer:

- Formylmethionine

8. It was proved that a molecule of immature mRNA (precursor mRNA) contained more triplets than amino acids found in the synthesized protein. The reason for that is that translation is normally preceded by:

- initiation
- replication
- processing
- repair
- mutation

Correct answer:

- processing

9. Sickle-cell anemia is caused by mutation of the gene that is responsible for synthesis of protein part of hemoglobin. In this case, polar amino acid is replaced by nonpolar that leads to reduction of solubility of hemoglobin and changing of erythrocyte shape. Specify, what replacement takes place in the hemoglobin molecule:

- alanine – into phenylalanine
- glutamic acid – into aspartic acid
- valine – into serine
- glutamic acid – into valine
- glutamic acid – into lysine

Correct answer:

- glutamic acid – into valine

10. Chargaff's rule indicates an equal ratio of purine and pyrimidine nitrogenous bases, which are the part of DNA molecules of any organism. The ratio between the sums of complementary bases $(A+T)/(G+C)$ indicates:

- amount of the proteins encoded in DNA
- phylogenetic relations of an organism
- size of DNA molecule
- species of an organism
- mutation degree

Correct answer:

- species of an organism

11. Changes of nucleotides are observed in DNA molecule, What consequences it can lead to?

- Anomalies of autosomes
- Chromosomal diseases
- Anomalies of sex chromosomes
- Translocations
- Gene diseases

Correct answer:

- Gene diseases

12. As a result of radiation influence on sequence of nucleotides in DNA, two nucleotides are lost. What of the listed types of mutations happened in DNA chain?

- Inversion
- Deletion
- Duplication
- Replication
- Translocation

Correct answer:

- Deletion

Note.

During exam in 2018, another variant of this question was used: *The cell was exposed to mutagenic factor, which resulted in DNA molecule losing 2 nucleotide pairs. What type of a mutation occurred in the DNA?*

13. Hereditary disease – xeroderma pigmentosum – was revealed in a patient. Malignant tumors were formed on skin. What is the nature of this disease?

- Activity of cardiovascular system is broken
- Nucleotide-excision repair of thymine dimers is disturbed
- Thymine dimers are formed with high frequency
- Methylation of purines occurs frequently
- Melanin metabolism is disturbed

Correct answer:

- Nucleotide-excision repair of thymine dimers is disturbed

Note.

In a database of the Testing Center, the answer "light repair of thymine dimers is disturbed" was proposed as correct one, but this repair system is absent in mammals. Nucleotide-excision repair is the sole repair pathway for pyrimidine dimers in humans.

14. What structural and chemical components take part in translation?

- Ribosomes, mRNA, tRNA, ATP, nucleotides, enzymes
- Ribosomes, mRNA, tRNA, AMP, amino acids, enzymes
- Ribosomes, pre-RNA, tRNA, ATP, lipids, enzymes
- Ribosomes, mRNA, tRNA, ATP, amino acids, enzymes
- Ribosomes, pre-RNA, tRNA, ATP, amino acids, enzymes

Correct answer:

- Ribosomes, mRNA, tRNA, ATP, amino acids, enzymes

15. Deoxyribonucleic acid (DNA) is the carrier of genetic information; its structural monomers are:

- mononucleotides
- amino acids
- nucleosides
- deoxyribose
- nitrogenous bases

Correct answer:

- mononucleotides

16. A 22-year-old girl has an open form of tuberculosis. Antibiotic rifampicin, which binds DNA-dependent RNA polymerase of prokaryotes, is a part of the complex of medicines prescribed for this girl. What process in the causative agent of tuberculosis is inhibited by rifampicin, which has medical effect?

- Translation
- Reverse transcription
- Replication
- Formations of aminoacyl-tRNA
- Transcription

Correct answer:

- Transcription

17. In the process of transcription, synthesis of complementary RNA molecule on DNA matrix is carried out. Choose the enzyme catalyzing this process:

- helicase
- topoisomerase
- DNA polymerase
- DNA-dependent RNA polymerase
- primase

Correct answer:

- DNA-dependent RNA polymerase

18. Polypeptide which has been synthesized on a ribosome includes 54 amino acids. How many codons did mRNA, used as a matrix during the synthesis, have?

- 44
- 27
- 108
- 162
- 54

Correct answer:

- 54

Note.

There is a mistake in this question. Correct answer must be 55 because we must add a stop codon.

19. Transversion has occurred in the mRNA molecule that codes for synthesis of β chain of hemoglobin A: the purine nucleotide was replaced with the pyrimidine nucleotide. It has led to damage of structure of hemoglobin molecule: valine appeared in the 6th position of β chain instead of glutamic acid. Clinically it is manifested as such disease:

- α thalassemia
- β thalassemia
- sickle-cell anemia
- Minkowsky–Shauffard disease
- favism

Correct answer:

- sickle-cell anemia

20. In genetic engineering, different mechanisms of introduction of an artificial gene to a cell of a recipient are used. In what method of the listed below viruses are used for this purpose?

- Transduction
- Hybridization
- Copulation
- Transformation
- Conjugation

Correct answer:

- Transduction

21. Specify, what molecular mechanism of mutations is induced by nitrous acid:

- reaction with amino groups of purines and pyrimidines
- formation of gaps in DNA chains
- formation of thymine dimers
- formation of mistakes in bonds of DNA with protein
- blocking of DNA-dependent RNA polymerase

Correct answer:

- reaction with amino groups of purines and pyrimidines

22. Labelled amino acids alanine and tryptophane were injected to a mouse in order to study localization of protein synthesis in its cells. The labelled amino acids will be accumulated near the following organelles:

- agranular (smooth) endoplasmic reticulum
- lysosomes
- Golgi apparatus
- ribosomes
- cell center

Correct answer:

- ribosomes

23. A substance blocking work of DNA polymerases was added into a nutrient medium for cultivation of cells. What process is damaged during interphase period of cellular cycle?

- ATP synthesis
- DNA repair
- Translation
- Active transport
- Transcription

Correct answer:

- DNA repair

24. During research of some cell organoids, their own nucleic acids containing uracil were revealed in these organoids. These organoids were:

- ribosomes
- Golgi complex
- chromosomes
- microtubules
- cell center

Correct answer:

- ribosomes

25. A fragment of diphtheria toxin is an enzyme that catalyzes reaction of ribosylation of the elongation factor TF-2 with its inactivation. What of the listed processes is blocked by diphtheria toxin as a result?

- RNA synthesis
- DNA synthesis
- Protein synthesis
- RNA maturing (processing)
- Posttranslational modification of protein

Correct answer:

- Protein synthesis

26. Preparations changing structure of ribosomes were used for influence on a cell. What processes will be broken first of all?

- Transport of substances
- Activation of amino acids
- Translation
- Synthesis of lipids
- Transcription

Correct answer:

- Translation

27. In culture of experimental cells, it was revealed that a fragment of nucleotide sequence in the DNA chain has moved. What of the listed changes has happened in DNA chain?

- Deletion
- Replication
- Translocation
- Duplication
- Inversion

Correct answer:

- Translocation

28. Antibiotic rifampicin is used in clinical practice as antitubercular drug. The mechanism of action of rifampicin is inhibition of:

- translation (protein synthesis)
- transcription (RNA synthesis)
- replication (DNA synthesis)
- reverse transcription (DNA synthesis on a RNA matrix)
- posttranslational modification of protein

Correct answer:

- transcription (RNA synthesis)

29. Gene expression is multistage process; information encoded in DNA is transferred to the sequence of amino acids of polypeptide as a result of this process. Define what of the listed stages does not the part of this process:

- transcription
- processing
- splicing
- replication
- translation

Correct answer:

- replication

30. Uracil (U) with a radioactive label was added into nutrient medium with human cells. During radioautography, labelled uracil will be found in:

- endoplasmic network
- Golgi apparatus
- ribosomes
- lysosomes
- cell center

Correct answer:

- ribosomes

31. A molecule of insulin consists of two polypeptide chains that are connected by disulfide bridges. Translation of each of them happens separately in cytoplasm, and later in a Golgi complex such process happens:

- folding of a polypeptide chain in a spiral
- cutting of amino acids in both ends
- binding of hormone with glucose
- replacement of some amino acids
- formation of quaternary structure

Correct answer:

- formation of quaternary structure

32. What is the length of DNA carrying information about synthesis of peptide, which contains 110 amino acid residues?

- 220 nucleotides
- 110 nucleotides
- 55 nucleotides
- 440 nucleotides
- 330 nucleotides

Correct answer:

- 330 nucleotides

33. One of characteristics of genetic code is its degeneracy. What does it mean?

- More than one codon correspond to one amino acid
- There are codons, which do not code amino acid
- One codon correspond to each amino acid
- One amino acid corresponds to each codon
- One codon corresponds to different amino acids

Correct answer:

- More than one codon correspond to one amino acid

34. Researches showed that glutamic acid in the sixth position of hemoglobin of a patient was replaced by valine. For what disease it is characteristic?

- Leukosis
- Beta thalassemia
- Alpha thalassemia
- Hemophilia
- Sickle-cell anemia

Correct answer:

- Sickle-cell anemia

35. What of the statements listed below about synthesis of protein is correct?

- Only one codon exists for each type of amino acid
- The molecules of transport RNA that are specific to appropriate amino acids are synthesized on matrix mRNA in cytoplasm
- Matrix (information RNA), which is synthesized on DNA matrix in a nucleus, carries information defining sequence of amino acids in a polypeptide chain
- Decoding of genetic code on ribosomes can begin from any point of mRNA
- Molecules of transport RNA deliver mRNA from a nucleus to ribosomes

Correct answer:

- Matrix (information RNA), which is synthesized on DNA matrix in a nucleus, carries information defining sequence of amino acids in a polypeptide chain

36. Choose the substances which are the part of one nucleotide:

- triose, nitrous acid, uracil
- pentose, residue of phosphoric acid, nitrogenous base
- hexose, residue of phosphoric acid, cyclic nitrogenous compound
- amino acid, phosphate group, thymine
- tetrose, phosphate group, adenine

Correct answer:

- pentose, residue of phosphoric acid, nitrogenous base

37. In a nucleus, the molecule of immature mRNA transforms to the molecule of the mature mRNA, which is shorter than the immature mRNA. What do we call the combination of stages in this transformation?

- Replication
- Processing
- Recognition
- Transmission
- Termination

Correct answer:

- Processing

38. It is known that information about the amino acid sequence in a protein molecule is written in the form of nucleotide sequence. There are four types of nucleotides in a DNA molecule. Different amino acids are encoded by different number of triplets ranging from one to six. What do we call this property of the genetic code?

- Triplet nature
- Universality
- Collinearity
- Degeneracy
- Specificity

Correct answer:

- Degeneracy

39. Blood of a child and putative father was referred to forensic medical examination for affiliation. What chemical components should be identified in the blood under study?

- Transfer RNA
- Ribosomal RNA
- Messenger RNA
- DNA
- snRNA

Correct answer:

- DNA

Note.

Affiliation is the same as paternity.

40. Structural analogs of pyrimidines (fluorouracil, fluorodeoxyuridine, Ftorafur) inhibit DNA replication and therefore are used for treatment of malignant tumors. What from the listed is broken under their action, causing blocking of DNA synthesis?

- Synthesis of deoxyribonucleotides – precursors of DNA
- Initiation of synthesis of nucleotide chains of DNA
- Activity of DNA polymerases
- Untwisting of a double spiral of DNA
- Activity of DNA ligase

Correct answer:

- Synthesis of deoxyribonucleotides – precursors of DNA

41. At all forms of reproduction (sexual and asexual reproduction), elementary discrete unit of heredity is:

- one nucleotide
- one chain of DNA molecule
- one pair of nucleotides
- one gene
- two chains of DNA molecule

Correct answer:

- one gene

42. Reverse transcriptases (revertases, or RNA-dependent DNA polymerases) catalyze:

- DNA synthesis on rRNA
- synthesis of mRNA on DNA
- synthesis of all types of RNA on DNA
- DNA synthesis on RNA
- DNA synthesis on DNA

Correct answer:

- DNA synthesis on RNA

43. In a general view, the genetic apparatus of eukaryotes is such: acceptor zone–exon–intron–exon. Such structural-functional organization of a gene causes special features of transcription. Choose what mRNA will be present according to the mentioned scheme:

- exon–exon
- exon–exon–intron
- exon–intron–exon
- acceptor zone–exon–intron–exon
- acceptor zone–exon–exon–intron

Correct answer:

- exon–exon

44. Radioprotectors, which increase resistance of an organism to action of mutagenic factors, were prescribed to an employee of scientific research institute, who works with radioactive materials. What possible mechanism of adaptation influence at the cellular level is carried out by radioprotectors?

- Stimulate mechanisms of DNA repair
- All listed mechanisms
- Activate nonspecific mechanisms of protection
- Inactivate products of free-radical oxidation
- None of the listed mechanisms

Correct answer:

- Inactivate products of free-radical oxidation

45. Enzyme DNA ligase that takes part in the process of excision repair of DNA, was blocked under the influence of unknown mutagen. What stage of the process of DNA repair will be broken?

- Recognition of the damaged site of DNA and its removal
- Cutting of the damaged DNA site
- Cutting of the damaged site of DNA and its replacement by the appropriate DNA site
- Synthesis of a new site by the principle of complementarity
- Linking together of the built-in nucleotides with an intact site of DNA molecule

Correct answer:

- Linking together of the built-in nucleotides with an intact site of DNA molecule

46. Protein-repressor has been found in a cell. What gene codifies the amino acid sequence of this protein?

- Promoter
- Terminator
- Regulator
- Modifier
- Operator

Correct answer:

- Regulator

Note.

This question is very bad. It should be emphasised that promoter, terminator, and operator are NOT genes, they are regulatory regions of genes!

47. Hydrocortisone and prednisolone, which stimulate transcription and therefore protein synthesis, were prescribed to a patient. What changes appear in karyoplasm of the nucleus at long drug intake?

- Amount of the functioning euchromatin decreases
- Amount of the functioning heterochromatin decreases
- Amount of the functioning heterochromatin increases
- Activity of the functioning heterochromatin increases
- Amount and activity of the functioning euchromatin increase

Correct answer:

- Amount and activity of the functioning euchromatin increase

48. Sickle-cell anemia, when erythrocytes are in the form of a sickle, is widespread among populations of some districts in tropic Africa. What biological phenomenon is this disease based on?

- Gene mutation
- Chromosomal aberration
- Modification
- Chromosomal mutation
- Transduction

Correct answer:

- Gene mutation

49. The health officer suspended work of chemical plant as a large number of different chemical mutagens were emitted into atmosphere as a result of breakages of treatment facilities. What type of mutations can arise under this influence?

- Insertions
- Chromosome aberrations
- Genomic mutations
- Point mutations
- Missense mutations

Correct answer:

- Point mutations

50. Transcription is taking place in human cells, RNA polymerase enzyme moving along the DNA molecule has reached a specific nucleotide sequence; after that, transcription has ended. What do we call this DNA site?

- Operator
- Terminator
- Promoter
- Repressor
- Regulator

Correct answer:

- Terminator

51. During the synthesis period (S) of the cell cycle, the redouble of DNA quantity takes place. This process occurs as a result of:

- denaturation of DNA
- dissociation of DNA
- replication of DNA
- DNA repair
- coagulation of DNA

Correct answer:

- replication of DNA

52. A promoter is known to be responsible for joining the RNA polymerase enzyme and initiating of transcription. At that site, deletion of two nucleotide pairs has taken place. What consequences could it have?

- Lack of protein synthesis
- Formation of abnormal proteins
- Synthesis of protein in unlimited quantities
- Formation of normal protein
- Short finish of protein synthesis

Correct answer:

- Lack of protein synthesis

53. Scientists established amino acid sequence in the molecule of ribonuclease enzyme. How this sequence is encoded in a cell?

- Sequence of exons in DNA molecule
- Nitrogenous bases in DNA
- Sequence of nucleotides of the appropriate site of the sense strand DNA
- Sequence of introns in DNA
- Alternation of exons and introns

Correct answer:

- Sequence of nucleotides of the appropriate site of the sense strand DNA

54. According to the hypothesis of lactose operon (Jacob, Monod, 1961), lactose, which gets into a cell of *Escherichia coli* from the environment, acts as an inducer. In what way does lactose induce the synthesis of enzymes that decompose it, i. e. turns on the operon?

- It combines with the repressor protein
- It combines with the operator gene
- It combines with the regulator gene
- It combines with the promoter
- It combines with the structural gene

Correct answer:

- It combines with the repressor protein

Note.

In the book *"Collection of tasks..."*, the term "operator gene" is used, but correct term is "gene operator" or "operator". Instead of "It combines", the phrase "It binds" must be used.

55. Let's assume that pro-RNA and mature mRNA were extracted from a nucleus. What of them is mature?

- Full copy of two chains of DNA
- Lacks introns
- Full copy of matrix chain of DNA
- Lacks exons
- Lacks several triplets

Correct answer:

- Lacks introns

56. Hemoglobin of adult man (HbA) is the tetramer protein consisting of two α chains and two β peptide chains. What name such structure of this protein has?

- Primary
- Tertiary
- Secondary
- Quarternary
- Peptide

Correct answer:

- Quarternary

57. Antibiotic rifamycin, which is used for treatment of tuberculosis, influences certain biochemical processes. Name them:

- inhibits RNA polymerase at initiation stage
- inhibits DNA polymerase at initiation stage
- inhibits DNA ligase
- inhibits aminoacyl-tRNA synthetase
- inhibits action of protein factors during protein synthesis

Correct answer:

- inhibits RNA polymerase at initiation stage

58. Scientists Francois Jacob and Jacques Monod proposed the general scheme of a structure of the genetic apparatus of prokaryotes (operon model) in 1961. What is the role of protein repressor in this model?

- Binds to operator
- Binds to promoter
- Activates structural genes (cistrons)
- Binds to terminator
- Inactivates proteins synthesized according to the program of structural genes

Correct answer:

- Binds to operator

59. Chemical substance, which blocks work of enzymes that take part in despiralization of DNA, was introduced into a cell. What processes and during what period of mitotic cycle of a cell are broken?

- DNA replication in metaphase
- Despiralization of chromosomes and formation of a nuclear envelope in telophase are broken
- Division of a site of centromere into separate chromatids in anaphase
- DNA replication in the synthetic period
- Daughter chromosomes do not reach cell poles in anaphase

Correct answer:

- DNA replication in the synthetic period

60. One of DNA chains consists of nucleotides; ATC-ACC-GAC-GTT... What sequence of nucleotides is on the second chain of this DNA molecule?

- ATC-ACC-GAC-GTT...
- GCT-GTT-AGT-ACC...
- TAG-TGG-CTG-CAA...
- CGA-CAA-TCA-TGG...
- TTG-CAG-CCA-CTA...

Correct answer:

- TAG-TGG-CTG-CAA...

61. During conjugation of bacteria of two strains A and B, it was established that gene *Str* was transferred on the 3rd minute of conjugation, gene *Bac* – on the 5th minute, and gene *Ins* – on the 9th minute. It indicates such phenomenon as:

- degeneracy of genetic code
- mosaicism of nucleoid in bacteria
- linear arrangement of genes
- existence of processes of reparation
- exon-intron organization of a genome

Correct answer:

- linear arrangement of genes

62. During translation, a few ribosomes, placed along the mRNA molecule at a certain distance from one another, join each mRNA simultaneously. What do we call the translation complex that consists of one mRNA molecule and some ribosomes which are placed on it?

- Centrosome
- Lysosome
- Phagosome
- Nucleosome
- Polysome

Correct answer:

- Polysome

63. You are studying functioning of the bacterial operon. An operator has been released from a repressor. Immediately after this, the following process will start in a cell:

- processing
- transcription
- replication
- translation
- repression

Correct answer:

- transcription

Note.

Incorrect sentence was present in the site <http://testcentr.org.ua/> (2013): "The operator gene has been released from the repressor gene."

64. Such research with bacteria from different strains was conducted. U-shaped tube in the lower part was divided by the bacterial filter. In one its half there were bacteria *E. coli*, which contain the enzyme that splits lactose, and a prophage (gene lac^+). In other half there was a strain that has no this enzyme (gene lac^-). After a while the analysis of cells of the second strain was performed; it was found that lac^+ forms appeared among them. What substance has caused the transduction phenomenon?

- tRNA
- mRNA
- Lipid
- Enzyme
- DNA

Correct answer:

- DNA

65. It is established that pro-RNA molecule consists of 9000 nucleotides, and 3000 nucleotides of them are introns. Define how many amino acids are present in a polypeptide:

- about 3000
- about 2000
- about 6000
- about 1000
- 9000

Correct answer:

- about 2000

66. A number of hemoglobinopathies are characterized by amino acid replacements in alpha and beta chains of hemoglobin. What of them is characteristic for HbS (in the case of sickle-cell anemia)?

- Ala → Ser
- Glu → Val
- Met → His
- Gly → Ser
- Glu → Lys

Correct answer:

- Glu → Val

67. During investigation of the process of replication of *E. coli* genome, small fragments of newly synthesized DNA were revealed. By means of what enzyme they form polynucleotide chain?

- DNA polymerase
- DNase
- DNA-dependent RNA polymerase
- Nucleotidase
- DNA ligase

Correct answer:

- DNA ligase

68. F plasmids encode synthesis of:

- enterotoxin
- proteins causing death of bacteria of the same species
- sex filaments for transfer of genetic information
- enzymes, which cause an inactivation of medicines or reduce permeability of cellular wall for antibiotics
- enzyme destroying membranes of erythrocytes

Correct answer:

- sex filaments for transfer of genetic information

Note.

Pay attention that pili are NOT fimbriae.

69. Process, in which DNA released during lysis of one bacterium penetrates into another bacterium and leads to change of its phenotype, is called:

- sexduction
- transformation
- transfection
- conjugation
- transduction

Correct answer:

- transformation

70. Mutations among bacteria arise due to action of:

- adaptive enzymes
- high oxidation-reduction potential of nutrient medium
- recombinant vaccines
- constructive enzymes
- base analogs

Correct answer:

- base analogs

Note.

In a database of the Testing Center, the answer "nitrogenous bases" was proposed as correct one.

71. Erythrocytes of a patient with heavy form of hemolytic anemia have sickle form. What is the molecular reason of developing of this disease?

- Disturbance of haem synthesis
- Disturbance of synthesis of porphyrins
- Replacement of glutamic acid by valine in beta chain of hemoglobin
- Disturbance of synthesis of beta chain of hemoglobin
- Disturbance of synthesis of alpha chain of hemoglobin

Correct answer:

- Replacement of glutamic acid by valine in beta chain of hemoglobin

72. What enzyme of HIV (human immunodeficiency virus) is associated with the mechanism of reverse transcription?

- Protease
- Integrase
- Endonuclease
- Revertase
- RNA polymerase

Correct answer:

- Revertase

73. Solution of thymine (T) with radioactive label was added to nutrient medium where human cells are cultivated. Labelled thymine will be found by radioautography in:

- ribosomes
- endoplasmic network
- Golgi apparatus
- mitochondria
- lysosomes

Correct answer:

- mitochondria

74. What is main mechanism of action of antineoplastic antibiotics?

- Alkylation of RNA and DNA
- Inhibition of cellular division in metaphase
- Incorporation into DNA and RNA molecules instead of natural compounds
- Competitive inhibition of DNA metabolism
- Formation of stable complex with DNA of a tumor cell

Correct answer:

- Formation of stable complex with DNA of a tumor cell

75. According to the model of double DNA helix that was suggested by Watson and Crick, it was established that one of chains would not be lost during replication and the second chain would be synthesized complementary to the first one. What mechanism of replication is it?

- Semiconservative
- Analogous
- Dispersed
- Identical
- Conservative

Correct answer:

- Semiconservative

Note.

In the book "*Collection of tasks...*", this question is written as follows: *DNA double spirals, which were formed as a result of replication, consist of one maternal chain and one daughter chain. What do we call this way of replication?*

76. Lesion by Rous sarcoma becomes possible only if information about the structure of RNA-containing virus is introduced into the genome of a host cell. What enzyme has to be present in the structure of oncogenic virus of Rous sarcoma?

- Reverse transcriptase
- DNA gyrase
- Aminoacyl-tRNA synthetase
- DNA-dependent RNA polymerase
- RNA replicase

Correct answer:

- Reverse transcriptase

77. Pigmentation of human skin intensifies under the influence of ultraviolet radiation. It results from change of:

- number of chromosomes
- structure of chromosomes
- structure of genes
- activity of genes
- activity of ribosomes

Correct answer:

- activity of genes

78. RNA of the AIDS virus penetrated into a leucocyte and forced a cell to synthesize viral DNA by means of reverse transcriptase. This process is based upon:

- replication
- reverse transcription
- operon repression
- reverse translation
- operon depression

Correct answer:

- reverse transcription

Note.

The term "convariant replication" was present in the site <http://testcentr.org.ua/> (2013), but this term is not used in scientific literature.

79. Chemical composition of human DNA molecules as carriers of genetic information is analyzed. Monomers of these biopolymers are:

- nucleotides
- nitrogenous bases
- deoxyribose
- genes
- amino acids

Correct answer:

- nucleotides

80. What researches of the listed below served as the first proof of the leading role of DNA in storage and transfer of hereditary information?

- Morgan's researches
- Investigation of Watson and Crick
- Investigations of Griffith and Avery
- Mendel's researches
- Investigations of Jacob and Monod

Correct answer:

- Investigations of Griffith and Avery

81. It was determined that the sequence of mRNA triplets totally corresponds to the amino acid sequence in the polypeptide chain. What do we call this characteristic of the genetic code?

- Universality
- Triplet nature
- Specificity
- Degeneracy
- Collinearity

Correct answer:

- Collinearity

Note.

Terms *collinearity* and *collinearity* are synonyms. Question is not good, because colinearity is NOT the property of the genetic code.

82. Oncogenic RNA viruses were introduced into an organism of experimental animal. By means of what enzyme replication of their genome occurs?

- DNA ligase
- RNA-dependent DNA polymerase
- DNA polymerase
- Translocase
- DNA-dependent RNA polymerase

Correct answer:

- RNA-dependent DNA polymerase

83. It was established that exons of a human gene (DNA molecule) contain 9000 nucleotides. What amount of amino acids is present in the polypeptide that is coded by this gene?

- About 1500
- About 3000
- About 9000
- About 4500
- About 12000

Correct answer:

- About 1500

84. Antibiotics, which inhibit biosynthesis of nucleic acids and proteins, are used in clinical practice as antineoplastic and antibacterial drugs. What mechanism of action is the most probable for antibiotics with antineoplastic activity?

- They block the center of binding of aminoacyl-tRNA in the aminoacyl center of a ribosome
- They bind a large subunit of ribosomes and inhibit translocation of a ribosome along mRNA
- They bind a large subunit of ribosomes and inhibit activity of peptidyltransferase
- They bind a small subunit of ribosomes and inhibit elongation process
- They form stable complexes with DNA and inhibit processes of replication and transcription

Correct answer:

- They form stable complexes with DNA and inhibit processes of replication and transcription

85. One of the stages of protein synthesis is recognition of a codon and anticodon. The second triplet of mRNA is UAU. What complementary triplet is found in tRNA?

- GUG
- UAU
- AUA
- UGU
- CUC

Correct answer:

- AUA

86. It is known that the genetic code is degenerate and has triplet nature. What nucleotide can be changed in the coding triplet without losing its sense?

- Second
- First
- Third
- Second or third
- First or second

Correct answer:

- Third

87. Life cycle of a cell is divided into periods. In the S period of an interphase, replication occurs. Why the S period is much shorter (6–10 hours), than time necessary in experiment for DNA replication 1 cm long?

- Due to higher activity of replication enzymes in a cell
- It is the result of chromosomal organization of genetic material
- Due to DNA replication from two ends of a chromosome
- Due to DNA replication in different directions from a replication point
- Due to dividing of chromosomal DNA into replicons

Correct answer:

- Due to dividing of chromosomal DNA into replicons

88. RNA viruses of measles were revealed in an organism of a patient. By means of what enzyme an increase in number of molecules of virus RNA in this patient occurs?

- Translocase
- DNA ligase
- DNA-dependent RNA polymerase
- RNA-dependent RNA polymerase
- Reverse transcriptase

Correct answer:

- RNA-dependent RNA polymerase

89. A sequence of amino acid residues in a polypeptide molecule was established. This sequence will correspond to a certain arrangement of nucleotides in such site of DNA:

- promoter
- pseudogene
- operator
- terminator
- structural gene

Correct answer:

- structural gene

90. A mutation has occurred in a cell in the first exon of a structural gene. The number of nucleotide pairs has decreased from 290 pairs to 250. What is the type of this mutation?

- Inversion
- Duplication
- Deletion
- Translocation
- Nullisomy

Correct answer:

- Deletion

Note.

Another variant of incorrect answer:

- Nonsense mutation

91. A patient with skin cancer was treated with antineoplastic antibiotic actinomycin D. What stage of gene expression is inhibited by this preparation?

- Initiation of translation
- DNA replication
- Transcription
- Termination of translation
- Elongation of translation

Correct answer:

- Transcription

92. mRNA is synthesized in a cell nucleus on one chain of DNA. How this process is called?

- Transcription
- Reparation
- Replication
- Translation
- Activation of amino acids

Correct answer:

- Transcription

93. For determination of molecular mass of a gene, one can use average value of molecular mass of one nucleotide that makes 345. What exactly needs to be considered for this purpose?

- Number of amino acids in the appropriate protein molecule
- Number of nucleotides in both chains of DNA of a gene
- Number of nucleotides in the appropriate mRNA
- Number of nucleotides in a triplet
- Number of nucleotides in one chain of DNA of a gene

Correct answer:

- Number of nucleotides in both chains of DNA of a gene

94. Protein synthesis is carried out on ribosomes from matrixes of mRNA to which activated amino acids are transported. What RNA transports amino acids to ribosomes?

- Information RNA
- Ribosomal RNA
- tRNA
- Mature mRNA
- Pro-RNA

Correct answer:

- tRNA

95. Four nitrogenous bases in a combination of three in triplets give $4^3=64$ different codons therefore the same amino acids can be coded by different triplets. How the bigger quantity of transport RNAs (61) than amino acids, which are used for protein synthesis (20), can be explained?

- Universality of a code
- Specificity of a code
- Variability of DNA
- Degeneracy of genetic code
- The repeating sequences of nucleotides

Correct answer:

- Degeneracy of genetic code

96. In the process of maturing of information RNA, special enzymes cut off introns and join exons (processing). How informative sites of a gene are called?

- Transcriptions
- Exons
- Anticodons
- Introns
- Codons

Correct answer:

- Exons

97. In eukaryotes, as a result of transcription, pro-RNAs containing sites, which are not informative (introns) and are cut out during its maturing, are formed mainly. This process is called:

- capping
- attenuation
- gene conversion
- recombination
- splicing

Correct answer:

- splicing

98. It was revealed that T lymphocytes were affected by HIV, Virus enzyme – reverse transcriptase (RNA-dependent DNA polymerase) – catalyzes the synthesis of:

- virus informational RNA on the matrix of DNA
- DNA on virus ribosomal RNA
- viral DNA on the DNA matrix
- mRNA on the matrix of virus protein
- DNA on the matrix of virus mRNA

Correct answer:

- DNA on the matrix of virus mRNA

Note.

Another variant of incorrect answer:

- virus protein on the viral RNA matrix

99. A patient has decreased concentration of magnesium ions that are necessary for attachment of ribosomes to the granular endoplasmic reticulum. This condition is known to disrupt the process of protein biosynthesis. Disruption occurs at the following stage:

- amino acid activation
- processing
- transcription
- replication
- translation

Correct answer:

- translation

Note.

During exam in 2017, incorrect phrase was used: "ribosomes connection to granular endoplasmic reticulum".

100. Degeneracy of genetic code is the ability of several triplets to code for one amino acid. What amino acid is encoded by one triplet?

- Leucine
- Serine
- Alanine
- Methionine
- Lysine

Correct answer:

- Methionine

101. Gene expression consists of a number of stages. During one of them, synthesis of mRNA is carried out on one of DNA molecule chains. How the specified process is called?

- Elongation
- Collinearity
- Translation
- Transcription
- Termination

Correct answer:

- Transcription

102. Human genetic apparatus consists of approximately 30 thousand genes, while the number of variants of antibodies can reach millions. What mechanism is used for formation of new genes that are responsible for synthesis of such a number of antibodies?

- Recombination of genes
- Amplification of genes
- DNA replication
- DNA repair
- Formation of Okazaki fragments

Correct answer:

- Recombination of genes

103. In operon model, a promoter is a place of primary attachment of RNA polymerase from which process of transcription begins. What can block this process?

- Interaction of structural genes
- Attachment of protein repressor to an operator
- Attachment of repressor to the regulatory gene
- Interaction of terminator with repressor
- Interaction of terminator with an operator

Correct answer:

- Attachment of protein repressor to an operator

104. Different cells that belong to one man are capable to synthesize different proteins at the same time. It is possible because:

- cells of one organism have different DNA
- protein biosynthesis occurs differently in different cells of one organism
- different sites of DNA are transcribed in different cells at the same time
- different mutations occur constantly in cells of an organism
- synthesized proteins get different structure in the process of self-assembly

Correct answer:

- different sites of DNA are transcribed in different cells at the same time

105. An influenza virus penetrated into a cell. The mechanism of protein biosynthesis was reorganised in such manner that synthesis of virus protein began to occur:

- on polyribosomes
- in a nucleus
- in lysosomes
- in peroxisomes
- in a centriole

Correct answer:

- on polyribosomes

106. Different physical and chemical factors can destroy the structure of DNA. What do we call the ability of cells to regenerate the DNA structure?

- Transduction
- Transcription
- Replication
- Repair
- Transformation

Correct answer:

- Repair

107. It was considered for the long time that relationship of virus and bacterial cell always end with destruction of the last one. Nevertheless, it was revealed over time, that not all phages cause cell death. They are capable to carry part of a genome of one bacterium to a genome of another one; owing to this process, genotype of recipient cell receives properties of another strain. How this phenomenon is called?

- Transformation
- Transduction
- Translation
- Transcription
- Transposition

Correct answer:

- Transduction

108. Children, who are homozygous for recessive autosomal mutation "xeroderma pigmentosum", look normally at birth, but already at early age they receive damages of skin under the influence of sunlight. Xeroderma pigmentosum results from disturbance of the process of:

- replication
- repair
- translation
- transcription
- recombination

Correct answer:

- repair

109. Phenylketonuria is the hereditary disease caused by a point mutation. This is the change of:

- number of chromosomes in diploid set
- number of genes
- molecular structure of a gene
- number of chromosome sets
- structures of a single chromosome

Correct answer:

- molecular structure of a gene

110. One of the main characteristics of a living being is ability to reproduction. On what level of living organisms organization does this process happen on the basis of matrix biosynthesis?

- Organismic
- Subcellular
- Cellular
- Tissue
- Molecular

Correct answer:

- Molecular

111. β thalassemia is a disease which is characterized by insufficient production of β chains of globin. It was found that excess of pro-RNA and deficiency of mRNA of β globin are observed in cells of patients. What stage of gene expression is broken in these people?

- Reduplication
- Transcription
- Processing
- Translation
- Reparation

Correct answer:

- Processing

112. During analysis of a DNA fragment synthesized in the process of polymerase chain reaction, it was revealed that it contains 180 nucleotide pairs. What amount of monomers of protein is encoded by this fragment?

- 2
- 60
- 90
- 120
- 180

Correct answer:

- 60

113. During oral test of students on the subject "Molecular Biology", a teacher asked a question: "Why the genetic code is called universal?" Correct answer should be as follows: "Because it...":

- contains information about protein structure
- is universal for all organisms
- is triplet code
- codes for amino acids
- is used during replication, transcription and translation

Correct answer:

- is universal for all organisms

114. DNA replication is carried out by means of a complex of enzymes. What process is catalyzed by enzyme primase?

- Untwisting of chains of DNA molecule
- A rupture of DNA chain in the point "*ori*"
- Linking together of Okazaki fragments
- Stabilization of single-stranded sites of DNA
- Synthesis of primers – RNA chains

Correct answer:

- Synthesis of primers – RNA chains

115. A new growth with metastases was revealed on the patient's gum; it is a consequence of long smoking. What of the given processes is the reason of appearing of the new growth?

- Reparation
- Transcription
- Mutation
- Replication
- Translation

Correct answer:

- Mutation

116. A group of antibiotics brakes different stages of RNA synthesis. What form of variation is caused by such antibiotics?

- Correlative
- Combinational
- Mutational
- Ontogenetic
- Modification

Correct answer:

- Modification

117. Genetic structure of eukaryotic genes is "exon–intron–exon". Such structure-functional organization of a gene leads to certain specific features of transcription process. What sequence will correspond to pro-mRNA according to this scheme?

- Exon-exon-intron
- Intron-exon
- Exon-intron-exon
- Exon-intron
- Exon-exon

Correct answer:

- Exon-intron-exon

Note.

In exam booklet, the second sentence was written as follows: *"This structure-functional organization of the gene caused transcription peculiarities."*

118. Protein synthesis includes several subsequent stages. It is preceded by the synthesis of immature mRNA. What do we call this process?

- Termination
- Replication
- Elongation
- Translation
- Transcription

Correct answer:

- Transcription

119. Despiralization of DNA molecule was experimentally disturbed in an animal cell. What processes will not happen in a cell first of all?

- Anaphase of mitosis
- Translation
- Transcription
- Anaphase of meiosis
- Processing

Correct answer:

- Transcription

120. During protein synthesis, a ribosome, having passed an initiation stage, passes to the subsequent reading of mRNA codons, moving to the 3' end. How this stage is called?

- Processing
- Elongation
- Termination
- Prolongation
- Splicing

Correct answer:

- Elongation

121. On one of stages of protein biosynthesis, reading of genetic information from mRNA molecule occurs. What chemical compound carries out this process?

- tRNA
- Amino acid
- rRNA
- RNA polymerase
- Pro-RNA

Correct answer:

- tRNA

122. DNA of a man and all eukaryotes contains exons (informative sites) and introns (fragments that are not informative). In the course of maturing of RNA, cutting of introns and joining of exons occur. What is the name of this process?

- Splicing
- Reparation
- Transcription
- Termination
- Replication

Correct answer:

- Splicing

123. By means of researches, which were performed by F. Sanger, it was found that the sequence of amino acid residues, which are connected by peptide bonds, forms:

- primary structure of protein
- secondary structure of protein
- tertiary structure of protein
- quaternary structure of protein
- β -structure of protein

Correct answer:

- primary structure of protein

124. Duration of addition of one amino acid to a polypeptide chain in bacterial cell under optimum conditions makes approximately $\frac{1}{20}$ second. How much time cell needs to synthesize polypeptide, which is encoded by a gene having 1200 nucleotide pairs?

- $\frac{1}{20}$ s
- 400 s
- 2 s
- 20 s
- $\frac{1}{2}$ s

Correct answer:

- 20 s

Note.

This answer is not good because a gene has not only coding region but also non-coding sequences.

125. tRNA molecules have two active centers. An amino acid molecule is attached to one of them, and the aminoacyl-tRNA complex is formed. The second active center consists of three nucleotides and is called:

- aminoacyl center
- amino peptidyl center
- peptidyl center
- anticodon
- codon

Correct answer:

- anticodon

126. Skin of patients with xeroderma pigmentosum is extremely sensitive to sunlight, and skin cancer can develop. Hereditary insufficiency of enzyme UV endonuclease is the reason of this condition. What process is broken as the result of this defect?

- DNA replication
- DNA repair
- translation
- transcription
- reverse transcription

Correct answer:

- DNA repair

127. Quinolones – inhibitors of enzyme DNA gyrase – are used for treatment of urogenital infections. What process is broken under the influence of quinolones first of all?

- DNA replication
- Recombination of genes
- Amplification of genes
- DNA repair
- Reverse transcription

Correct answer:

- DNA replication

128. All types of RNA take part in a process of gene expression. Determine RNA and its function by such traits: it has 300–3000 nucleotides, its weight is from several hundred thousands to two million Dalton, it exists in the form of two fractions (mature and its precursor) and it is localized between two subunits of ribosomes:

- rRNA – provides transcription
- tRNA – defines initiation process
- rRNA – provides removing of protein from a ribosome
- tRNA – takes part in activation of amino acids
- mRNA – takes part in translation

Correct answer:

- mRNA – takes part in translation

129. Such gene mutations as inserts and losses of nucleotide pairs in DNA molecule occur due to unequal crossing-over; frequency of this crossing-over increases considerably under the influence of chemical and physical mutagenic factors. How the minimum quantity of the genetic material, which is lost or acquired owing to unequal crossing-over and induces mutation, is called?

- Muton
- Recon
- Cistron
- Transcripton
- Replicative fork

Correct answer:

- Recon

130. Examination of initial molecular structure of hemoglobin revealed substitution of glutamic acid by valine. What inherited pathology is it typical for?

- Thalassemia
- Sickle-cell anemia
- Hemoglobinosis
- Minkowsky–Shauffard disease
- Favism

Correct answer:

- Sickle-cell anemia

131. There are different levels of regulation of gene expression in eukaryotic cell. At what level process is controlled by enhancers?

- Translation
- Replication
- Processing
- Transcription
- Posttranslational modification

Correct answer:

- Transcription

132. A patient needs a large amount of proteins. What preparation needs to be applied?

- Increasing translation
- Reducing translation
- Reducing transcription
- Increasing replication
- Reducing replication

Correct answer:

- Increasing translation

133. An increase in quantity of new growths was revealed on skin of a woman after stay in a solarium. Damage of nucleotide sequence owing to influence of ultraviolet rays was the cause of appearance of new growths. Damage of what listed processes led to appearance of new growths?

- Transcription
- DNA repair
- Formation of mutations in DNA
- Termination of DNA synthesis
- DNA replications

Correct answer:

- DNA repair

134. An increase in formation of immunoglobulins owing to the increase in synthesis of appropriate mRNAs was revealed in a child recovering after flu. What process of the listed below leads to the increase in amount of protective proteins?

- DNA mutation
- Transcription
- DNA repair
- DNA replication
- Termination of DNA synthesis

Correct answer:

- Transcription

135. Some mRNA triplets (UAA, UAG, and UGA) code no amino acids, but in the process of reading of information they serve as terminators, in other words, they are able to stop translation. What are they?

- Stop codons
- Operators
- Anticodons
- Exons
- Introns

Correct answer:

- Stop codons

136. A patient with sickle-cell anemia has crescent shape of erythrocytes due to replacement of glutamic acid by valine in a hemoglobin molecule. What is the main defect of hereditary material?

- Structural chromosomal defect
- Crossing-over
- Mutation of changing of chromosome number
- Recombination
- Gene mutation

Correct answer:

- Gene mutation

137. Tryptophane for tryptophane operon is the compound that blocks this operon. How tryptophane blocks an operon?

- Binds to operator
- Binds to regulatory gene
- Binds to protein repressor
- Binds to promoter
- Binds to structural gene

Correct answer:

- Binds to protein repressor

138. A gene, which encodes a polypeptide chain, consists of 4 exons and 3 introns. When processing is over, the mature mRNA consists of nucleotides, which are complementary to:

- 3 introns
- 2 exons and 1 intron
- 1 exon and 1 intron
- 4 exons
- 4 exons and 3 introns

Correct answer:

- 4 exons

139. It is known that when one nucleotide in DNA is replaced, only one amino acid in peptide can be replaced. What property of genetic code is proved by this fact?

- Nonoverlapping of the code
- Degeneracy of the code
- Universality of the code
- Triplet structure of the code
- Specificity of the code

Correct answer:

- Nonoverlapping of the code

140. In an organism, nitrogenous acid, which causes oxidizing deamination of nitrogenous bases of nucleotides, is synthesized from nitrates, nitrites and nitrosamines. It can lead to a point mutation – replacement of cytosine to:

- adenine
- guanine
- inosine
- uracil
- thymine

Correct answer:

- uracil

141. A mutation of a structural gene did not lead to replacement of amino acids in protein. It shown such property of genetic code as:

- mutability
- redundancy
- colinearity
- insufficiency
- universality

Correct answer:

- redundancy

142. A 58-year-old man underwent an operation concerning prostate cancer. The course of radiation therapy and chemotherapy was carried out to him in 3 months. The complex of medicines contained 5-fluorodeoxyuridine – an inhibitor of thymidylate synthase. Synthesis of what substance is blocked by this preparation?

- rRNA
- Protein
- tRNA
- mRNA
- DNA

Correct answer:

- DNA

143. What is necessary for formation of transport form of amino acids for protein synthesis?

- mRNA
- GTP
- Aminoacyl-tRNA synthetase
- Ribosome
- Revertase

Correct answer:

- Aminoacyl-tRNA synthetase

144. RNA polymerase II is blocked due to amanitine poisoning (poison of death-cup). It disturbs:

- synthesis of mRNA
- primers synthesis
- synthesis of tRNA
- reverse transcription
- maturation of mRNA

Correct answer:

- synthesis of mRNA

145. In a healthy cell of salivary gland of a man, processes of biosynthesis of enzymes are investigated. The main direction of flow of information in this cell will be:

- mRNA \rightarrow polypeptide \rightarrow DNA
- DNA \rightarrow mRNA \rightarrow polypeptide
- tRNA \rightarrow mRNA \rightarrow DNA \rightarrow polypeptide
- DNA \rightarrow polypeptide \rightarrow mRNA
- polypeptide \rightarrow mRNA \rightarrow DNA

Correct answer:

- DNA → mRNA → polypeptide

146. Solution of thymine (T) with radioactive label is introduced into nutrient medium with cells. In what cell structures this labelled thymine will be found during radioautography?

- Nucleus
- Lysosomes
- Endoplasmic reticulum
- Ribosomes
- Golgi apparatus

Correct answer:

- Nucleus

147. Mature mRNA, in which molecule sense codons are revealed, approached a ribosome. These codons in the process of biosynthesis of polypeptide are a signal of:

- addition of certain amino acid
- binding of certain exons
- beginning of transcription
- termination of transcription
- addition of RNA polymerase

Correct answer:

- addition of certain amino acid

148. It was established that genetic information can be transferred not only from DNA to RNA, but also in the opposite direction – from RNA to DNA. What enzymes carry out this transfer?

- Ligases
- Restrictases
- Synthetases
- Revertases
- Polymerases

Correct answer:

- Revertases

149. A lymphocyte is affected with retrovirus HIV (AIDS). In this case, the direction of flow of information in a cell will be:

- mRNA \rightarrow polypeptide \rightarrow DNA
- DNA \rightarrow mRNA \rightarrow polypeptide
- RNA \rightarrow DNA \rightarrow mRNA \rightarrow polypeptide
- DNA \rightarrow polypeptide \rightarrow mRNA
- polypeptide \rightarrow RNA \rightarrow DNA \rightarrow mRNA

Correct answer:

- RNA → DNA → mRNA → polypeptide

150. What of the following statements about genetic code is wrong?

- A codon contains three nucleotides
- There is only one codon for each amino acid
- Codons are in matrix ribonucleic acid
- Each codon defines one amino acid
- The nucleotide of one codon cannot be the part of the other codon

Correct answer:

- There is only one codon for each amino acid

151. It is known that there are 64 codons. How many codons have no information about amino acids and are stop codons?

- 1
- 3
- 5
- 8
- 10

Correct answer:

- 3

152. What answer from listed is the most competent? Transcription is:

- transcription of genetic information from DNA molecule on matrix ribonucleic acid
- copying of matrix ribonucleic acid from DNA molecule
- synthesis of proteins
- synthesis of matrix RNA on DNA molecule as a sequence of nucleotides that complementary to DNA molecule
- polypeptide synthesis

Correct answer:

- synthesis of matrix RNA on DNA molecule as a sequence of nucleotides that complementary to DNA molecule

153. The structure of DNA twisted into a double spiral was proposed on the basis of data on X-ray diffraction, which were collected by:

- Franklin and Wilkins
- Griffith
- Avery, MacLeod and McCarty
- Watson and Crick
- Hershey and Chase

Correct answer:

- Franklin and Wilkins

154. What from listed is correct about bonds in DNA?

- A skeleton has 3',2'-phosphodiester bonds
- Two chains are connected by covalent bonds
- One chain is ended with the 2'-phosphate
- Follow from the 5'-phosphate to the 3'-carbon of sugar
- Both chains are ended with 3'-hydroxylic groups

Correct answer:

- Follow from the 5'-phosphate to the 3'-carbon of sugar

155. What of these postulates corresponds to the modern level of genetic knowledge?

- One gene – one trait
- One gene – one protein
- One gene – one ATP
- One gene – one DNA
- One gene – one polypeptide

Correct answer:

- One gene – one polypeptide

156. An experiment has demonstrated that UV-irradiated dermal cells of patients with xeroderma pigmentosum restore the native DNA structure slower than cells of healthy people due to the defect in DNA repair enzyme. What enzyme takes part in this process?

- Primase
- RNA ligase
- DNA polymerase III
- Endonuclease
- DNA gyrase

Correct answer:

- Endonuclease

157. Overdose of such antibiotics as kanamycin and chloramphenicol (Levomycesin) is dangerous, it leads to deafness. It is explained by the fact that they inhibit:

- replication
- transcription in a nucleus
- translation in cytoplasm of eukaryotic cells
- transcription in mitochondria
- translation in mitochondria

Correct answer:

- translation in mitochondria

158. It was found that some compounds, for instance fungi toxins and some antibiotics can inhibit activity of RNA polymerase. What process will be disturbed in a cell in the case of inhibition of this enzyme?

- Transcription
- Replication
- Translation
- Processing
- Repair

Correct answer:

- Transcription

159. It is known that a structural part of genes of eukaryotes is characterized by alternation of sense sites and sites that are not informative. What is the name of sites that has no information about sequence of amino acids in polypeptide?

- Exons
- Introns
- Mutons
- Recons
- Sites

Correct answer:

- Introns

160. It was established that not all point mutations like replacement of a base pair serve as the reason of change of amino acid in a polypeptide. Thanks to what property of genetic code it is possible?

- Degeneracy
- Colinearity
- Universality
- Continuity
- Triplet structure

Correct answer:

- Degeneracy

161. What organic compounds play a role of messengers between DNA molecules, which are carriers of genetic information, and polypeptide chains, which are elementary traits?

- Carbohydrates
- Lipids
- Proteins
- ATP
- RNA

Correct answer:

- RNA

162. The flow of substances, energy and information constantly passes through a human body. Reading and realization of genetic information at the molecular level are associated, first of all, with properties of:

- carbohydrates
- lipids
- amino acids
- nucleic acids
- mineral substances

Correct answer:

- nucleic acids

163. During epithelium regeneration of mucous membrane of oral cavity, DNA replication (selfreproduction) occurred according to semiconservative mechanism. Nucleotides of the new DNA chain are complementary to:

- Maternal chain
- Sense codons
- DNA polymerase enzyme
- Introns
- RNA polymerase enzyme

Correct answer:

- Maternal chain

164. It is known that some chemical compounds (bromine preparations, proflavin and other) are capable to cause mutations like deletions. To what such mutations will lead if damages happen in a structural site of a gene?

- Replacement of nucleotides of DNA
- Inversion of sites of DNA
- Damages of reading frame
- Replacement of several nucleotides
- The genetic code will not change

Correct answer:

- Damages of reading frame

165. Genetic polymorphism serves as basis for interpopulation and intrapopulation variation of people, which is shown in irregular distribution on the planet of some diseases, severity of their clinical course, different degree of predisposition to them, and drug effect. What consequences for people action of mutational process, which results in genetic and phenotypic polymorphism, has?

- Frequency of appearance of mutations in human population decreases
- Accumulation of homozygotes in large populations occurs
- Action of natural selection and genetic drift is excluded
- Hereditary variety is a barrier to organ transplantation
- Possibility of death of zygotes and embryos in each next generation of people decreases

Correct answer:

- Hereditary variety is a barrier to organ transplantation

166. It is known that the sequence of triplets in DNA defines an order of amino acids in a protein molecule. What is the property of genetic code?

- Complementarity
- Colinearity
- Specificity
- Nonoverlapping
- Anti-parallelism

Correct answer:

- Colinearity

167. Synthesis of protein on a ribosome begins with formation of initiation complex that includes:

- tRNA with phenylalanine
- tRNA with alanine
- tRNA with tyrosine
- tRNA with leucine
- tRNA with methionine

Correct answer:

- tRNA with methionine

168. It is known that the structural part of genes of eukaryotes is characterized by alternation of sense sites and sites that are not informative. What is the name of sites containing information about sequence of amino acids in polypeptide?

- Introns
- Mutons
- Exons
- Sites
- Recons

Correct answer:

- Exons

169. The linear structure of protein, which does not have metabolic activity, was formed on a ribosome. In the process of "maturing", it can lose end amino acids, form tertiary and quaternary structures, connect to carbohydrate or lipidic molecules. How processes of transformation of initial structure of polypeptide and formation of metabolic active proteins are called?

- Induced translation
- Protein termination
- Polypeptide elongation
- Translocation
- Posttranslational modification

Correct answer:

- Posttranslational modification

170. Process of conjugation was established in bacteria; during this process, the cytoplasmatic bridge is formed between bacteria; plasmids and DNA fragments are transferred through this bridge from the donor cell to the recipient cell. What is value of this process?

- Provides exchange of substances between cells
- Promotes activization of mutational process
- Provides transfer of the genetic material
- Increases heterozygosity
- Liquidates undesirable mutations

Correct answer:

- Provides transfer of the genetic material

Note.

During exam in 2017, such correct answer was used: "Provides exchange of genetic material", but this is a mistake. During conjugation, DNA is transferred in one direction only, exchange of the genetic material between cells does not occur.

171. A man is a carrier of HIV that is an RNA virus. Synthesis of viral DNA occurs in cells of this person. This process is based on:

- replication
- transcription
- reverse transcription
- repair
- translation

Correct answer:

- reverse transcription

172. Ultraviolet rays break integrity of DNA molecules and lead to formation of pyrimidine dimers, which cause mutations. Why the irradiated cells survive much better on light, than in the dark?

- Excision repair occurs
- Photorepair occurs
- Mitosis is activated
- Recombinational reparation occurs
- DNA polymerase is activated

Correct answer:

- Photorepair occurs

173. It is known that β -carotene, vitamins C and E reduce spontaneous damages of DNA. What group these substances belong to?

- Antimutagens
- Mutagens
- Comutagens
- Teratogens
- Oncogenes

Correct answer:

- Antimutagens

174. The gene for alanine tRNA was synthesized for the first time by H. Khorana in 1970. This gene consisted of 77 nucleotide pairs, had no regulatory part and therefore did not function. The gene for tyrosine tRNA, which was synthesized by Khorana later, functioned as real gene. What sites of a gene were synthesized in addition?

- Enhancers
- Structural genes
- Regulatory gene
- Promoter and terminator
- Repressor

Correct answer:

- Promoter and terminator

175. Formation of RNA molecules on DNA matrix is called:

- processing
- translation
- transcription
- splicing
- posttranslational modification

Correct answer:

- transcription

176. Infectious diseases are treated with antibiotics streptomycin, erythromycin, and chloramphenicol. They inhibit the following stage of protein synthesis:

- splicing
- processing
- replication
- translation
- transcription

Correct answer:

- translation

177. Synthesis of DNA begins from a primer.
The primer is:

- oligodeoxyribonucleotide
- oligoribonucleotide
- ATP
- dATP (deoxyadenosine triphosphate)
- DNA fragment consisting of 40 nucleotides

Correct answer:

- oligoribonucleotide

178. All RNA types are synthesized in the form of RNA precursors that are exposed then to maturing (processing). One of stages of processing is splicing. Splicing is:

- cutting of sites that are not informative (introns) and binding together of informative sites (exons)
- addition of 7-methylguanosine to the 5' end
- addition of 100–200 residues of adenylic acid to the 3' end
- chemical modification of the nitrogenous bases
- fragmentation of RNA

Correct answer:

- cutting of sites that are not informative (introns) and binding together of informative sites (exons)

179. Under the influence of solar radiation, in DNA of human skin such structures are most often formed:

- deletions
- replacements of nucleotides
- thymine dimers
- chromosome mutations
- one-stranded DNA

Correct answer:

- thymine dimers

180. In cells of a patient with AIDS, which are affected with HIV virus, activity of enzyme revertase is revealed. What nucleic acid is synthesized with participation of this enzyme?

- mRNA
- DNA
- rRNA
- tRNA
- Pro-mRNA

Correct answer:

- DNA

181. Streptomycin was used for treatment of an infectious disease. Synthesis of what substances will be suspended by action of this antibiotic?

- DNA
- mRNA
- tRNA
- rRNA
- Proteins

Correct answer:

- Proteins

182. In experiment, increase in activity of beta galactosidase after addition of lactose into culture medium with *E. coli* was shown. What site of lactose operon becomes unblocked from a repressor under these conditions?

- Promoter
- Operator
- Structural gene
- Regulatory gene
- Primer

Correct answer:

- Operator

183. Rifamycin was prescribed to a patient with tuberculosis of lungs. It inhibits enzyme RNA polymerase at stage of initiation of the process:

- translation
- replication
- termination
- elongation
- transcription

Correct answer:

- transcription

184. Translation begins with an initiation phase, when AUG codon encoding methionine binds to complementary anticodon of tRNA. Specify this anticodon.

- UCG
- UGC
- ACU
- UAC
- AUG

Correct answer:

- UAC

185. Process of protein biosynthesis is energy-dependent. Specify, what energy-rich substratum is used in this process at elongation stage.

- ATP
- ADP
- GTP
- UTP
- CTP

Correct answer:

- GTP

186. In structure of an operon of DNA of prokaryotes, there is a site to which RNA polymerase is attached in the phase of initiation of transcription. Find the name of this site.

- Primary transcript
- Promoter
- Operator
- Regulatory gene
- Structural gene

Correct answer:

- Promoter

187. The concept about transfer of hereditary information in the direction "DNA–RNA–protein" was the central dogma of molecular biology. How hereditary information is transferred in retroviruses?

- RNA–DNA–protein
- DNA–protein–RNA
- DNA–DNA–RNA–protein
- DNA–RNA–protein
- RNA–DNA–RNA–protein

Correct answer:

- RNA–DNA–RNA–protein

188. Process of transcription occurs in a cell of pathogenic bacterium. What serves as matrix for synthesis of one molecule of mRNA?

- Entire DNA molecule
- Site of one chain of DNA
- One entire chain of DNA molecule
- The chain of DNA molecule lack of introns
- The chain of DNA molecule lack of exons

Correct answer:

- Site of one chain of DNA

189. In some regions of South Africa, there is a spread of sickle-cell anemia, in which erythrocytes have sickle shape due to substitution of glutamic acid by valine in the hemoglobin molecule. What is the cause of this disease?

- Genomic mutation
- Crossing over
- Transduction
- Disturbance of mechanisms of genetic information realization
- Gene mutation

Correct answer:

- Gene mutation

Note.

This question was present in the site <http://testcentr.org.ua/> (2013) and contained a mistake: "substitution of glutamin by valine".

190. As a result of intoxication, enzymes providing splicing are not synthesized in the epithelial cell of mucous membrane of oral cavity. What is the reason of the termination of protein biosynthesis in this case?

- ATP is not synthesized
- rRNA is not synthesized
- Amino acids are not activated
- Transport of amino acids is broken
- Mature mRNA is not synthesized

Correct answer:

- Mature mRNA is not synthesized

191. In a genetical laboratory in course of the work with DNA molecules of white rats of Wistar's line, a nucleotide was substituted for another one. As a result, only one amino acid was substituted in a peptide. This result is caused by the following mutation:

- Deletion
- Duplication
- Displacement of reading frame
- Missense mutation
- Translocation

Correct answer:

- Missense mutation

Note.

Original question has such correct answer: "transversion", but this is a mistake. Indeed, this mutation is called "missense mutation" (it is a variant of the point mutation) and can be both transversion and transition depending on the nature of base substitution.

192. When studying features of genetic code, students found that there are amino acids, which are encoded by 6 codons, and five amino acids are encoded by 4 different codons. Other amino acids are encoded by three and two codons and only two amino acids by one codon. Specify, what property of genetic code was rediscovered by students?

- Universality
- Redundancy
- Colinearity
- Unidirectionality
- Triplet code

Correct answer:

- Redundancy

Note.

In the booklet published in 2006, answer with incorrect word "triplety" was used; we replace it by the answer "triplet code".

193. Owing to violation of safety rules, a worker of chemical company underwent toxic effect of nitrogenous acid and nitrites, which cause deamination of cytosine in DNA molecule. What enzyme initiates a chain of repair processes?

- Uracil DNA glycosylase
- DNA-dependent RNA polymerase
- Orotidine monophosphate decarboxylase
- Thymidylate synthase
- Cytidine triphosphate synthetase

Correct answer:

- Uracil DNA glycosylase

194. At the stage of translation in the rough endoplasmic reticulum, a ribosome moves along mRNA. Amino acids are joined together by peptide bonds in a specific sequence, and thus polypeptide synthesis takes place. The sequence of amino acids in a polypeptide corresponds to the sequence of:

- rRNA nucleotides
- rRNA anticodons
- mRNA codons
- tRNA nucleotides
- tRNA anticodons

Correct answer:

- mRNA codons

195. It is known that an operator is responsible for binding of RNA polymerase and initiation of transcription. Deletion of two nucleotides has occurred in this site. What consequences it can have?

- Formation of abnormal proteins
- Lack of protein synthesis
- Synthesis of protein in unlimited quantity
- Formation of normal protein
- Fast termination of protein synthesis

Correct answer:

- Lack of protein synthesis

196. mRNA, which contains both exonic and intronic sites, was transported to ribosomes of granular ER in human cell. It is explained by absence of:

- replication
- transcription
- translation
- processing
- prolongation

Correct answer:

- processing

197. As a result of translation, a linear protein molecule corresponding to its primary structure was formed. What connection appears between residues of amino acids in this protein structure?

- Peptide
- Hydrogen
- Disulfide
- Hydrophobic
- Ionic

Correct answer:

- Peptide

198. A mutation of a structural gene happened. In this gene, the number of nucleotides changed: instead of 90 base pairs, it became 180. This mutation is called:

- Inversion
- Duplication
- Deletion
- Translocation
- Transversion

Correct answer:

- Duplication

199. Damage of a structural gene as a part of DNA molecule occurred. However, it did not lead to replacement of amino acids in protein because after a while this damage was liquidated by means of specific enzymes. It was shown that DNA has the ability for:

- transcription
- mutation
- reverse transcription
- replication
- repair

Correct answer:

- repair

200. The majority of structural genes of eukaryotes in their structure (DNA fragments) are functionally unequal. They contain exons (informative sites) and introns (not informative fragments). What molecule of RNA is synthesized at first on this DNA?

- Informational RNA
- Pro-mRNA
- tRNA
- rRNA
- mRNA

Correct answer:

- Pro-mRNA

201. Treatment of a patient with hereditary form of immunodeficiency involved gene therapy: an enzyme gene was introduced into cells of a patient by means of a retrovirus. What property of the genetic code allows to use retroviruses as vectors of functional genes?

- Specificity
- Collinearity
- Continuity
- Universality
- Redundancy

Correct answer:

- Universality

202. Infectiologists widely apply antibiotics that inhibit synthesis of nucleic acids. What stage of biosynthesis is broken by rifampicin?

- Transcription in prokaryotes and eukaryotes
- Splicing in prokaryotes and eukaryotes
- Termination of transcription in prokaryotes and eukaryotes
- Replication in prokaryotes
- Initiation of transcription in prokaryotes

Correct answer:

- Initiation of transcription in prokaryotes

203. mRNA synthesis takes place on DNA matrix taking into account the principle of complementarity. If triplets in DNA are the following – ATG-CGT, the corresponding codons of mRNA will be:

- UAG-CGU
- ATG-CGT
- AUG-CGU
- UAC-GCA
- TAG-UGU

Correct answer:

- UAC-GCA

204. During cell division, DNA replication occurs by a signal from a cytoplasm, and a certain portion of the DNA helix unwinds and splits into two individual strains. What enzyme facilitates this process?

- RNA polymerase
- Ligase
- Restrictase
- Helicase
- DNA polymerase

Correct answer:

- Helicase

Note.

The phrase "During cell division, DNA replication occurs..." is not correct because DNA replication occurs before cell division, in interphase. (This question was used during exams in 2013, 2014, and 2015).

205. Nowadays about 50 minor bases have been found in the tRNA structure besides the main four nitrogenous bases. Choose the minor nitrogenous base:

- cysteine
- dihydrouracil
- cytosine
- uracil
- adenine

Correct answer:

- dihydrouracil

206. Students studied peculiarities of the genetic code and found out that there are amino acids corresponded by 6 codons, 5 amino acids – by 4 different codons. Other amino acids are encoded by three or two codons and only two amino acids are encoded by one codon. What peculiarity of the genetic code did students find out?

- Versatility
- Collinearity
- Redundancy
- Unidirectionality
- Triplet code

Correct answer:

- Redundancy

Note.

Redundancy is the same as degeneracy.

207. Tuberculosis can be treated by means of combined chemotherapy that includes substances with different mechanisms of action. What antituberculous medication inhibits transcription of DNA into RNA in mycobacteria?

- Isoniazid
- Streptomycin
- Rifampicin
- Ethionamide
- Para-aminosalicylic acid

Correct answer:

- Rifampicin

Note.

In the site <http://testcentr.org.ua/> (2013), incorrect phrase "transcription of RNA into DNA" was present.

208. Nucleolar organizers of human chromosomes 13–15, 21, and 22 contain about 200 cluster genes that synthesize RNA. These chromosomal regions contain the information on the following type of RNA:

- tRNA + rRNA
- snRNA
- mRNA
- rRNA
- tRNA

Correct answer:

- rRNA

209. A doctor was addressed by a 30-year-old man. There is a probability of a patient being HIV-positive. To clarify the diagnosis a doctor proposed to perform polymerase chain reaction. The basic process in this kind of investigation is:

- gene mutation
- transcription
- chromosome mutation
- genetic recombination
- gene amplification

Correct answer:

- gene amplification

210. Patients with xeroderma pigmentosum are characterized by abnormally high sensitivity to ultraviolet rays leading to skin cancer that arises owing to inability of fermental systems to repair damages of the hereditary material of cells. With disturbance of what process this pathology is associated?

- DNA repair
- Gene conversion
- DNA recombination
- Gene complementation
- DNA reduplication

Correct answer:

- DNA repair

211. A process of translation occurs in a cell. When a ribosome reaches UAA, UAG or UGA codons, synthesis of a polypeptide chain comes to an end. These codons in the process of polypeptide biosynthesis are not recognized by any tRNA and therefore serve as a signal of:

- posttranslational modification
- beginning of transcription
- termination
- elongation
- initiation

Correct answer:

- termination

212. As a result of treatment of viral RNA with nitrous acid, UCA triplet mutated to UGA triplet. What kind of mutation occurred?

- Nucleotide deletion
- Missense
- Transversion
- Nucleotide insertion
- Inversion

Correct answer:

- Transversion

Note.

During exams for students studying stomatology in 2014 and 2015, the answer "transition" was proposed as correct answer, but this is a mistake.

213. A large number of different tRNA molecules, which transport amino acids to a ribosome, was revealed during cytologic investigations. The number of different tRNAs in a cell will be equal to the number of:

- nucleotides
- amino acids
- proteins synthesized in a cell
- different types of mRNAs
- triplets coding for amino acids

Correct answer:

- triplets coding for amino acids

Note.

In 1966, F. Crick developed the *wobble hypothesis*, which proposed that some nonstandard pairings of bases could occur at the third position of a codon. Wobble allows some tRNAs to pair with more than one codon on an mRNA; thus the cells of most organisms possess from about 32 to 50 different types of tRNA.

214. A 28-year-old patient with bacterial pneumonia was administered a course of erythromycin treatment. It is known that antibacterial properties of erythromycin are determined by the ability to bind with free 50S subunit of a ribosome. Synthesis of what substances is blocked by this antibiotic in bacterial cells?

- Proteins
- RNA
- DNA
- Fats
- Polysaccharides

Correct answer:

- Proteins

215. Ability to divide is characteristic of pro-caryotic and eukaryotic cells. Procaryotic cell division is different from that of eukaryotic, but there is one molecular process that is the basis of both types of division. Name this process.

- Transcription
- Reparation
- Translation
- DNA replication
- Gene amplification

Correct answer:

- DNA replication

216. Genetic information is stored in DNA but DNA does not participate directly in protein synthesis within cells. What process ensures transfer of genetic information into polypeptide chain?

- Translation
- Formation of rRNA
- Formation of tRNA
- Formation of mRNA
- Replication

Correct answer:

- Translation

217. Defects in a DNA molecule can develop under the influence of physical factors. For instance, ultraviolet irradiation can cause formation of dimers. Dimers are two adjacent pyrimidine bases joined together. Name these bases:

- adenine and thymine
- guanine and cytosine
- adenine and guanine
- thymine and cytosine
- guanine and thymine

Correct answer:

- thymine and cytosine

218. Patients suffering from xeroderma pigmentosum have extremely photosensitive skin due to disrupted excision repair. Specify the process that is affected in such patients:

- Synthesis of mRNA
- Maturation of mRNA
- Repair of DNA molecule
- Synthesis of protein primary structure
- Intron excision and exon linking

Correct answer:

- Repair of DNA molecule

219. Sickle-cell anemia at a person is followed by appearance of abnormal hemoglobin in blood, change of a shape of erythrocytes, development of anemia. This disease is a result of:

- chromosome aberration
- mitochondrial mutation
- polyteny
- polyploidy
- gene mutation

Correct answer:

- gene mutation

220. In the process of evolution, molecular mechanisms for correction of damaged DNA molecules were developed. This process is called:

- repair
- transcription
- translation
- replication
- processing

Correct answer:

- repair

Note.

Original question was: "In the course of evolution,..."

221. A 15-year-old young man complains of general weakness, dizziness, fast fatigue. During investigation, erythrocytes with changed shape are revealed, their number is reduced. Provisional diagnosis: sickle-cell anemia. What type of a mutation causes development of this pathological condition?

- Frame-shift mutation
- Chromosome aberration
- Inversion
- Deletion
- Point mutation

Correct answer:

- Point mutation

222. A young family came for genetic counseling to identify the father of their child. The husband insists that the child does not resemble him at all and cannot possibly be his. Polymerase chain reaction method for person identification is based on the following:

- transduction
- genetic recombination
- missense mutation
- gene amplification
- nucleotide deletion

Correct answer:

- gene amplification

223. Streptomycin and other aminoglycosides prevent joining of formylmethionyl-tRNA by bonding with the 30S ribosomal subunit. This effect leads to disruption of the following process:

- translation initiation in eucaryotes
- transcription initiation in eucaryotes
- transcription initiation in procaryotes
- replication initiation in procaryotes
- translation initiation in procaryotes

Correct answer:

- translation initiation in procaryotes

224. During research of cells, high content of aminoacyl-tRNA synthetase was found in their cytoplasm. This enzyme provides such process in a cell:

- activation of amino acids
- repair
- transcription
- replication
- elongation

Correct answer:

- activation of amino acids

225. Antibiotic chloramphenicol (Levomyce-tin) was prescribed to a patient. It breaks pro-tein synthesis in microorganisms by inhibition of the process:

- formation of polyribosomes
- processing
- transcription
- amplification of genes
- elongation of translation

Correct answer:

- elongation of translation

226. Due to deficit of UV endonuclease, DNA repair is broken and such disease appears:

- sickle-cell anemia
- albinism
- gout
- phenylketonuria
- xeroderma pigmentosum

Correct answer:

- xeroderma pigmentosum

227. During DNA replication, one of its chains is synthesized with delay. What defines this feature of synthesis?

- Lack of nucleoside triphosphates
- Anti-parallelism of chains
- Need of repair
- Large size of DNA polymerase
- Complementarity of chains

Correct answer:

- Anti-parallelism of chains

228. In a nucleus of eukaryotic cell, the pre-mRNA molecule, which is complementary to exons and introns of a structural gene, is firstly synthesized. But then mRNA, which is complementary to exons only, arrives ribosomes. It testifies that such process takes place in a nucleus:

- replication
- reverse transcription
- transcription
- processing
- repair

Correct answer:

- processing

229. Biochemical analysis of amino-acid composition of just synthesized polypeptides showed that the first amino acid in each protein during translation is the same. Name it:

- isoleucine
- phenylalanine
- serine
- methionine
- histidine

Correct answer:

methionine

230. Formation of a large amount of immunoglobulins with different antigenic specificity from a small amount of genes occurs due to:

- translocation
- recombinations of genes
- transcription
- deletion
- replication

Correct answer:

- recombinations of genes

231. Under the influence of UV radiation and other factors, changes in DNA structure can occur. Repair of DNA molecule is reached by coordinated action of all listed enzymes **EXCEPT:**

- DNA ligase
- DNA polymerase
- DNA glycosidase
- endonuclease
- aminoacyl-tRNA synthetase

Correct answer:

- aminoacyl-tRNA synthetase

232. A 2-year-old boy who recently emigrated from Somalia is brought to the physician because of pain of his arms and legs. A peripheral blood smear shows sickle cells. Genetic analyses show a point mutation in the β -globin gene leading to a change of a GAG codon (glutamic acid) to a GUG codon (valine). Which of the following anticodons is most likely in the tRNA for valine?

- CAC
- GAG
- GUG
- CUC
- TCT

Correct answer:

- CAC

233. A mutation that causes the loss of the 3'-5' exonuclease activity of DNA-dependent DNA polymerase is most likely to also cause *Escherichia coli* to have problems with which cellular process?

- Segregating sister chromosomes
- Supercoiling of DNA
- Replacing misincorporated bases
- Synthesizing an RNA primer
- Transferring DNA strands during conjugation

Correct answer:

Replacing misincorporated bases

234. A newly synthesized compound that inhibits telomerase is being tested as a potential antineoplastic drug. Which of the following is most likely to occur in neoplastic cells treated with this drug?

- Arrest of the cell cycle in S phase
- Chromosome shortening
- Failure to complete mitosis
- Increased rate of mutation on the lagging strand of the replication fork
- Inhibition of cell senescence

Correct answer:

- Chromosome shortening

MEDICAL GENETICS

1. Three chromosomes of the 13th pair were revealed at a newborn child with multiple defects of a skull, extremities and internal by means of karyotyping method. The diagnosis was established:

- Edwards' syndrome
- Klinefelter's syndrome
- Down syndrome
- Patau syndrome
- Turner's syndrome

Correct answer:

- Patau syndrome

2. A 14-year-old girl has some abnormalities: her height is lower than that of girls of the same age, signs of puberty are absent, her neck is very short, her shoulders are wide. During cytogenetic analysis, the lack of one X chromosome was found. The girl has normal intellectual development. What disease does the girl have?

- Turner's syndrome
- Down's syndrome
- Edwards' syndrome
- Patau syndrome
- Klinefelter's syndrome

Correct answer:

- Turner's syndrome

3. A healthy woman who had viral roseola during pregnancy gave birth to a deaf baby with a normal karyotype and genotype. Baby's deafness is a manifestation of:

- Phenocopy
- Gene mutation
- Genocopy
- Combinative variability
- Chromosomal aberration

Correct answer:

- Phenocopy

4. A 14-year-old girl lags behind in physical and intellectual development, has small height and wide thorax resembling a shield; secondary sexual characteristics are absent. Barr bodies are not present. What is the mechanism of this disease?

- Genetic defect of synthesis of gonadotrophin
- Genetic defect of synthesis of sex hormones
- Hypothyroidism
- Disturbance of disjunction of sex chromosomes in meiosis
- Acquired insufficiency of somatotropin (growth hormone)

Correct answer:

- Disturbance of disjunction of sex chromosomes in meiosis

5. Sex chromatin was detected during examination of buccal epithelium of a man. What chromosomal disease this is characteristic for?

- Klinefelter's syndrome
- Down syndrome
- Trisomy of the X chromosome
- Hypophosphatemic rickets
- Turner's syndrome

Correct answer:

- Klinefelter's syndrome

6. A patient has long growth of extremities, extended "arachnoid" fingers, defects of crystalline lens of an eye, anomalies of cardiovascular system. Intelligence is normal. What traits this patient can have still?

- Cleft soft and hard palate
- Maldevelopment of connective tissue
- Underdevelopment of gonads
- Flat face and wide nose bridge
- Underdevelopment of the lower jaw

Correct answer:

- Maldevelopment of connective tissue

7. A 15-year-old boy of tall height, with delay of intellectual development and delayed sexual maturity has XXY karyotype. How many Barr bodies are in his cells?

- 0
- 1
- 2
- 3
- 4

Correct answer:

- 1

8. In medical consultation, the family tree of a patient with alkaptonuria is constructed. He is 12 years old. What symbol is necessary to be used for designation of the proband?

- To shade or paint over a symbol (square)
- To draw a horizontal hyphen over a square
- To put an exclamation mark or an asterisk near a square
- To draw an arrow near a square
- To put the dot inside a square

Correct answer:

- To draw an arrow near a square

9. In what family there is a high risk of development in a newborn of acholuric jaundice at the second childbirth?

- Wife is Rh-positive, husband is Rh-negative, the first child is Rh-negative
- Wife is Rh-positive, husband is Rh negative, the first child is Rh-positive
- Wife is Rh-negative, husband is Rh-positive, the first child is Rh-negative
- Wife is Rh-positive, husband is Rh-positive, the first child is Rh-positive
- Wife is Rh-negative, husband is Rh-positive, the first child is Rh-positive

Correct answer:

- Wife is Rh-negative, husband is Rh-positive, the first child is Rh-positive

10. Down syndrome was found in a 6-year-old child. However, the chromosomal analysis showed, that not all cells have an abnormal karyotype. How this phenomenon is called?

- Epistasis
- Incomplete penetrance
- Incomplete domination
- Mosaicism
- Variable expressivity

Correct answer:

- Mosaicism

11. A 25-year-old woman is pregnant for the third time; she got to clinic with threat of induced miscarriage. What combination of Rhesus factor in her organism and in a fetus can be the cause of this condition?

- Mother Rh^- , fetus Rh^-
- Mother Rh^+ , fetus Rh^-
- Mother Rh^+ , fetus Rh^+
- Mother Rh^- , fetus Rh^+
- It is impossible to define

Correct answer:

- Mother Rh⁻, fetus Rh⁺

12. Mother's karyotype contains 45 chromosomes. It was established that it is associated with translocation of the 21st chromosome onto the 15th one. What disease most likely will be present in a child (the father's karyotype is normal)?

- Klinefelter's syndrome
- Down syndrome
- Patau syndrome
- Morris' syndrome
- Edwards' syndrome

Correct answer:

- Down syndrome

13. "Cat's cry" syndrome – the "mewing" voice timbre – has appeared in a child immediately after birth. What was found after investigation of a karyotype of this child?

- Additional Y chromosome
- Deficiency of the X chromosome
- Additional chromosome 21
- Deletion of the short arm of chromosome 5
- Additional X chromosome

Correct answer:

- Deletion of the short arm of chromosome 5

14. Narrow shoulders and wide pelvis, underdevelopment of testes, high voice, gynecomasty, and infertility are characteristic for:

- Down syndrome
- Edwards' syndrome
- Klinefelter's syndrome
- Patau syndrome
- Turner's syndrome

Correct answer:

- Klinefelter's syndrome

15. In a 5-year-old child, tyrosine metabolism is broken. It leads to lesion of nervous system and mental deficiency, but is easily treated by special diet prescribed at early age. What is this disease?

- Hemophilia
- Cystinuria
- Phenylketonuria
- Brachydactyly
- Thalassemia

Correct answer:

- Phenylketonuria

16. At what disease heterozygotes are resistant to malaria?

- Brachydactyly
- Cystinuria
- Phenylketonuria
- Hemophilia
- Sickle-cell anemia

Correct answer:

- Sickle-cell anemia

17. The child's birth is not recommended to a 43-year-old woman because of high probability of chromosome syndrome in a child. Why such restriction does not concern men?

- Stage of prophase of I meiotic division in women is very long
- Ovum is motionless
- Limited number of oocytes of the first order
- During oogenesis, only one ovum is formed, but not four ova
- During oogenesis, formation stage is absent

Correct answer:

- Stage of prophase of I meiotic division in women is very long

18. Truncated extremities, small skull, flat wide nose bridge, narrow palpebral fissures, hanging fold of an upper eyelid, a monkey fold, and mental retardation are characteristic for:

- Turner's syndrome
- Edwards' syndrome
- Klinefelter's syndrome
- Down syndrome
- trisomy X

Correct answer:

- Down syndrome

19. Positive reaction of the Fölling test, musty specific odour of urine and sweat, retarded motor and mental development from 6-month age, and lightening of hairs are characteristic for:

- Turner's syndrome
- galactosemia
- fructosuria
- phenylketonuria
- Patau syndrome

Correct answer:

- phenylketonuria

20. Cleft palate, underdevelopment or lack of eyes, incorrectly formed ears, deformation of hands and feet, and maldevelopment of heart and kidneys are characteristic for:

- Patau syndrome
- Down syndrome
- Klinefelter's syndrome
- Turner's syndrome
- Edwards' syndrome

Correct answer:

- Patau syndrome

21. A 6-month-old child presents with retarded motor and mental development, paleness of integuments, hairs and iris of eyes, and positive test with 5% solution of trichloroacetic iron. What of the specified hereditary diseases is revealed in the child?

- Galactosemia
- Alkaptonuria
- Down syndrome
- Albinism
- Phenylketonuria

Correct answer:

- Phenylketonuria

22. Narrow forehead and wide occiput, deformed ears that are located very low, underdevelopment of the lower jaw, and wide short fingers are characteristic for:

- Turner's syndrome
- Edwards' syndrome
- Down syndrome
- Patau syndrome
- Klinefelter's syndrome

Correct answer:

- Edwards' syndrome

23. What methods of investigation allow to establish the diagnosis of phenylketonuria in due time?

- Determination of Barr bodies or drum sticks
- Calculation of probability of the birth of a patient (according to genetic laws)
- Biochemical test of blood and urine
- Determination of karyotype
- Studying dermatoglyphics

Correct answer:

- Biochemical test of blood and urine

24. Mother and father are healthy. In genetic consultation, sex chromatin and karyotype of a fetus were determined by the method of amniocentesis: $n=45$, XO. What diagnosis can be made to the future child?

- Syndrome trisomy X
- Philadelphia chromosome
- Hepatolenticular degeneration (Wilson's disease)
- Turner's syndrome
- Phenylketonuria

Correct answer:

- Turner's syndrome

25. In a family, a father suffers from hemophilia and daltonism at the same time. You are a doctor of genetic consultation. Analyse possible variants of inheritance of these anomalies:

- both genes will be received by girls
- the gene of hemophilia will be received by boys
- both genes will be received by boys
- the gene of daltonism will be received by girls
- both genes will be received by children irrespective of sex

Correct answer:

- both genes will be received by girls

26. A woman prematurely gave birth to a dead boy. What reason of spontaneous abortion is the most frequent?

- Gene mutation
- Trauma
- Chromosome aberration
- Incompatibility on Rhesus factor
- Infection of mother

Correct answer:

- Chromosome aberration

27. By what method it is possible to diagnose heterozygous carrier state of the pathological gene if the dose effect for the specified allele is observed, and expressiveness of a trait in phenotypes of dominant homozygote and heterozygote are different?

- Genealogical method
- Cytogenetic method
- Biochemical method
- Twin study
- Population-statistical method

Correct answer:

- Biochemical method

28. Disturbance of synthesis of tyrosine, adrenaline, noradrenaline, and melanin are observed in a patient. Mental deficiency is expressed. Which of the following is the most likely diagnosis?

- Ichthyosis
- Hepatocerebral dystrophy (Wilson's disease)
- Gout
- Phenylketonuria
- Family amaurotic idiocy (Tay-Sachs disease)

Correct answer:

- Phenylketonuria

29. A woman with monosomy of the X chromosome addressed to genetic consultation. Daltonism was revealed in her organism. Choose her karyotype and genotype:

- 45, X^dX^d
- 46, X^D0
- 45, X^D0
- 46, X^d0
- 45, X^d0

Correct answer:

- 45, X^{d0}

30. Mother and father are healthy. Fetus karyotype 47,XX,+21 was determined by method of amniocentesis. Make the diagnosis:

- cat's cry syndrome
- Down syndrome
- syndrome "superwoman"
- Turner's syndrome
- Edwards' syndrome

Correct answer:

- Down syndrome

31. A child, who is ill with phenylketonuria, suffers from mental retardation. What mechanism will be the main thing in development of damage of the central nervous system?

- Increase in tyrosine synthesis
- Accumulation of phenylalanine and phenyl ketones (phenylpyruvate) in blood
- Decrease in synthesis of melanin
- Increase in excretion of phenyl ketone bodies with urine
- Decrease in synthesis of thyroid hormones

Correct answer:

- Accumulation of phenylalanine and phenyl ketones (phenylpyruvate) in blood

32. Healthy spouses, whose son is sick with phenylketonuria, addressed to genetic consultation. Spouses are disturbed by health of the next child. Phenylketonuria is inherited on autosomal recessive type. What is the probability of the birth of the second child with phenylketonuria?

- 0%
- 50%
- 100%
- 75%
- 25%

Correct answer:

- 25%

33. What method of genetic examination most likely makes it possible to diagnose Shereshevsky-Turner syndrome?

- Genealogical
- Demographic-statistical
- Identification of sex chromatin
- Bigeminal
- Dermatoglyphics

Correct answer:

- Identification of sex chromatin

34. A newborn with anomalies of skull and extremities was examined in genetic consultation by karyotyping. Existence of three autosomes of the 18th pair was established. What disease is the most probable in the child?

- Edwards' syndrome
- Syndrome XXX
- Down syndrome
- Patau syndrome
- Klinefelter's syndrome

Correct answer:

- Edwards' syndrome

35. In human, hemophilia is encoded by the recessive gene linked with the X chromosome. Future spouses addressed to genetic consultation: healthy young man marries the girl, whose father had hemophilia and mother and her relatives were healthy. What is the probability of manifestation of the mentioned trait in sons from this marriage?

- 50%
- 100%
- 75%
- 0%
- 25%

Correct answer:

- 50%

36. A pregnant woman, who worked at the harmful factory, addressed to genetic consultation because she has the bases for excitement concerning the birth of an abnormal child. After carrying out of amniocentesis, there was a question about induced abortion. Doctors explained the woman that her future child will not be viable and will have defects in a structure of heart, kidneys, and digestive system, cleft soft palate and cleft hard palate, and underdevelopment or lack of eyes. About what disturbance in a karyotype one can talk in this case?

- Polysomy X
- Monosomy X
- Trisomy Y
- Trisomy 13
- Trisomy 21

Correct answer:

- Trisomy 13

37. A 70-year-old man suffers from gouty arthritis. In his family tree, patients with gout were also present. What factor is an immediate cause of the development of pathology in this case?

- Genetic defect of urea metabolism
- Genetic defect of uric acid metabolism
- Old age
- Excessive consumption of meat
- Male sex

Correct answer:

- Genetic defect of uric acid metabolism

38. A 20-year-old young man with tall stature, asthenic body type, signs of hypogonadism, gynecomastia, and diminished production of semen (azoospermia), has karyotype 47, XXY. What hereditary syndrome is characterized by this chromosomal anomaly?

- Shereshevsky-Turner
- Wiskott-Aldrich
- Louis-Bar
- Klinefelter
- Down

Correct answer:

- Klinefelter

39. One of the forms of rickets is inherited in the autosomal dominant way. This disease is a result of:

- Aneuploidy
- Change in the number of chromosomes
- Chromosomal mutation
- Polyploidy
- Gene mutation

Correct answer:

- Gene mutation

Note.

This question has bad answers because aneuploidy and polyploidy are changes in the number of chromosomes (see the second answer), and these three types of mutations are chromosomal mutations (the third answer).

40. It is known that phenylketonuria arises owing to mutation of the gene, which is responsible for phenylalanine transformation and disintegration of phenylalanine to the final products of metabolism. Choose, what way of metabolism of phenylalanine will lead to development of phenylketonuria:

- phenylalanine \rightarrow tyrosine \rightarrow thyroxin
- phenylalanine \rightarrow thyroxin \rightarrow nora-drenaline
- phenylalanine \rightarrow thyroxin \rightarrow homo-gentisic acid
- phenylalanine \rightarrow phenylpyruvate \rightarrow keto-acids
- phenylalanine \rightarrow tyrosine \rightarrow melanin

Correct answer:

- phenylalanine → phenylpyruvate → keto-acids

41. Medical examination at the military registration and enlistment office revealed that a 15-year-old boy was high, with eunuchoid body proportions, gynecomastia, female pattern of pubic hair distribution. The boy had also fat deposits on the thighs, no facial hair, high voice, subnormal intelligence quotient. Which karyotype corresponds to this disease?

- 47, XXY
- 47, XXX
- 46, XY
- 46, XX
- 45, XO

Correct answer:

- 47, XXY

Note.

During exams (2009, 2011), incorrect word combination "corresponds with" was used in the question.

42. During the analysis of urine of a three-month child, the increased amount of homogentisic acid was revealed; urine when standing on air gets dark coloring. What of the listed below diseases, the described changes are characteristic for?

- Alkaptonuria
- Albinism
- Aminoaciduria
- Cystinuria
- Phenylketonuria

Correct answer:

- Alkaptonuria

43. Owing to disturbance of meiosis, such types of ova were formed in a woman: 22+XX, 22+0. What diseases are possible in her daughters if man's spermatozoa have normal set of chromosomes?

- Trisomy X and Down syndrome
- Turner's syndrome and Klinefelter's syndrome
- Klinefelter's syndrome and trisomy X
- Klinefelter's syndrome and Down syndrome
- Turner's syndrome and trisomy X

Correct answer:

- Turner's syndrome and trisomy X

44. Healthy parents have got a fair-haired, blue-eyed girl. Irritability, anxiety, sleep and feeding disturbance developed in the first months of the infant's life. Neurological examination revealed developmental lag. What method of genetic investigation should be used for exact diagnosis?

- Population-statistical
- Cytological
- Twin study (Gemellary)
- Genealogical
- Biochemical

Correct answer:

- Biochemical

45. During analysis of woman's buccal mucosa epithelium cells, no sex chromatin was found. Which of the below mentioned diseases can it be?

- Edwards' syndrome
- Klinefelter's syndrome
- Down's syndrome
- Turner's syndrome
- Patau syndrome

Correct answer:

- Turner's syndrome

Note:

In the book "*Collection of tasks...*", incorrect term "sexual chromatin" is used. Similar question is present in the Section "Pathophysiology": "A doctor consulted a woman with defects of physical and sexual development. Microscopy of mucosa cells in the oral cavity did not reveal any sex chromatin in the nuclei. What kind of chromosomal pathology does it characterize? Answers: Shereshevskiy-Turner syndrome; Down's syndrome; Recklinghausen's disease; Klinefelter's syndrome; trisomy on X chromosome". Pay attention that the last answer should be written as "trisomy of the X chromosome".

46. Parents with suspicion on a chromosomal disease of a child addressed to a medical genetic center. During karyotyping of a child, translocation of additional chromosome 21 onto the 15th chromosome was revealed. A doctor established the diagnosis: translocation form of Down syndrome. Damage of what structure of the chromosome has caused developing of this disease?

- Short arm
- Long arm
- Secondary constriction
- Centromere
- Telomeric region

Correct answer:

- Telomeric region

47. During clinical examination of a pregnant woman, an increase in the content of phenylalanine in blood was revealed. How it can affect a child?

- Development of galactosemia is possible
- Development of mental retardation is possible
- Development of Wilson's disease is possible
- No influence
- The child's birth with Down syndrome is possible

Correct answer:

- Development of mental retardation is possible

48. An 18-year-old man with asthenic body constitution came to a geneticist. He presents with narrow shoulders, broad pelvis, tall stature, and poor hair on his face. Mental retardation is present. The provisional diagnosis was Klinefelter's syndrome. What method of medical genetics can confirm the diagnosis?

- Dermatoglyphics
- Population-statistic
- Genealogic
- Cytogenetic
- Twin study

Correct answer:

- Cytogenetic

Note.

In the book *"Collection of tasks..."*, this question is written as follows: *An 18-year-old young man is tall and has narrow shoulders, a large pelvis, an adult woman pattern of hair distribution, and oxyphonia. Mental retardation is also present. Based on these symptoms, the provisional diagnosis of Klinefelter's syndrome was made by a doctor. What genetic method can confirm the diagnosis?* Answers: a) Cytogenetic; b) Pedigree analysis; c) Study of twins; d) Biochemical; e) Population-statistical. In addition, another similar question is present in this book: *A teenager with the provisional diagnosis of Klinefelter's syndrome came for advice to a genetic consultation. What genetic method does the doctor have to apply to make a correct diagnosis?*

49. An 18-year-old girl with complaints of lack of menstruations consulted a doctor. During examination, such traits were revealed: height is 140 cm, short neck with characteristic folds of skin ("neck of a sphinx"), big shoulders, narrow pelvis, lack of secondary sex traits, and underdevelopment of ovaries. What provisional diagnosis can be established?

- Patau syndrome
- Morris's syndrome
- Turner's syndrome
- Down syndrome
- Klinefelter's syndrome

Correct answer:

- Turner's syndrome

50. A woman with the first blood type and normal blood clotting married a man that is ill with hemophilia and has the second blood type. At what genotypes of parents a child, who has the first blood type and is ill with hemophilia, can be born in this family?

- $ii X^H X^H \times I^A i X^h Y$
- $ii X^H X^h \times I^A I^A X^h Y$
- $ii X^H X^H \times I^A I^A X^H Y$
- $ii X^H X^h \times I^A i X^h Y$
- $ii X^H X^H \times I^A I^A X^h Y$

Correct answer:

- *ii* $X^H X^h \times I^A i X^h Y$

51. A 26-year-old man complains of infertility. Objective traits: height of 186 cm, long extremities, gynecomasty, hypoplasia of testicles; Barr bodies are found in scraping of mucous membrane of a cheek. Klinefelter's syndrome is diagnosed. What mechanism of chromosomal anomaly takes place at this disease?

- Chromosome deletion
- Translocation
- Nondisjunction of heterochromosomes in meiosis
- Inversion of a chromosome
- Nondisjunction of chromatids in mitosis

Correct answer:

- Nondisjunction of heterochromosomes in meiosis

52. Phenylketonuria was revealed in a child. What of the listed methods of treatment need to be used?

- Hormonal therapy
- Surgical treatment
- Removal of toxic substances from an organism
- Dietotherapy
- Medicinal therapy

Correct answer:

- Dietotherapy

53. With damage of structure of what cellular organelles, storage diseases appear?

- Lysosomes
- Golgi complex
- Centrosomes
- Mitochondria
- Plastids

Correct answer:

- Lysosomes

54. Trisomic, translocation, and mosaic forms of Down's syndrome are known. What method of human genetics can be applied to differentiate these forms of Down's syndrome?

- Population-statistical
- Study of twins
- Pedigree analysis
- Biochemical
- Cytogenetic

Correct answer:

- Cytogenetic

Note.

Another variant of incorrect answer:

- Genealogical

55. It is known that, during application of the method of determination of sex chromatin, calculation of number of Barr bodies in the painted smear of buccal epithelium (mucous membrane of a cheek) allows to establish precisely human karyotype. What karyotype will be present in woman if two Barr bodies are present?

- 48, XXXY
- 47, XXY
- 46, XX
- 48, XXXX
- 47, XXX

Correct answer:

- 47, XXX

56. Studying prints of epidermic ridges of fingers of hands (dactyloscopy) is used in criminalistics for identification of the personality, and also for diagnostics of genetic anomalies, in particular, of Down syndrome. What layer of skin defines identity of prints?

- Papillary
- Corneous
- Reticular
- Bright
- Basal

Correct answer:

- Papillary

57. A 40-year-old pregnant woman underwent amniocentesis. Examination of fetus karyotype revealed 47,XY,+21. What fetal pathology was detected?

- Phenylketonuria
- Patau's disease
- Klinefelter's syndrome
- Down's syndrome
- Shereshevsky-Turner's disease

Correct answer:

- Down's syndrome

58. Positive reaction of urine with 10% solution of chloride of iron was revealed in a child after birth. For what hereditary pathology it is characteristic?

- Alkaptonuria
- Tyrosinosis
- Diabetes (hereditary form)
- Phenylketonuria
- Galactosemia

Correct answer:

- Phenylketonuria

59. Choose what of the diseases listed below has is based on destruction of normal process of DNA repair after ultraviolet radiation:

- hypertrichosis
- xeroderma pigmentosum
- simple ichthyosis
- melanism
- albinism

Correct answer:

- xeroderma pigmentosum

60. Spouses, who after three-year married life had no children, addressed to genetic consultation. During examination of a husband, underdevelopment of testes and lack of spermatogenesis was revealed. He has narrow shoulders, wide pelvis, and undeveloped muscles. What of the listed karyotypes this man had?

- 46, t(13.13)
- 46, 5p-
- 45, XO
- 47, 21+
- 47, XXY

Correct answer:

- 47, XXY

61. A 1.5-year-old child has mental and physical lag, decolorizing of skin and hair, decrease in catecholamine concentration in blood. When a few drops of 5% solution of trichloroacetic iron had been added to the child's urine it turned olive green. Such alterations are typical for the following pathology of amino acid metabolism:

- albinism
- xanthinuria
- phenylketonuria
- alkaptonuria
- tyrosinosis

Correct answer:

- phenylketonuria

Note.

In the book *"Collection of tasks..."*, this question is written as follows: *A few months after birth a child developed symptoms of the CNS disorder. The skin and hair became lighter. The solution of 5% trichloroacetic ferric lactase, added to fresh urine, gives it olive-green coloring. What kind of hereditary disorder is characterized by these manifestations?* Answers: tyrosinosis; alcaptonuria; fructosuria; phenylketonuria; albinism.

62. A woman addressed to genetic consultation concerning deviations of physical and sexual development. During microscopy of cells of a mucous membrane of a mouth, sex chromatin was not revealed. For what chromosomal pathology it is characteristic?

- Turner's syndrome
- Klinefelter's syndrome
- Down syndrome
- Recklinghausen's disease
- Trisomy of the X chromosome

Correct answer:

- Turner's syndrome

63. Need to carry out identification of the personality appears periodically in forensic medical practice. The method of dactyloscopy is used for this purpose. Explain what structure defines individual drawing of skin of human fingers:

- features of the structure of reticular layer of derm
- structure of epidermis and derm
- features of the structure of papillary layer of derm
- features of the structure of epidermis
- structure of epidermis, derm, and hypoderm

Correct answer:

- features of the structure of papillary layer of derm

64. Mother and father of future child are healthy. The method of amniocentesis determined a fetus karyotype: 45, XO. What syndrome can be expected in a newborn baby?

- Patau syndrome
- Turner's syndrome
- Syndrome "superwoman"
- Cri du chat syndrome
- Edwards' syndrome

Correct answer:

- Turner's syndrome

65. A child of 10-month age, whose parents are brunettes, has fair hairs, very light skin, and blue eyes. Externally at birth he looked normally, but for the last three months disturbance of cerebral blood flow, lag in intellectual development were observed. The reason of such state is:

- phenylketonuria
- glycogenosis
- histidinemia
- galactosemia
- sharp porphyria

Correct answer:

- phenylketonuria

66. A young man of tall height, with increased lower jaw and projected superciliary arches, was surveyed in genetic consultation in connection with problems in training and anti-social behavior. The karyotype 47, XYY is revealed. What is the disease?

- Edwards' syndrome
- Patau syndrome
- "Supermale" syndrome
- Turner's syndrome
- Klinefelter's syndrome

Correct answer:

- "Supermale" syndrome

67. Father and son in a family are sick with hemophilia A. Mother is healthy. Choose genotypes of parents:

- $X^H X^H \times X^h Y$
- $Aa \times aa$
- $X^h X^h \times X^H Y$
- $aa \times Aa$
- $X^H X^h \times X^h Y$

Correct answer:

- $X^H X^h \times X^h Y$

68. The diagnosis "Konovalov-Wilson's disease", which is associated with metabolic disorder, was made to a woman of old age. Disturbance of metabolism of what substances is caused by this disease?

- Minerals
- Amino acids
- Carbohydrates
- Lipids
- Proteins

Correct answer:

- Minerals

69. One little body of sex X chromatin was revealed in nuclei of the majority of cells of an epithelium of mucous membrane of man's cheek. For what of the listed syndromes it is characteristic?

- Trisomy of the X chromosome
- Klinefelter's syndrome
- Turner's syndrome
- Down syndrome
- Edwards' syndrome

Correct answer:

- Klinefelter's syndrome

70. Hemophilia A is a hereditary disease caused by existence of the pathological gene in:

- 21st chromosome
- 19th chromosome
- Y chromosome
- 7th chromosome
- X chromosome

Correct answer:

- X chromosome

71. Dyspepsia, excitation, and an increase in muscular tone and tendon reflexes are noted in a monthly child. Test on finding of phenylpyruvic acid in urine is positive. Choose the diagnosis of the disease:

- mucopolysaccharidosis
- daltonism
- Duchenne's dystrophy
- phenylketonuria
- hemophilia A

Correct answer:

- phenylketonuria

72. For studying human heredity, different methods of human genetics are used; among them, there are genealogical method and twin study. What can be determined by twin study?

- Expressivity
- Coefficient of heredity
- Penetrance
- Type of inheritance
- Zygoty of a proband

Correct answer:

- Coefficient of heredity

73. Examination of a youth with mental retardation revealed eunuchoid body construction and genitals underdevelopment. Cells of the oral cavity contained chromatin. What method of genetic investigation should be performed to make more specified diagnosis?

- Population-statistic
- Dermatoglyphics
- Biochemical
- Cytological
- Clinico-genealogical

Correct answer:

- Cytological

74. Parents of a newborn, at whom Down syndrome is suspected, addressed to genetic consultation. What method of investigation it is necessary to prescribe for confirmation of the diagnosis of chromosomal pathology and for exception of phenocopy?

- Cytogenetic
- Dermatoglyphic
- Biochemical
- Determination of sex chromatin
- Immunological

Correct answer:

- Cytogenetic

75. A 6-month-old child presents with sharp lag in psychomotor development, attacks of spasms, pale skin with eczematous changes, blond hairs, and blue eyes. Determination of concentration of what substance in blood and urine will most authentically allow to establish the diagnosis for this child?

- Leucine
- Histidine
- Tryptophane
- Phenylpyruvate
- Valine

Correct answer:

- Phenylpyruvate

76. Rh-negative woman marries heterozygous Rh-positive man. What is the probability of rhesus incompatibility between organisms of the mother and a fetus during the second pregnancy?

- 0%
- 12.5%
- 25%
- 50%
- 75%

Correct answer:

- 50%

77. Men owing to abuse of alcohol can have nondisjunction of sex chromosomes in meiosis. What hereditary diseases can be caused by this situation in descendants?

- Klinefelter's syndrome
- Trisomy of the X chromosome
- Turner's syndrome
- Any hereditary diseases
- Klinefelter's syndrome and Turner's syndrome

Correct answer:

- Klinefelter's syndrome and Turner's syndrome

78. One of forms of cystinuria is caused by an autosomal recessive gene. However, raised cysteine contents in urine are observed in heterozygotes, whereas stones in kidneys are formed in recessive homozygotes. What form of cystinuria is possible in children in a family, where a father has this disease and a mother has raised content of cysteine in urine?

- Both (formation of stones and raised content of cysteine in urine)
- No listed form
- Formation of stones
- Raised content of cysteine
- Raised content of cysteine and lack of both forms of cystinuria

Correct answer:

- Both (formation of stones and raised content of cysteine in urine)

79. In a maternity hospital, a child with numerous development anomalies was diagnosed with Patau syndrome. What genetic method can confirm this diagnosis?

- Pedigree analysis
- Biochemical
- Population-statistical
- Cytogenetic
- Study of twins

Correct answer:

- Cytogenetic

80. At what disease it is possible to determine heterozygous carrier state by method of load tests?

- Galactosemia
- Down syndrome
- Hemophilia
- Patau syndrome
- Cystinuria

Correct answer:

- Galactosemia

81. A man with the problem of sterility appealed to a genetic consultation. During analysis of cheek mucosa epithelium, one Barr body was found in each nucleus of most cells. In neutrophil nuclei, they found one "drumstick" in each. Which syndrome can cause such phenomenon?

- Patau syndrome
- Turner's syndrome
- Trisomy of the X chromosome
- Down's syndrome
- Klinefelter's syndrome

Correct answer:

- Klinefelter's syndrome

82. Developing of following diseases is associated with genetic factors. Name pathology with hereditary predisposition:

- sickle-cell anemia
- daltonism
- phenylketonuria
- Huntington's chorea
- diabetes

Correct answer:

- diabetes

83. Examination of an 18-year-old girl revealed the following features: hypoplasia of ovaries, broad shoulders, narrow pelvis, shortening of lower extremities, and "neck of sphinx". Mental development is normal. The girl was diagnosed with Turner's syndrome. What kind of chromosome abnormality is it?

- Trisomy 18
- Trisomy X
- Trisomy 13
- Monosomy X
- Nullisomy X

Correct answer:

- Monosomy X

84. A pregnant woman addressed to genetic consultation. Her first child was born with numerous malformations: nonclosure of an upper lip and palate, microphthalmos, syndactyly, heart and kidneys malformations. The child died at the age of one month; 46 chromosomes were revealed in his karyotype, the 13th chromosome was translocated on the other chromosome. With what chromosomal disease this child was born?

- Turner's syndrome
- Patau syndrome
- Edwards' syndrome
- Down syndrome
- Klinefelter's syndrome

Correct answer:

- Patau syndrome

85. A woman with Rh-negative and III blood group gave birth to a child with the II blood type, who had hemolytic disease owing to rhesus incompatibility. What group according to ABO system and Rhesus factor is possible in the child's father?

- II (A), rh⁻
- I (O), rh⁻
- III (B), Rh⁺
- I (O), Rh⁺
- II (A), Rh⁺

Correct answer:

- II (A), Rh+

86. In a maternity hospital a child with numerous development anomalies of internal organs, such as the heart, kidneys, digestive system, was born. A doctor suspected Edwards' syndrome. What genetic method can confirm this diagnosis?

- Biochemical
- Dermatoglyphic
- Study of twins
- Pedigree analysis
- Cytogenetic

Correct answer:

- Cytogenetic

87. A number of methods are used in human genetics. What of the listed methods gives the chance to estimate extent of influence of heredity and environment on development of a trait?

- Cytogenetic method
- Twin study
- Biochemical method
- Dermatoglyphic method
- Genealogical method

Correct answer:

- Twin study

88. In 1950s in Western Europe, women who had taken thalidomide (soporific) bore a few thousands of babies with underdevelopment or absence of extremities and transgression of a skeleton. What nature did the pathology have?

- Genocopy
- Chromosomal mutation
- Phenocopy
- Chromosomal aberration
- Gene mutation

Correct answer:

- Phenocopy

89. What of the listed human diseases is hereditary and monogenic?

- Hypertension
- Stomach ulcer
- Poliomyelitis
- Hemophilia
- Diabetes

Correct answer:

- Hemophilia

90. An 18-year-old girl has body disproportion: wide shoulders, a narrow pelvis, shortened low extremities, wing-like skin folds on the neck, underdeveloped ovaries. During laboratory analysis, neither "drumsticks" in the neutrophil nuclei nor Barr bodies in the nuclei of the buccal epithelium cells were found. Dermatoglyphics method revealed that her *atd* palmar angle is 66° . What provisional diagnosis can be made in this case?

- Turner's syndrome
- Down's syndrome
- Klinefelter's syndrome
- Patau syndrome
- Edwards' syndrome

Correct answer:

- Turner's syndrome

Note.

In the book "*Collection of tasks...*", another similar question is also present: An 18-year-old girl complained to a doctor of the absence of menstruation. The patient had such features: 140 cm in height, a short neck with typical folds ("neck of sphinx"), wide shoulders, a narrow pelvis, absence of secondary sexual characters, underdeveloped ovaries. What was the provisional diagnosis of the girl?

Other variants of incorrect answers:

- Cri du chat (cat cry) syndrome
- Morris' syndrome

91. A girl with the provisional diagnosis of Turner's syndrome came for advice to a genetic consultation. Which genetic method can confirm this diagnosis?

- Pedigree analysis
- Hybridization of somatic cells
- Sex chromatin test
- Biochemical
- Study of twins

Correct answer:

- Sex chromatin test

92. A 28-year-old female patient consulted a gynecologist about sterility. Examination revealed underdeveloped ovaries and uterus, irregular menstrual cycle. Analysis of sex chromatin revealed two Barr bodies in most somatic cells. What chromosome disease is the most probable in this case?

- Turner's syndrome
- Triple X syndrome
- Klinefelter's syndrome
- Patau's syndrome
- Edwards' syndrome

Correct answer:

- Triple X syndrome

Note.

In the book "*Collection of tasks...*", this question is written as follows: A 28-year-old woman saw a physician because of infertility. Underdevelopment of the ovary and the womb, disorder of the menstrual cycle were diagnosed. During the test of buccal epithelium cells it appeared that most of their nuclei had two Barr bodies. The neutrophil nuclei had two "drumsticks" each. What provisional diagnosis can we make in this case?

93. A baby has such pathology: anomaly of the lower jaw and the larynx development accompanied by voice changes resembling a cat's cry. Moreover, the baby has microcephaly, heart trouble, and four fingers. A likely cause of such anomaly is the deletion of:

- short arm of chromosome 11
- short arm of chromosome 7
- short arm of chromosome 9
- short arm of chromosome 5
- short arm of chromosome 21

Correct answer:

- short arm of chromosome 5

94. A four-year-old girl presents with dislocation of crystalline lenses, long and slender fingers, hereditary heart disease, and high level of oxyproline (amino acid) in urine. All these defects are caused by anomaly of connective tissue. For what disease these clinical symptoms are characteristic?

- Marfan's syndrome
- Phenylketonuria
- Hypophosphatemias
- Fructosuria
- Galactosemia

Correct answer:

- Marfan's syndrome

95. Down syndrome is the most widespread of all syndromes associated with chromosomal anomalies. Characteristic symptoms of Down syndrome are shortening of extremities, small skull, anomalies of face structures, narrow palpebral fissures, epicanthus, mental retardation, frequent damages of internal structures. In the case of Down syndrome caused by trisomy of chromosome 21, the main diagnostic method is:

- genealogical method
- cytogenetic method
- biochemical method
- population-statistical method
- modeling

Correct answer:

- cytogenetic method

96. A child, who was born in late marriage, has small stature, lag in intellectual development, thick "geographical" tongue, narrow palpebral fissures, and flat face with wide cheekbones. What sort of disturbance has caused development of the described syndrome?

- Birth injury
- Chromosomal pathology
- Intrauterine immune conflict
- Intrauterine intoxication
- Intrauterine infection

Correct answer:

- Chromosomal pathology

97. In genetic consultation, it was established that heterozygous carrier mother gave a mutant gene to half of sons who are sick, and half of daughters who are phenotypically healthy carriers and can transfer a recessive gene together with the X chromosome to the next generation. What gene from the listed diseases can be transmitted by her daughter?

- Polydactyly
- Thalassemia
- Phenylketonuria
- Hemophilia
- Hypertrichosis

Correct answer:

- Hemophilia

98. Lack of B lymphocytes and sharp decrease in amount of immunoglobulins of main classes were revealed in the blood of a sick boy. The diagnosis of congenital agammaglobulinaemia is made. Owing to what event this hereditary disease has appeared, if parents of a patient are healthy, and cases of the disease in a pedigree are not observed?

- Somatic mutation in a patient
- Mutation in somatic cells of parents
- Incomplete penetrance of a gene in parents
- Mutation in sex cells of parents
- Generative mutation in a patient

Correct answer:

- Mutation in sex cells of parents

99. There is repeated pregnancy. Mother has O blood type, she is Rh-negative, and both fetuses have II blood group and are Rh-positive. By what variant there can be conflict?

- Incompatibility in A antigen
- Rh incompatibility
- Incompatibility in Rh system and ABO system
- Incompatibility in other systems
- Incompatibility in B antigen

Correct answer:

- Incompatibility in Rh system and ABO system

100. Lymphatic edema of extremities and surplus of skin on the neck is revealed in a newborn girl. There are no "drum sticks" in neutrophils. What is your diagnosis?

- Klinefelter's syndrome
- Down syndrome
- Patau syndrome
- Edwards' syndrome
- Turner's syndrome

Correct answer:

- Turner's syndrome

101. Three sons grew up in a family where a father has suffered from hypertensive disease. One of them worked as an air traffic controller, a head of flights at the large international airport with high intensity of the movement. Two other sons lived in rural areas and had professions of a beekeeper and a plant breeder. The dispatcher at mature age got sick with heavy form of hypertensive disease. This disease was absent in other sons, but small raising of blood pressure was only occasionally noted. What group of genetic diseases should be hypertensive disease in this family referred to?

- Monogenic disease
- Chromosomal disease
- Multifactorial disease
- Genomic disease
- Disease of nonheritable character

Correct answer:

- Multifactorial disease

102. During determination of a blood type on ABO system, antigens A and B were revealed. This blood can be transfused to persons having such group:

- I
- II
- IV
- III
- everything listed

Correct answer:

- IV

103. The provisional diagnosis – phenylketonuria – was made to a child in maternity hospital. What results of biochemical investigation will confirm the diagnosis?

- Deposition of urine acid salts in joints
- Disturbed synthesis of tyrosine, adrenaline, noradrenaline, and melanin
- Accumulation of lipids in nervous cells, retina of an eye, and liver
- Disturbed carbohydrate metabolism
- Disturbed copper exchange

Correct answer:

- Disturbed synthesis of tyrosine, adrenaline, noradrenaline, and melanin

104. In genetic consultation, the analysis of linkage groups and localization of genes in chromosomes was carried out. Thus, the method was used:

- hybridizations of somatic cells
- population-statistical method
- twin study
- genealogical method
- dermatoglyphic method

Correct answer:

- hybridizations of somatic cells

105. A healthy woman, who had had viral roseola during pregnancy, gave birth to a baby with a cleft lip and cleft palate. The baby has a normal karyotype and genotype. This anomaly can be the result of:

- Influence of teratogenic factor
- Gene mutation
- Chromosomal aberration
- Chromosomal mutation
- Combinative variability

Correct answer:

- Influence of teratogenic factor

106. A pregnant woman is on consultation. A doctor for prognosis of health of the expected child can use a genetic method:

- method of crossing
- amniocentesis
- twin study
- biochemical method
- dermatoglyphic method

Correct answer:

- amniocentesis

107. During the checkup of an 18-year-old boy, some physical and psychical development defects are found. They are as follows: eunuchoidism, female lipopexia and an adult woman pattern of hair distribution, muscular hypoplasia, mental deficiency. Using the cytogenetic method, the karyotype of the patient was determined. Which karyotype was it?

- 47, XY, 21+
- 45, XO
- 47, XY, 18+
- 47, XYY
- 47, XXY

Correct answer:

- 47, XXY

108. The translocation of a site of the 22nd chromosome onto the other chromosome is revealed in patient's leukocytes. Such mutation leads to development of:

- Turner's syndrome
- Down syndrome
- chronic leukemia
- syndrome "cry of a cat"
- phenylketonuria

Correct answer:

- chronic leukemia

109. Heterozygous carrier state of a semi-lethal allele, which has dose effect, was established in a patient; expressiveness of this allele in homozygotes and heterozygotes is different. This fact was established by means of a method:

- cytogenetic method
- population-statistical method
- mapping of chromosomes
- twin study
- biochemical method

Correct answer:

- biochemical method

110. Rhesus-negative woman with I (O) blood type is pregnant with Rh-positive fetus having A blood type. To prevent a sensitization of Rh-negative mother by Rh-positive erythrocytes of a fetus, she needs to enter intravenously for 72 hours after delivery:

- B-globulin
- fibrinogen
- anti-D globulin
- Rhesus agglutinins
- prothrombin

Correct answer:

- anti-D globulin

III. A human has galactosemia – a disease of accumulation. Which genetic method can we use to diagnose the case?

- Cytogenetic
- Biochemical
- Population-statistical
- Study of twins
- Pedigree analysis

Correct answer:

- Biochemical

112. The 22nd human chromosome has different mutant variants – monosomies and trisomies, deletions of a long arm, and translocations. Each mutation has the clinical variant of manifestation. By what method it is possible to define variant of a chromosome mutation?

- Sequencing
- Biochemical method
- Cytogenetic method
- Twin study
- Dermatoglyphic method

Correct answer:

- Cytogenetic method

113. A patient has a mutation of a gene that is responsible for hemoglobin synthesis. It has led to development of sickle-cell anemia. How the pathological hemoglobin revealed at this disease is called?

- HbA
- HbF
- HbS
- HbA1
- Bart-Hb

Correct answer:

- HbS

114. During examination of an 18-year-old girl, such features as underdeveloped ovaries, wide shoulders, a narrow pelvis, shortened low extremities, a "neck of sphinx" were determined. There was no mental deficiency. A doctor suspected Turner's syndrome. With what genetic method can this diagnosis be confirmed?

- Cytogenetic
- Population-statistical
- Study of twins
- Pedigree analysis
- Biochemical

Correct answer:

- Cytogenetic

115. A child had special "mewing" voice timbre in the early childhood. Retardation of psychomotor development and mental deficiency are observed. The syndrome of "cat's cry" is diagnosed. At what level of the organization there was damage, which has caused this syndrome?

- Molecular
- Subcellular
- Cellular
- Tissue
- Organismal

Correct answer:

- Molecular

116. During examination of a child, a pediatrician noted lag in physical and intellectual development. The content of ketoacid in the urine is sharply raised; this acid gives qualitative color reaction with chloric iron. What metabolic disorder was revealed?

- Cystinuria
- Tyrosinemia
- Phenylketonuria
- Alkaptonuria
- Albinism

Correct answer:

- Phenylketonuria

117. A patient is 18 years old. Phenotypically: she has small height, short neck, epicanthus, and downward slant of palpebral fissures. Karyotype 45, XO. Sex chromatin: 0% of X chromatin. The most likely diagnosis is:

- Sandberg's syndrome
- Turner's syndrome
- Down syndrome
- Klinefelter's syndrome
- true hermaphroditism

Correct answer:

- Turner's syndrome

118. A newborn child had multiple malformations; cleavage of hard palate, cyst of spinal cord, wrong placement of heart. The child's mother, working in radiation laboratory without following safety rules, underwent corpuscular ionizing radiation (mutagenic influence). With what type of prenatal maldevelopment such changes, which appeared in the child born by the woman, are associated?

- Embryopathies – disturbances of embryogenesis on the 2–8th weeks of development
- Blastopathies – disturbances at a blastula stage
- Gametopathies – disturbances at a zygote stage
- Fetopathies – disturbances after 10 weeks of development
- Extra duration of pregnancy

Correct answer:

- Embryopathies – disturbances of embryogenesis on the 2–8th weeks of development

119. A patient with a normal karyotype has some abnormalities of fingers (arachnodactyly), skeleton, cardiovascular system, disorders in the development of connective tissue, and lens defect. What provisional diagnosis can we make?

- Edwards' syndrome
- Down's syndrome
- Turner's syndrome
- Patau syndrome
- Marfan's syndrome

Correct answer:

- Marfan's syndrome

120. The first step in diagnosing diseases provoked by disorder of metabolism is the application of express methods, which are based on a simple quality reaction of determining metabolites in blood or urine. The second step is to confirm the diagnosis, for which exact chromatographic methods of enzymes and amino acids study are used. What genetic method can be applied?

- Biochemical
- Study of twins
- Cytogenetic
- Population-statistical
- Hybridization of somatic cells

Correct answer:

- Biochemical

Note.

Terms "express methods" and "quick tests" have equivalent meaning.

121. A baby boy presents with deformations of cerebral and facial cranial parts, microphthalmia, an ear deformation, and cleft palate. The baby's karyotype is 47,XY,13+. What disease is it?

- Edwards' syndrome
- Klinefelter's syndrome
- Patau syndrome
- Down's syndrome
- Turner's syndrome

Correct answer:

- Patau syndrome

Note.

There is a mistake in this question in the book "*Collection of tasks...*" – the word combination "cleft plate" is used in this book.

122. It is known that 0–5% of interphase nuclei of man's somatic cells and 60–70% of nuclei of woman's cells contain in norm masses of sex chromatin. For what purpose the number of masses of sex chromatin is defined in genetic consultations?

- For studying the structure of sex X chromosome
- For express diagnostics of human sex
- For studying the structure of sex Y chromosome
- For studying the structure of autosomes
- For determination of the karyotype

Correct answer:

- For determination of the karyotype

123. A patient has mental deficiency, a short stature, and mongolian type of the eyelid fold. Microscopical examination of the patient's karyotype revealed the presence of trisomy of the 21st chromosome. What do we call the disease, which is caused by this chromosomal abnormality?

- Down's syndrome
- Klinefelter's syndrome
- Turner's syndrome
- Edwards' syndrome
- Patau syndrome

Correct answer:

- Down's syndrome

124. What diseases can develop if deficiency of enzymes playing a role in digestion of substances is present in lysosomes?

- Storage diseases
- Chromosomal diseases
- Diseases associated with mineral exchange
- Anomalies of autosomes
- Anomalies of sex chromosomes

Correct answer:

- Storage diseases

125. Autopsy of a newborn boy revealed polydactyilia, microcephaly, cheiloschisis and uranoschisis as well as hypertrophy of parenchimatous organs. These defects correspond with the description of Patau's syndrome. What is the most probable cause of this pathology?

- Partial monosomy
- Trisomy of the 13th chromosome
- Nondisjunction of sex chromosomes
- Trisomy of the 21th chromosome
- Trisomy of the 18th chromosome

Correct answer:

- Trisomy of the 13th chromosome

Note.

In the book "*Collection of tasks...*", this question is written as follows: *The pathoanatomic inspection of a newborn boy's dead body showed the following abnormalities: polydactyly, microcephaly, a cleft lip and cleft palate, hypertrophy of the parenchymal organs. These symptoms are typical of Patau syndrome. What is the cause of this disease?* Answers: a) Trisomy on the 21st chromosome; b) Trisomy on the 18th chromosome; c) Trisomy on the 13th chromosome; d) Trisomy on X chromosome; e) Monosomy on X chromosome.

126. A baby was born with abnormalities of external and internal organs development. During the check up, the following abnormalities were found: epicanthus, shortened extremities, a small skull, and impaired development of the cardiovascular system. On these grounds, the provisional diagnosis of Down's syndrome was made. What genetic method can confirm this pathology?

- Pedigree analysis
- Population-statistical
- Study of twins
- Cytogenetic
- Biochemical

Correct answer:

- Cytogenetic

127. What substance is accumulated in tissues of brain and liver and causes their degeneration at Wilson-Konovalov's disease?

- Phosphorus
- Tyrosine
- Phenylalanine
- Lipids
- Copper

Correct answer:

- Copper

128. As a result of abnormal chromosomes disjunction during meiosis, a secondary oocyte, which contains only 22 autosomes, has been formed. What disease can a baby have after impregnation of this secondary oocyte by a normal spermatozoon (22+X)?

- Klinefelter's syndrome
- Turner's syndrome
- Trisomy of the X chromosome
- Down's syndrome
- Edwards' syndrome

Correct answer:

- Turner's syndrome

Note.

In the book "*Collection of tasks...*", incorrect term "chromosome divergence" is used (this is a mistake). Another possible variant of the question describes formation and fertilization of an ovum, but in humans, a secondary oocyte is fertilized.

129. In the case of amaurotic idiocy (Tay-Sachs disease), irreversible heavy disturbances of the central nervous system are developed; they lead to death at early children's age. At this disease, disturbance of metabolism of what substances is observed?

- Carbohydrates
- Amino acids
- Mineral substances
- Lipids
- Nucleic acids

Correct answer:

- Lipids

130. During the analysis of the buccal mucosa epithelium of a male patient, two Barr bodies in each nucleus of most cells were found, and two "drumsticks" were found in each neutrophil nucleus. What syndrome is it typical of?

- Patau syndrome
- Turner's syndrome
- Klinefelter's syndrome
- Down's syndrome
- Edwards' syndrome

Correct answer:

- Klinefelter's syndrome

131. Galactosemia – storage disease – is diagnosed for a man. Owing to damage of what cellular structure this disease has appeared?

- Lysosomes
- Centrosomes
- Cell center
- Mitochondria
- Golgi complex

Correct answer:

- Golgi complex

132. Albinos badly sunbathe – they get burns. Disturbance of metabolism of what amino acid is the cornerstone of this phenomenon?

- Glutamic acid
- Histidine
- Phenylalanine
- Methionine
- Tryptophane

Correct answer:

- Phenylalanine

133. Mucopolysaccharidosis belongs to storage diseases. Due to the lack of enzymes, cleavage of polysaccharides is broken. An increase in their secretion with urine and accumulation in one of cell organoids are observed in patients. What organoids mucopolysaccharides are accumulated in?

- In Golgi complex
- In lysosomes
- In endoplasmic reticulum
- In mitochondria
- In the cell center

Correct answer:

- In lysosomes

134. A mother of a child consulted a dermatologist with complaints of existence of dark spots on ears, nose, and cheeks of the child. Urine when standing on air became black. Which of the following is the most likely diagnosis?

- Urticaria
- Albinism
- Alkaptonuria
- Daltonism
- Down syndrome

Correct answer:

- Alkaptonuria

135. During examination of a baby boy, a pediatrician noticed that the baby's crying was similar to a cat's cry. Besides, the baby had microcephaly and abnormality in heart development. By means of the cytogenetic method, it was found that the baby's karyotype was 46, XY, 5p⁻. At what mitotic stage was the karyotype of the baby examined?

- Metaphase
- Prometaphase
- Prophase
- Anaphase
- Telophase

Correct answer:

- Metaphase

136. A woman on the 16th week of pregnancy addressed to genetic consultation. By drawing up a pedigree, it became clear that her husband from first marriage has a child, which is ill with phenylketonuria. What method will allow to define existence of phenylketonuria in a fetus?

- Cytogenetic method
- Genealogical method
- Amniocentesis
- Dermatoglyphics
- Twin study

Correct answer:

- Amniocentesis

137. Specify the reason of developing of hereditary diseases which received the name "storage disease":

- absence of certain enzymes in lysosomes
- absence of certain enzymes in mitochondria
- absence of certain enzymes in ER
- absence of certain enzymes in Golgi apparatus
- absence of certain enzymes in a nucleus

Correct answer:

- absence of certain enzymes in lysosomes

138. An analysis of the fetus's amniotic fluid cells for the presence of sex chromatin shows that the majority of their nuclei have two Barr bodies each. Which inherited disease can this baby have?

- Down's syndrome
- Trisomy of the X chromosome
- Turner's syndrome
- Patau syndrome
- Edwards' syndrome

Correct answer:

- Trisomy of the X chromosome

139. A woman worked some time at a factory under harmful working conditions. She gave birth to a child with cleft lip and cleft palate. What factor served as a reason of defect development?

- Mechanical influence on a fetus
- Alimentary factor
- Increase in body temperature of the pregnant woman
- Infectious disease
- Radiation

Correct answer:

- Radiation

140. During the cytogenetic analysis, a patient was found to have cells with chromosome number 46,XY and 47,XXY in the same proportions. What did a doctor diagnose?

- Down's syndrome
- Morris's syndrome
- Patau syndrome
- Klinefelter's syndrome
- Turner's syndrome

Correct answer:

- Klinefelter's syndrome

141. Watching a child for 1.5 years, mother began to notice lag in intellectual development. After careful examination, phenylketonuria was established in the child. The cause of this disease can be:

- damage of the structure of structural genes of a transcript
- monosomy of the X chromosome
- insufficient number of mitochondria in cells
- additional chromosome from the 21st pair of autosomes
- other reason

Correct answer:

- damage of the structure of structural genes of a transcript

142. The genealogical method of human genetics provides collection of information, drawing up and the analysis of pedigrees. How the person which pedigree needs to be made is called?

- Respondent
- Subject of research
- Proband
- Sib
- Patient

Correct answer:

- Proband

143. There is a direct dependence of rules of inheritance of antigenic specificity and genetic conditionality of manifestation of immune reactions in a human body. What science studies these processes?

- Genetics
- Immunogenetics
- Immunology
- Immunopathology
- Ecological genetics

Correct answer:

- Immunogenetics

144. For a number of hereditary diseases, which were considered incurable, possibility of suppression of their phenotypic manifestation was established due to the development of medical genetics. At present it most of all concerns:

- phenylketonuria
- anemias
- mucoviscidosis
- cystinuria
- achondroplasia

Correct answer:

- phenylketonuria

145. It is known that molecules only of one type of antibodies are synthesized in each B lymphocyte; these molecules are encoded by only one of two homologous chromosomes containing such genes. What name has this phenomenon?

- Gene exception
- Genomic exception
- Genetic exception
- Chromosomal exception
- Allelic exception

Correct answer:

- Allelic exception

146. Karyotype of a man is 47 chromosomes; a Barr body is revealed in the nucleus of somatic cell. Endocrine insufficiency is observed: underdevelopment of testes, lack of spermatogenesis. What disease is characterized by this phenotype?

- Patau syndrome
- Edwards' syndrome
- Turner's syndrome
- Down syndrome
- Klinefelter's syndrome

Correct answer:

- Klinefelter's syndrome

147. Phenylketonuria is an autosomal recessive disease, which is followed by disturbance of synthesis of melanin and β -adrenergic agonists, disorders of motive functions, and mental retardation. What method of studying human heredity needs to be used for the purpose of more precise definition of the diagnosis?

- Genealogical
- Biochemical
- Dermatoglyphics
- Cytogenetic
- Population-statistical

Correct answer:

- Biochemical

148. The twin method of diagnostics is used for:

- diagnostics of chromosomal diseases
- diagnostics of metabolic diseases
- determination of the nature of inheritance of a trait
- estimation of degree of influence of genotype and environment on the trait development
- diagnostics of diseases, which are inherited as sex-linked traits

Correct answer:

- estimation of degree of influence of genotype and environment on the trait development

149. A 10-year-old girl has got shortened extremities, a small skull, a face anomaly, mongolian type of eyelid fold, epicanthus, mental deficiency, disorders of the heart, and vascular structure. In a genetic clinic, the girl's karyotype was determined. What was the girl's karyotype?

- 45, XO
- 47, XX, 13+
- 47, XX, 18+
- 47, XX, 21+
- 47, XXX

Correct answer:

- 47, XX, 21+

150. Symptoms of rickets are revealed in a child; also, the level of phosphates in the blood is reduced. Treatment by ergocalciferol did not yield positive results. On what type this disease is inherited?

- Dominant, linked with the X chromosome
- Autosomal dominant
- Recessive, linked with the X chromosome
- Autosomal recessive
- Linked with the Y chromosome

Correct answer:

- Dominant, linked with the X chromosome

151. By means of the cytogenetic analysis, the karyotype 47, XX, 13+ of a child with plural defects of the skull, extremities, and internal organs was determined. What syndrome did the baby have?

- Edwards' syndrome
- Patau syndrome
- Klinefelter's syndrome
- Down's syndrome
- Turner's syndrome

Correct answer:

- Patau syndrome

152. During the cytogenetic analysis in cells of an abortive fetus, only 44 chromosomes were found due to the absence of both chromosomes from the 3rd pair. What type of mutation occurred?

- Monosomy
- Chromosomal aberration
- Gene mutation
- Polyploidy
- Nullisomy

Correct answer:

- Nullisomy

153. The dermatoglyphic method is applied to more precise definition of the diagnosis of hereditary pathology. In a patient with disturbance of mental activity and mental retardation, the cross furrow is revealed on a palm, and the palmar angle (*atd*) equals 80° . For what hereditary pathology these traits are characteristic?

- Klinefelter's syndrome
- Down syndrome
- Turner's syndrome
- Marfan's syndrome
- Edwards' syndrome

Correct answer:

- Down syndrome

154. A 30-year-old woman addressed to genetic consultation; two Barr bodies was established in nuclei of the most cells of cheek mucosa epithelium. What provisional diagnosis can be made?

- Trisomy of the 13th chromosome
- Trisomy of the 21st chromosome
- Trisomy of the X chromosome
- Trisomy of the 18th chromosome
- Monosomy of the X chromosome

Correct answer:

- Trisomy of the X chromosome

155. A patient has phenylpyruvic acid in the blood and urine. Based on this, the diagnosis of phenylketonuria is made. What genetic method was used?

- Pedigree analysis
- Population-statistical
- Study of twins
- Biochemical
- Immunological

Correct answer:

- Biochemical

156. Mother is Rh-negative. She gave birth to an Rh-positive child with symptoms of hemolytic disease. What cells of the sick child are destroyed in this case?

- Macrophages
- Thrombocytes
- Erythrocytes
- B lymphocytes
- T lymphocytes

Correct answer:

- Erythrocytes

157. A sick child presents with disturbance of lipid exchange, which is accompanied by the increase in lipid concentration in the blood serum and accumulation of the substance in nerve cells. Some dysfunctions of the central nervous system are also present. What hereditary disease can such symptoms be typical of?

- Tay-Sachs disease
- Edwards' syndrome
- Phenylketonuria
- Marfan's syndrome
- Hemophilia

Correct answer:

- Tay-Sachs disease

158. During examination of a newborn, the diagnosis of Down's syndrome was made. What is the main cause of this pathology?

- Trisomy of the 13th chromosome
- Trisomy of the 21st chromosome
- Trisomy of the X chromosome
- Trisomy of the 18th chromosome
- Monosomy of the X chromosome

Correct answer:

- Trisomy of the 21st chromosome

Note.

In the book *"Collection of tasks..."* such incorrect answer was used: "Undivergence of sex chromosomes", but the word "undivergence" does not exist (this is a mistake), the term "nondisjunction" must be used! During exam in 2016, another question with the same answers was used: "A 2-year-old boy is diagnosed with Down syndrome. What chromosomal changes can cause this disease?" During exam in 2017, such question was used: "47 chromosomes were found in skin fibroblasts of the child with Down disease. Determine the type of anomaly".

Other variants of incorrect answers:

- Monosomy of the 1st chromosome
- Polysomy Y

159. Coloring of sclerae and mucous membranes is observed in a baby. The urine, which darkens on air, is excreted. Homogentisic acid is found in the blood and urine. What can be the cause of this state?

- Alkaptonuria
- Galactosemia
- Histidinemia
- Albinism
- Cystinuria

Correct answer:

- Alkaptonuria

160. Choose the most exact definition of congenital diseases:

- they are all hereditary diseases
- hereditary diseases with dominant type of inheritance
- diseases caused by pathology of child-birth
- diseases with which a person is born
- transplacental infectious diseases

Correct answer:

- diseases with which a person is born

161. The male karyotype is 47, XXY. He has endocrine insufficiency; underdevelopment of testicles and absence of spermatogenesis. What disease do these symptoms suggest?

- Edwards' syndrome
- Patau syndrome
- Klinefelter's syndrome
- Turner's syndrome
- Down's syndrome

Correct answer:

- Klinefelter's syndrome

Note.

In a a database of tests, the word combination "endocrine hypertrophy" is present in this question; we replaced it by "endocrine insufficiency".

162. A patient has pathological process, which is caused by a gene mutation linked with sex X chromosome. This disease is followed by deficiency of the VIII factor and lengthening of time of blood clotting till 25 min. How this disease is called?

- Galactosemia
- Hemophilia
- Daltonism
- Glaucoma
- Hemeralopia

Correct answer:

- Hemophilia

163. In the genetic consultation, a provisional diagnosis of Turner's syndrome of a 14-year-old girl was made. What karyotype does the girl have?

- 47, XY, 13+
- 46, XX
- 47, XXY
- 46, XY
- 45, XO

Correct answer:

- 45, XO

164. "Cat's cry" syndrome is characterized by underdevelopment of laryngeal muscles, "mi-aowing" voice timbre, and psychomotoric immaturity of a child. This disease is the result of:

- duplication of a fragment of the 5th chromosome
- translocation of the 21st chromosome onto the 15th chromosome
- deletion of the short arm of the 5th chromosome
- deletion of the short arm of the 21st chromosome
- inversion of a fragment of the 21st chromosome

Correct answer:

- deletion of the short arm of the 5th chromosome

Note.

In the book "*Collection of tasks...*", the incorrect word "immaturation" is used (this word does not exist), we replaced it by "immaturity".

165. Spouses with a 9-month-old child who has hypotrophy, but is mentally normally developed, consulted a hospital. The child is ill almost since neonatal period, suffers from pertussoid spasmodic cough. Since five months, after adding of food, frequent defecation with large amount of light-coloured fecal masses with an unpleasant odour were appeared. The increase in liver is noted. According to laboratory data, concentration of sodium and chlorine in sweat is increased. About what disease one can think?

- Amaurotic idiocy of children
- Mucoviscidosis
- Agammaglobulinaemia
- Duchenne's dystrophy
- Hemophilia

Correct answer:

- Mucoviscidosis

166. The frequency of heterozygotes with a genome of phenylketonuria in a population of Ukraine is 3%. What method of genetical investigation is used for revealing early phenylketonuria of a newborn?

- Cytogenetic
- Population-statistical
- Genealogical
- Dermatoglyphics
- Biochemical

Correct answer:

- Biochemical

167. A 3-year-old child is hospitalized in children's clinic in a serious condition with hemoglobinopathy (sickle-cell anemia). Replacement of glutamic acid by what amino acid in the β chain of globin is the cornerstone of formation of pathological hemoglobin in this case?

- Arginine
- Serine
- Tyrosine
- Phenylalanine
- Valine

Correct answer:

- Valine

168. A child with Down syndrome and karyotype of 46 chromosomes was born to healthy parents. However, one of chromosomes from group D had extended short arm. What is the cause of illness of the child?

- Monosomy of the 21st pair of chromosomes
- Unbalanced translocation of an extra 21st chromosome
- Trisomy of the 21st pair of chromosomes
- Balanced translocation
- Trisomy of the 15th pair of chromosomes

Correct answer:

- Unbalanced translocation of an extra 21st chromosome

169. Green color of urine after addition of 5% FeCl_3 solution was revealed in a mentally retarded child. Disturbance of metabolism of what amino acid, the positive result of this diagnostic test indicates to?

- Arginine
- Tryptophane
- Phenylalanine
- Glutamine
- Tyrosine

Correct answer:

- Phenylalanine

170. A boy with splitting of an upper jaw (cleft lip and cleft palate) was born to a 45-year-old woman. During additional examination, considerable disturbances of his nervous, cardiovascular, and visual systems were found. By investigation of a karyotype, the trisomy 13 was diagnosed. What syndrome is present in the boy?

- Klinefelter's syndrome
- Turner's syndrome
- Edwards' syndrome
- Down syndrome
- Patau syndrome

Correct answer:

- Patau syndrome

Note.

Another variant of incorrect answer:

- DiGeorge syndrome

171. A patient with complaints of intolerance of solar radiation consulted a doctor. He has burns of skin and disturbance of sight. Provisional diagnosis is albinism. Disturbance of metabolism of what amino acid is present in this patient?

- Proline
- Tryptophane
- Alanine
- Tyrosine
- Lysine

Correct answer:

- Tyrosine

172. A 32-year-old man presents with tall stature, gynecomastia, adult woman pattern of hair distribution, high voice, mental deficiency, sterility. Provisional diagnosis is Klinefelter's syndrome. In order to specify diagnosis it is necessary to analyze:

- spermatogenesis
- genealogy
- blood group
- karyotype
- leukogram

Correct answer:

- karyotype

173. It is widely known about Rhesus factor conflict in the situation when a mother is rh^- and a child is Rh^+ . Why it does not happen on the contrary?

- Fetus produces very few antibodies
- The organism of a mother is not sensitive to fetus's antibodies
- Fetus is not sensitive to mother's Rhesus factor
- Fetus does not produce antibodies yet
- All listed factors are important

Correct answer:

- Fetus does not produce antibodies yet

174. A baby, who is the second child in a family, had hemolytic disease of the newborn that is caused by rhesus incompatibility. It is known from anamnesis that the first child is Rh-negative. What are genotypes of parents?

- Wife is heterozygous; husband is homozygous for the gene of Rhesus factor negativity
- Wife is homozygous for the gene of Rhesus factor negativity; husband is homozygous for the gene of Rhesus factor positivity
- Wife is homozygous for the gene of Rhesus factor negativity; husband is heterozygous
- Wife and husband are homozygous for the gene of Rhesus factor negativity
- Wife and husband are homozygous for the gene of Rhesus factor positivity

Correct answer:

- Wife is homozygous for the gene of Rhesus factor negativity; husband is heterozygous

175. During examination of teenage children in a military registration and enlistment office, a young man with certain deviations of psychosomatic development was revealed, namely: asthenic structure of a body, increase in mammary glands, and decrease in intelligence. He was directed to genetic consultation for specification of a diagnosis. What karyotype will be revealed?

- 46, XY, there are no Barr bodies
- 47, XXY, one Barr body
- 47, XXY, two Barr bodies
- 45, XO, there are no Barr bodies
- 47, XXX, two Barr bodies

Correct answer:

- 47, XXY, one Barr body

176. For diagnosis of metabolic disease, which is caused by changes of activity of different enzymes, amino acid composition of proteins and their primary structure are studied. What method is used in this case?

- Chromatography
- Cytogenetic method
- Dermatoglyphics
- Electronic microscopy
- Genealogical method

Correct answer:

- Chromatography

177. In one of uniovular twins who lived in different ecological conditions, an ecogenetic (multifactorial) disease was diagnosed. What had caused its demonstration?

- Interaction of genes
- Specific factor of the environment
- Deficiency of enzymes
- Mutant dominant gene
- Change of a gene pool of population

Correct answer:

- Specific factor of the environment

178. A 15-year-old boy of high growth, mentally retarded and with delay of sexual development has one Barr body in epithelial cells. What chromosomal disease this patient has?

- Syndrome "superwoman"
- Klinefelter's syndrome
- Syndrome of "cat's cry"
- Edwards' syndrome
- Turner's syndrome

Correct answer:

- Klinefelter's syndrome

179. In a patient with symptoms of Down syndrome, 46 chromosomes were revealed. Therefore, his pathology appeared owing to one of chromosomal anomalies, namely:

- inversion
- deletion
- polyploidy
- translocation
- duplication

Correct answer:

- translocation

180. In a child who was on breastfeeding, dyspeptic phenomena and weight loss are observed; yellowing of skin and large liver mass were appeared. Test with chloride iron is negative. A doctor prescribed special diet instead of breast milk; it improved child's status. What disease is possible in this child?

- Galactosemia
- Mucoviscidosis
- Phenylketonuria
- Fructosemia
- Homocystinuria

Correct answer:

- Galactosemia

181. Karyotype of a woman is 47 chromosomes, two Barr bodies are revealed in the nucleus of somatic cell. Endocrine pathology is observed: insufficient function of ovaries with lack of follicles that causes infertility and primary or more often secondary amenorrhea. What disease is indicated by this phenotype?

- Patau syndrome
- Edwards' syndrome
- Klinefelter's syndrome
- Turner's syndrome
- Trisomy of the X chromosome

Correct answer:

- Trisomy of the X chromosome

182. Healthy parents with unremarkable family history have a child with multiple developmental defects. Cytogenetic analysis revealed the trisomy 13 in somatic cells (Patau syndrome). What phenomenon has caused the defects?

- Somatic mutation
- Dominant mutation
- Chromosomal mutation
- Recessive mutation
- Abnormal gametogenesis

Correct answer:

- Abnormal gametogenesis

Note.

The answer "chromosomal mutation" can also be considered as correct answer because abnormal gametogenesis leads to the numerical chromosomal mutation (trisomy) that causes Patau syndrome.

183. Examination of cell culture got from a patient with lysosomal pathology revealed accumulation of great quantity of lipids in lysosomes. What of the following diseases is this disturbance typical for?

- Galactosemia
- Phenylketonuria
- Tay-Sachs disease
- Gout
- Wilson disease

Correct answer:

- Tay-Sachs disease

184. A woman, who was sick with rubella during pregnancy, gave birth to a deaf child with hare's lip and cleft palate. This congenital defect is an example of:

- genocopy
- Down's syndrome
- Edwards' syndrome
- Patau's syndrome
- phenocopy

Correct answer:

- phenocopy

185. Digestion and bile flow are broken in child; increased release of chlorides with urine is observed. Mucoviscidosis is diagnosed. Damage of components of what cellular structure takes place in this disease?

- Cellular membrane
- Nuclear membrane
- Mitochondria
- Ribosomes
- Endoplasmic reticulum

Correct answer:

- Cellular membrane

186. Man with karyotype 46,XY has female phenotype with developed external secondary sex traits. According to this information, a doctor established provisional diagnosis:

- Morris' syndrome
- Down syndrome
- syndrome "superman"
- Klinefelter's syndrome
- Turner's syndrome

Correct answer:

- Morris' syndrome

187. What is hemophilia?

- Acceleration of blood clotting
- Destruction of erythrocytes
- Slowdown of blood clotting
- Increase in time of bleeding
- Absence of blood clotting

Correct answer:

- Absence of blood clotting

188. Usage of thalidomide by pregnant women in the 1950s led to the birth of thousands of children with defects of skeleton (lack of extremities). This congenital defect is the result of:

- monosomy
- gene mutation
- triploidy
- modifications
- trisomy

Correct answer:

- modifications

189. Underdevelopment of ovaries is observed in a sick woman, and trisomy of the X chromosome (karyotype XXX) is found. How many Barr bodies will be determined in somatic cells?

- 0
- 1
- 2
- 3
- 4

Correct answer:

- 2

190. A 15-year-old boy suffers from alkaptonuria. His urine turns black after settling. Hereditary metabolic disorder of which substance is taking place?

- Uric acid
- Tyrosine
- Cysteine
- Alanine
- Urea

Correct answer:

- Tyrosine

191. During genetic examination of patients with chronic myeloleukemia, specific anomaly of one of chromosomes was revealed. Such chromosome has received the name "Philadelphia" and it is a genetic marker of the disease. What type of chromosome aberration takes place in this case?

- Deletion of short arm of one of chromosomes of the 22nd pair
- Translocation of short arm of one of chromosomes of the 21st pair
- Duplication of long arm of one of chromosomes of the 22nd pair
- Deletion of a part of long arm of one of chromosomes of the 22nd pair with translocation onto the 9th chromosome
- Inversion of short arm of one of chromosomes of the 21st pair

Correct answer:

- Deletion of a part of long arm of one of chromosomes of the 22nd pair with translocation onto the 9th chromosome

192. A 16-year-old young man addressed to a genetic consultation concerning disturbance of color recognition: he does not distinguish green and red colors. He told that his father also does not distinguish these colors, and color recognition in mother is not broken. What can be told in this regard about mother's genotype?

- Polygenic for the daltonism gene
- Homozygous for the daltonism gene
- Homozygous for the gene of normal recognition of color
- Homozygous for the hemeralopia (day blindness) gene
- Heterozygous for the daltonism gene

Correct answer:

- Heterozygous for the daltonism gene

193. A man with chromosomal damage has the balanced translocation of a long arm of the 21st chromosome onto the 13th chromosome. Highest risk of what disease exists for his children?

- Turner's syndrome
- Edwards' syndrome
- Patau syndrome
- Down syndrome
- Klinefelter's syndrome

Correct answer:

- Down syndrome

194. Continuous taking of some drugs before pregnancy increases the risk of giving birth to a child with congenital defects. What is this effect called?

- Mutagenic effect
- Blastomogenic effect
- Teratogenic effect
- Fetotoxic effect
- Embryotoxic effect

Correct answer:

- Mutagenic effect

195. Examination of a 12-year-old boy with developmental lag revealed achondroplasia: disproportional constitution with evident shortening of upper and lower limbs as a result of growth disorder of epiphyseal cartilages of long tubular bones. This disease is:

- congenital
- acquired
- inherited, sex-linked
- inherited, recessive
- inherited, dominant

Correct answer:

- inherited, dominant

196. Dark spots indicating formation of homogentisic acid are found on diapers of a newborn child. With disturbance of metabolism of what substance it is associated?

- Galactose
- Tyrosine
- Tryptophane
- Cholesterol
- Methionine

Correct answer:

- Tyrosine

197. Sex chromosomes of a woman didn't separate and didn't move to the opposite poles of a cell during gametogenesis (meiosis). An ovum was impregnated with a normal spermatozoon. Which chromosomal disease can be found in her child?

- Patau's syndrome
- Turner's syndrome
- Cat cry syndrome
- Edwards' syndrome
- Down's syndrome

Correct answer:

- Turner's syndrome

198. A boy referred to a genetics clinic was found to have one drumstick in blood neutrophils. The boy is likely to have the following syndrome:

- Turner's
- Klinefelter's
- Trisomy X
- Edwards'
- Down's

Correct answer:

- Klinefelter's

199. A couple had a child with Down's syndrome. Mother is 42 years old. This disease is most probably caused by the following impairment of prenatal development:

- blastopathy
- gametopathy
- embryopathy
- non-specific fetopathy
- specific fetopathy

Correct answer:

- gametopathy

200. Cytogenetic examination of a patient with reproductive dysfunction revealed normal karyotype 46,XY in some cells, but most of cells have karyotype of Klinefelter's syndrome – 47,XXY. Such phenomenon of cell heterogeneity is called:

- mosaicism
- duplication
- inversion
- heterogeneity
- transposition

Correct answer:

- mosaicism

Note.

During exams in 2010 and 2011, the answer "heterogeneity" was replaced by "monomorphism".

201. A two-year-old child who has impairment of intellectual and physical development and suffers from frequent vomiting after meal, was taken to a hospital. Phenylpyruvic acid was defined in urine. What consequence of disturbance this pathology has?

- Metabolism of amino acids
- Carbohydrate metabolism
- Water-salt exchange
- Lipid metabolism
- Phosphorus-calcium metabolism

Correct answer:

- Metabolism of amino acids

202. A man with daltonism married a healthy woman whose father had daltonism and mother is healthy, and patients with daltonism are not present among her relatives. Define probability of birth of children who are ill with daltonism in this family.

- 0%
- 25%
- 50%
- 75%
- 100%

Correct answer:

- 50%

203. A 14-year-old boy presents with high growth, eunuchoid proportions of a body, narrow shoulders, and wide pelvis; hypodermic basis is excessively developed, pilosis in a pubic zone is of female type, penis has normal size, and intelligence is considerably lowered. What pathology should be suspected?

- Trisomy of the X chromosome
- Klinefelter's syndrome
- Down syndrome
- Turner's syndrome
- Edwards' syndrome

Correct answer:

- Klinefelter's syndrome

204. A 35-year-old woman had car accident and got brain concussion. Soon after discharge from a hospital, prodromal disorders of mentality appeared, which became deeper, and in a year the diagnosis were made to her – schizophrenia. Studying a pedigree showed that schizophrenics are also present among her cousins and second cousins. In this case schizophrenia is:

- congenital disease
- hereditary disease
- acquired disease
- disease with hereditary predisposition
- remote consequence of a trauma

Correct answer:

- disease with hereditary predisposition

205. During examination of a patient, who complains of general weakness and bone pain, the diagnosis "chronic myeloleukemia" was established. Name the chromosomal anomaly typical for the majority of cases of this disease.

- Duplication of the 21st chromosome
- Translocation of the 9th chromosome onto the 22nd chromosome
- Translocation of the 21st chromosome onto the 15th chromosome
- Partial deletion of the 12th chromosome
- Full deletion of the X chromosome

Correct answer:

- Translocation of the 9th chromosome onto the 22nd chromosome

206. Fructosemia is a hereditary disease caused by sharp decrease of the activity of enzyme fructose-bisphosphate aldolase. This disease meets frequency of 1:20000 in a population. On what type fructosemia is inherited?

- X-linked dominant inheritance
- X-linked recessive inheritance
- Holandric inheritance
- Autosomal dominant inheritance
- Autosomal recessive inheritance

Correct answer:

- Autosomal recessive inheritance

207. A newborn child has such symptoms: spasms, vomiting, jaundice, and specific odour of urine. A doctor-geneticist stated suspicion about hereditary disease of metabolism. What method of investigation needs to be used for statement of the exact diagnosis in the absence of DNA diagnostics?

- Dermatoglyphic
- Biochemical
- Population-statistical
- Cytogenetic
- Twin study

Correct answer:

- Biochemical

208. High palate, wrong growth of big teeth with defects of tooth enamel was revealed in a young man who has high growth (187 cm). During investigation of buccal scraping by means of luminescent microscopy, two Y chromosomes were revealed. This anomaly is the result of:

- monosomy
- allopolyploidy
- nullisomy
- autopolyploidy
- trisomy

Correct answer:

- trisomy

209. A pregnant woman for the first time consulted a doctor of genetic consultation concerning possible hereditary pathology in her future child. What method will be the first during her examination?

- Cytogenetic
- Twin study
- Karyotyping
- Genealogical
- Biochemical

Correct answer:

- **Genealogical**

210. Mohr's syndrome is inherited as dominant and is followed by numerous anomalies of development of a skeleton (brachydactyly), disturbance of teeth formation, hypodontia, etc. What method of human genetics will be used by a doctor for differentiation of this pathology from possible genocopy and for the prognosis of possible pathology in descendants?

- Genealogical
- Cytogenetic
- Dermatoglyphic
- Twin study
- Population-statistical

Correct answer:

- **Genealogical**

211. People with Down syndrome have anomalies of front part of a skull, including hypoplasia of the upper jaw, high palate, and wrong growth of teeth. What karyotype is characteristic for a man with Down syndrome?

- 47, XY, +18
- 47, XXY
- 47, XY, +21
- 48, XXXY
- 47, XXX

Correct answer:

- 47, XY, +21

212. Children with congenital heart diseases, deafness and cataract were born in six women, who were ill with viral disease (rubella) in the first third of pregnancy. What result of influence of the virus is observed in this case?

- Cancerogenic
- Recombination of genes
- Malignization
- Genocopy
- Teratogenic

Correct answer:

- Teratogenic

213. Hypertrichosis of auricles is caused by a gene that is localized in the Y chromosome. Father has this feature. What is the probability that son will have this anomaly?

- 25%
- 35%
- 0%
- 100%
- 75%

Correct answer:

- 100%

Note.

Information that hypertrichosis is Y-linked is out of date. According to more careful study, this trait is autosomal (some families hid their affected female members). In the book *"Collection of tasks ..."*, another similar question is also present: *An excessive ear pilosis (hypertrichosis) is determined by the gene, which is localized in Y chromosome. A man has got this feature. What is the probability of his having a son with such a feature?* Answers: 75%; 0%; 25%; 35%; 100%. Authors propose the answer "100%" as correct but this is a mistake. When you ask about probability that parents will have a son with a feature, you should to calculate this probability among ALL children and correct answer must be 50%. Hence, authors do not propose correct answer at all.

214. The diagnosis Turner's syndrome was established to a sick woman. Karyotype is 45,XO. What number of sex chromosomes is present in this set?

- One
- Zero
- Two
- Forty four
- Forty five

Correct answer:

- One

215. There is ichthyosis in the family pedigree. This feature appears in each generation and is typical only of male. What type of inheritance does this feature have?

- Recessive, X-linked
- Autosomal dominant
- Autosomal recessive
- Y-linked
- Dominant, X-linked

Correct answer:

- Y-linked

216. In marriage of a healthy woman and a man, who has vitamin D-resistant rickets, all sons are healthy, and all daughters have this disease. Establish type of inheritance of the specified pathology:

- autosomal recessive
- autosomal dominant
- recessive, linked with the X chromosome
- dominant, linked with the X chromosome
- linked with the Y chromosome

Correct answer:

- dominant, linked with the X chromosome

217. During prophylactic medical examination, a 7-year-old boy was diagnosed with daltonism. His parents are healthy and have normal color vision, but his grandfather on his mother's side has the same abnormality. What is the type of the abnormality inheritance?

- Autosomal dominant
- Sex-linked dominant
- Sex-linked recessive
- Autosomal recessive
- Incomplete dominance

Correct answer:

- Sex-linked recessive

Note.

In the book "*Collection of tasks...*" and in some exam booklets, the term "semidominance" is used instead of "incomplete dominance".

218. A child with hemophilia – serious recessive illness, which is linked with sex, was born to healthy parents. What is characteristic for X-linked recessive type of inheritance?

- Sick father always has all sick daughters and healthy sons
- The trait appears in half of sons of heterozygous mother, who is a carrier, and sick daughter always has sick father
- Sick man always has sick father and sick brothers
- The trait appears in all sons of heterozygous mother, who is a carrier, and women have no such disease
- Sick father always has all sick sons and healthy daughters

Correct answer:

- The trait appears in half of sons of heterozygous mother, who is a carrier, and sick daughter always has sick father

219. A proband, his three sons, his brother and father have syndactyly. His sisters and two daughters do not have this sign. What is the character of the inheritance of this sign?

- Holandric
- Autosomal recessive
- Autosomal dominant
- Dominant, X-linked
- Recessive, X-linked

Correct answer:

- Holandric

Note.

Another similar question describes ichthyosis.

220. It is known that, except autosomal, there is sex-linked inheritance. What is characteristic for inheritance of recessive traits that are linked with the X chromosome?

- Are absent in men at all
- More often are found in phenotype of women
- Are found in men and women with identical frequency
- More often are found in phenotype of men
- Are absent in women at all

Correct answer:

- More often are found in phenotype of men

221. After the genealogy analysis, a geneticist came to the conclusion: a feature is manifested in each generation, men and women inherit a feature with equal frequency, parents give this feature to their offspring in equal way. What type of inheritance does the investigated feature have?

- Autosomal-dominant inheritance
- X-linked dominant inheritance
- X-linked recessive inheritance
- Autosomal-recessive inheritance
- Y-linked inheritance

Correct answer:

- Autosomal-dominant inheritance

Note.

In the book "*Collection of tasks...*", this question is written as follows: "Due to the results of the pedigree analysis a geneticist found out that a feature becomes apparent in each generation, a male and a female inherit this feature with the same frequency, both parents transmitting this feature to their children. What type of inheritance does this feature have?"

222. Young healthy spouses have two children with Tay-Sachs disease (disease of accumulation of lipids). Parents are found to be relatives. What is the most probable type of inheritance of this disease?

- Autosomal recessive
- Recessive, linked with the X chromosome
- Linked with the Y chromosome
- Autosomal dominant
- Dominant, linked with the X chromosome

Correct answer:

- Autosomal recessive

223. Skin of a newborn boy is covered with a thick layer of keratinized scales (ichthyosis). It looks like reptile skin. After investigation of the pedigree of his family, it was revealed that this feature occurs in each generation only in males. Which of the below mentioned biological regularities becomes apparent in this case?

- The law of independent assortment
- The law of unit characters
- The law of segregation
- Sex-linked inheritance
- Linkage of genes

Correct answer:

- Sex-linked inheritance

224. The pedigree of a family with brachydactyly is characterized by the following: a ratio between affected men and women is 1:1, nearly a half of children of the affected parents are affected. What is the type of inheritance of this trait?

- Autosomal recessive
- Autosomal dominant
- Linked with the Y chromosome
- Recessive, linked with the X chromosome
- Dominant, linked with the X chromosome

Correct answer:

- Autosomal dominant

225. During medico-genetic counseling of a family with hereditary pathology, it was revealed that anomaly is appears through generation in men. What type of inheritance is characteristic of this hereditary anomaly?

- Autosomal recessive
- Autosomal dominant
- Recessive, linked with the X chromosome
- Dominant, linked with the X chromosome
- Linked with the Y chromosome

Correct answer:

- Recessive, linked with the X chromosome

226. A proband has webbed fingers on legs. His three sons also have fingers that grow together, and two daughters have normal fingers. Sisters of the proband have normal fingers. Fingers of his brother and father are webbed too. How the transferred trait is called?

- Recessive
- Allelic
- Dominant
- Expressive
- Holandric

Correct answer:

- Holandric

227. The genealogical method of human genetics allows to establish the type of inheritance of a trait. What is not typical for autosomal recessive inheritance?

- The probability of birth of a sick child makes 25%
- Presence of patients in all generations
- Presence of patients "across" the pedigree
- Rather small amount of patients in a pedigree
- Phenotypically healthy parents of a sick child are heterozygous

Correct answer:

- Presence of patients in all generations

228. Both a mother and a father are phenotypically healthy. They have a sick baby in whose blood and urine phenylpyruvic acid has been found, which indicates phenylketonuria. What is the type of the inheritance of this disease?

- Autosomal dominant
- Autosomal recessive
- Recessive, X-linked
- Y-linked
- Dominant, X-linked

Correct answer:

- Autosomal recessive

229. A couple has a son with haemophilia. The parents are healthy but the maternal grandfather also has haemophilia. Specify the type of inheritance:

- Y-linked
- Autosomal recessive
- Dominant, sex-linked
- Recessive, sex-linked
- Autosomal dominant

Correct answer:

- Recessive, sex-linked

Note.

In the book "*Collection of tasks...*", this question is written as follows: *A child, ill with hemophilia, has been born to healthy parents, but the mother's grandfather had hemophilia, too. What type of inheritance does this feature have?* In the exam booklet (2012), the answer "semidominance" was present but we replaced it by the answer "Y-linked" because semidominance is NOT a type of inheritance.

230. Hypertrichosis is a Y-linked character. A father has hypertrichosis, and a mother is healthy. In this family, the probability of having a child with hypertrichosis is:

- 0.5
- 1
- 0.25
- 0.125
- 0.0625

Correct answer:

- 0.5

Note.

Information that hypertrichosis is Y-linked is out of date. According to more careful study, this trait is autosomal (some families hid their affected female members)

231. During the pedigree analysis of a family with such an inherited pathology as transgression of enamel formation, it was found that the disease appeared in each generation. It is inherited by daughters from fathers. What type of inheritance can we observe in this case?

- Dominant, X-linked
- Recessive, X-linked
- Autosomal dominant
- Autosomal recessive
- Y-linked

Correct answer:

- Dominant, X-linked

232. A man suffering from hereditary disease married a healthy woman. They got five children, three girls and two boys. All girls inherited the father's disease. What is the type of the disease inheritance?

- Autosomal recessive
- Y-linked
- Recessive, X-linked
- Dominant, X-linked
- Autosomal dominant

Correct answer:

- Dominant, X-linked

233. Pedigree analysis showed that the proband's disease occurred in each generation, affected a relatively big number of sibs, both men and women. What type of inheritance does it point out?

- Y-linked
- Autosomal recessive
- Dominant, X-linked
- Recessive, X-linked
- Autosomal dominant

Correct answer:

- Autosomal dominant

234. The study of the genealogy of a family with hypertrichosis (hirsutism or pilosis) has demonstrated that this trait is manifested in all generations only in men and is inherited by son from his father. What is the type of hypertrichosis inheritance?

- Autosomal-recessive
- X-linked recessive
- Y-linked
- Autosomal-dominant
- X-linked dominant

Correct answer:

- Y-linked

Note.

In the book "*Collection of tasks...*", this question is written as follows: *In a family pedigree hypertrichosis (excessive pilosis of the auricle) is observed. This feature appears in each generation and is typical only of men. What type of inheritance does this feature have?* In the site <http://testcentr.org.ua/> (2013), incorrect phrase was used: "connected with Y-chromosome", but the term "Y-linked" must be used. Also information about hypertrichosis as Y-linked trait is out of date. According to more careful study, this trait is autosomal.

235. During employment to the chemical and pharmaceutical enterprise, some men who did not feel odour of hydrocyanic acid were revealed. What type of inheritance is characteristic for this anomaly?

- Linked with the Y chromosome
- Linked with the X chromosome, dominant
- Linked with the X chromosome, recessive
- Autosomal recessive
- Autosomal dominant

Correct answer:

- Linked with the X chromosome, recessive

236. Frequency of cardiovascular diseases constantly increases in human populations because these diseases are:

- multifactorial
- autosomal dominant
- linked with the X chromosome
- autosomal recessive
- chromosomal

Correct answer:

- multifactorial

237. A geneticist analyzed a genealogy of a family and found that both males and females may have an illness, not across all generations, and that healthy parents may have ill children. What is the type of illness inheritance?

- Autosomal-recessive
- Y-linked
- X-linked recessive
- Autosomal-dominant
- X-linked dominant

Correct answer:

- Autosomal-recessive

238. In genetic consultation, spouses asked a question about probability of the birth of children with X-linked form of rickets. A father is healthy, but a mother and the grandmother from the maternal line have this disease. Vitamin-D resistant rickets can appear in:

- daughters only
- half of daughters and sons
- sons only
- all children
- correct answer is absent (all children will be healthy)

Correct answer:

- half of daughters and sons

239. Healthy woman from two of her marriages has three sons affected by daltonism. Both of her husbands are healthy. What is the most possible type of inheritance of this disease?

- Autosomal recessive
- Autosomal dominant
- Linked with the Y chromosome
- Recessive, linked with the X chromosome
- Dominant, linked with the X chromosome

Correct answer:

- Recessive, linked with the X chromosome

240. As a result of prophylactic medical examination, a 7-year-old boy was diagnosed with Lesch-Nyhan syndrome (only boys are affected). His parents are healthy but his grandfather by his mother's side suffers from the same disease. What is the type of disease inheritance?

- Autosomal recessive
- Dominant, sex-linked
- Autosomal dominant
- Recessive, sex-linked
- Y-linked

Correct answer:

- Recessive, sex-linked

Note.

In database, the answer "semidominance" was present but we replaced it by the answer "Y-linked" because semidominance is NOT a type of inheritance.

241. A healthy young woman, whose father suffers from Taybi syndrome (multiple anomalies of a face and skeleton, abnormal growth of teeth), consulted a doctor-geneticist. The disease is inherited as the X-linked recessive one. Predict the birth of a sick child for this woman if her husband is healthy.

- 37.5%
- 25%
- 56.25%
- 50%
- 75%

Correct answer:

- 25%

242. During oogenesis, a cell with unbalanced number of chromosomes – 22 chromosomes – was formed; the X chromosome is absent. What probability of appearance of a child with Klinefelter's syndrome if this cell will be fertilized by a spermatozoon with normal number of chromosomes?

- 0%
- 100%
- 50%
- 25%
- 75%

Correct answer:

- 0%

243. A 16-year-old girl consulted a stomatologist concerning dark enamel of teeth. When studying a family tree, it was established that this pathology is transmitted from a father to all girls and from a heterozygotic mother to 50% of boys. What is the type of inheritance of this disease?

- Dominant, linked with the Y chromosome
- Recessive, linked with the X chromosome
- Autosomal dominant
- Dominant, linked with the X chromosome
- Autosomal recessive

Correct answer:

- Dominant, linked with the X chromosome

244. A female patient sought medical-genetic consultation. Physical examination revealed pterygium colli deformity (webbed neck), broad chest, underdeveloped breasts. Study of buccal epithelium cells revealed no X chromatin in the nuclei. This indicates that the patient has the following syndrome:

- Turner's
- Klinefelter's
- Patau's
- Down's
- Edwards'

Correct answer:

- Turner's

Note:

During exam in 2019, such question was used:

An 18-year-old girl comes to her physician with concern about her health because she has not achieved menarche. She denies any significant weight loss, changes in mood, or changes in her appetite. She mentions that her mother told her about mild birth defects, but she cannot recall the specifics. Past medical history and family history are benign. On physical examination, the patient is short in stature, has a short and webbed neck and wide chest. Staining of buccal smear reveals absence of Barr bodies in the nucleus of epithelial cells. A urine pregnancy test is negative. Which of the following genetic disorders is the most likely cause of this patient's condition?

245. Hairs grow intensively on edge of auricles of a man and his son. This phenomenon was observed also in the man's father. What type of inheritance is characteristic for this trait?

- Linked with the Y chromosome
- Autosomal recessive
- Dominant, linked with the X chromosome
- Autosomal dominant
- Recessive, linked with the X chromosome

Correct answer:

- Linked with the Y chromosome

246. Changes in human karyotype cause chromosomal diseases. Specify what of these disturbances are lethal.

- Monosomy of the X chromosome
- Monosomies of autosomes
- Trisomy of the X chromosome
- Polysomy of the Y chromosome
- Trisomies of autosomes

Correct answer:

- Monosomies of autosomes

247. It is known that in case of related marriages of healthy people, children with hereditarily pathologies are born more often. At what type of inheritance it more often occurs?

- Autosomal dominant
- X-linked dominant
- Autosomal recessive
- X-linked recessive
- Cytoplasmatic

Correct answer:

- Autosomal recessive

248. The additional X chromosome was revealed in a man by karyotyping method. Specify probability of the birth of a son if he marriage healthy woman.

- 0%
- 50%
- 75%
- 25%
- 100%

Correct answer:

- 0%

249. Specify, to what type of mutations it is possible to belong the organism with trisomy of chromosome 13 (Patau syndrome), chromosome 18 (Edwards' syndrome), and chromosome 21 (Down syndrome),

- Aneuploidy of heterosomes
- Structural chromosome aberrations
- Phenocopies
- Somatic mutations
- Aneuploidy of autosomes

Correct answer:

- Aneuploidy of autosomes

250. Dietotherapy can prevent clinical manifestation of a number of hereditary diseases or facilitate their clinical course. What type of variation is caused by dietotherapy?

- Mutational
- Combinational
- Correlative
- Modification
- Teratogenic

Correct answer:

- Modification

251. A child with Patau syndrome was born to healthy parents. By means of what method of human genetics it is possible to differentiate this hereditary disease from phenocopy?

- By determination of sex chromatin
- Cytogenetic
- Biochemical
- Twin study
- Dermatoglyphic

Correct answer:

- Cytogenetic

252. Genetic determination of disorder of lipid metabolism can be associated with deficiency of lysosomal enzymes, be followed by increase in concentration of lipids in blood serum, and it plays an important role in development of atherosclerosis. Thus accumulated action of many genes that influence on the development of pathology occurs. What group of diseases can be caused by this action of genes?

- Monogenic diseases
- Chromosomal diseases
- Mitochondrial diseases
- Genomic diseases
- Multifactorial diseases

Correct answer:

- Multifactorial diseases

253. In the liquid received during amniocentesis, cells with the Y chromosome were revealed. Whether is it an indicator for induced abortion?

- Yes, it indicates pathology
- No, it is pleiotropy
- No, it indicates that fetus is male
- No, it is sex-linked inheritance
- No, twins will be born

Correct answer:

- No, it indicates that fetus is male

254. Children with congenital shortcomings of development are born more often in women of advanced age (35–45 years). What is the major factor, which influences on appearance of heavy anomalies that are often not compatible with life?

- Insufficient number of oocytes
- Decrease in general metabolism
- Insufficient hormonal activity
- Genetic defects in oocytes throughout life
- Disturbance of production of ova in a woman

Correct answer:

- Genetic defects in oocytes throughout life

255. The diagnosis of Patau syndrome was made to a newborn child with many malformations. What is the prognosis of life at this syndrome?

- Average life expectancy is 3 weeks
- Average life expectancy is 3 months
- Average life expectancy is 3 years
- Average life expectancy is 10 years
- Forecast of life is favorable

Correct answer:

- Average life expectancy is 3 months

256. A child with Down syndrome with a karyotype of 46 chromosomes was born to healthy parents. However, one of chromosomes of group D had the extended short arm. What method revealed an unbalanced translocation of an extra chromosome 21?

- Cytogenetic
- Biochemical
- Population-statistical
- Genealogical
- Twin study

Correct answer:

- Cytogenetic

257. Sex chromatin was revealed in cells of a man with eunuchoid and slightly feminized body structure. What diagnosis can be made?

- Klinefelter's syndrome
- Down syndrome
- Patau syndrome
- Trisomy X
- Phenylketonuria

Correct answer:

- Klinefelter's syndrome

258. Monosomy X was revealed in a 14-year-old girl. What diagnosis will be made?

- Down syndrome
- Turner's syndrome
- Patau syndrome
- Mucoviscidosis
- Wilson-Konovalov's disease

Correct answer:

- Turner's syndrome

259. Vomiting began in a newborn child. The laboratory analysis of urine showed the enhanced content of amino acids with branched chain – valine, leucine, isoleucine. Urine has a characteristic odour of maple syrup. What hereditary disease is associated with these changes?

- Leucinosi
- Cystinosis
- Alkaptonuria
- Fructosuria
- Mucoviscidosis

Correct answer:

- Leucinosis

260. Parents of a child consulted a doctor-geneticist for more precise definition of the diagnosis. During research of the child, liver pathology (cirrhosis, high content of copper) and movement disorders were determined. What hereditary disease of metabolism disorder is available in the child?

- Tay-Sachs disease
- Lesch-Nyhan syndrome
- Wilson-Konovalov's disease
- Niemann-Pick disease
- Gaucher disease

Correct answer:

- Wilson-Konovalov's disease

261. The sweat test – investigation of the content of chlorine and sodium in sweat – was carried out to a two-year-old girl with suspicion on molecular hereditary disease. It was established that their concentration exceeds norm by 5 times. What hereditary disease is it characteristic for?

- Phenylketonuria
- Galactosemia
- Fructosemia
- Mucoviscidosis
- Homocystinuria

Correct answer:

- Mucoviscidosis

262. A patient among somatic cells with normal karyotype has cells with trisomy of the 21st pair. What is the mechanism of this mutation?

- nondisjunction of chromosomes of the 21st pair during oogenesis
- nondisjunction of chromosomes of the 21st pair during mitosis
- nondisjunction of chromosomes of the 21st pair during spermatogenesis
- structural chromosome aberration
- gene mutation

Correct answer:

- nondisjunction of chromosomes of the 21st pair during mitosis

263. Specify, what set of sex chromosomes is present in a woman if the mass of sex chromatin is not revealed in nuclei of the epithelium of mucous membrane of the oral cavity.

- XXY
- XY
- XXXX
- XX
- XO

Correct answer:

- XO

264. During examination of a two-month child, a female pediatrician paid attention that crying of the child resembles cat's cry; microcephaly and heart disease is diagnosed. By means of cytogenetic method, the child's karyotype was found: $46,XX,5p^-$. This disease is a consequence of:

- duplication
- deletion
- inversion
- translocation
- pleiotropy

Correct answer:

- deletion

265. A newborn boy presents with dolichocephalic skull, microstomia, narrow palpebral fissures, and the deformed auricles. Karyotype of the child is 47,XY,18+. Establish the diagnosis.

- Patau syndrome
- Down syndrome
- Klinefelter's syndrome
- Turner's syndrome
- Edwards' syndrome

Correct answer:

- Edwards' syndrome

266. Myotonic dystrophy is characterized by muscular weakness, myotonia, and cardiac arrhythmia. The analysis of a family tree has revealed that the disease is found in each generation, meets identically in individuals of both sexes, parents equally transmit the disease to children. Define type of inheritance of this disease.

- Autosomal recessive
- X-linked dominant
- X-linked recessive
- Autosomal dominant
- Y-linked

Correct answer:

- Autosomal dominant

267. Each doctor has to know markers, which are characteristic for hereditary diseases. Crystalline lens dislocation was revealed in a patient. What syndrome will be diagnosed by a doctor, if he also will take into account features of the shape of hand and foot of the patient?

- Marfan's syndrome
- Turner's syndrome
- Klinefelter's syndrome
- Down syndrome
- Trisomy X

Correct answer:

- Marfan's syndrome

268. Urine of a sick child has specific sweetish odour. It is associated with disturbance of metabolism of such amino acids as leucine, isoleucine, and valine. What diagnosis will be made to the child by a doctor?

- Phenylketonuria
- Fructosuria
- Galactosemia
- Alkaptonuria
- Maple syrup urine disease

Correct answer:

- Maple syrup urine disease

269. In the case of disturbance of metabolism of one of amino acids, a diagnosis is confirmed by direct determination of activity of histidase in a horn layer of skin or in liver tissue. What hereditary disease one can talk about?

- Homocystinuria
- Histidinemia
- Phenylketonuria
- Cystinuria
- Tyrosinemia

Correct answer:

- Histidinemia

270. What hereditary disease is characterized by association of cirrhosis, dystrophic processes of a brain and reduction of the content of ceruloplasmin?

- Tay-Sachs disease
- Niemann-Pick disease
- Wilson-Konovalov's disease
- Marfan's syndrome
- Gilbert's disease

Correct answer:

- Wilson-Konovalov's disease

271. Karyotype of the female patient with Turner's syndrome is studied. Cell fission is stopped at metaphase stage of mitosis. How many chromosomes are present at this stage in one metaphase plate?

- 43 autosomes + 2 X chromosomes
- 44 autosomes + 1 X chromosome
- 44 autosomes + 2 X chromosomes
- 45 autosomes + 0 X chromosomes
- 42 autosomes + 3 X chromosomes

Correct answer:

- 44 autosomes + 1 X chromosome

272. During investigation of cells of buccal epithelium of the mucous membrane of a cheek, no mass of sex chromatin was revealed in a male patient. Which of the following is the most likely diagnosis?

- Normal man
- Klinefelter's syndrome
- Turner's syndrome
- Syndrome "superman"
- Morris' syndrome

Correct answer:

- Normal man

273. A woman gave birth to two babies. The provisional diagnosis was made to one child: syndrome of "cat's cry", which is characterized by the "mewing" voice timbre. By means of what method it is possible to confirm or disprove this diagnosis?

- Biochemical method
- Amniocentesis
- Twin study
- Cytogenetic method
- Population-statistical method

Correct answer:

- Cytogenetic method

274. By means of a cytogenetic method, the patient's karyotype with Klinefelter's syndrome 47,XXY is studied. How many masses of sex chromatin are present in a nucleus of one cell in this case?

- Two
- One
- Four
- No mass
- Three

Correct answer:

- One

275. Galactosemia is an autosomal recessive disease, which leads to injury of brain, liver, and eyes if a child remains on breastfeeding. What method of genetic examination needs to be applied to exact establishment of the diagnosis?

- Twin study
- Genealogical method
- Hybridizations of somatic cells
- Biochemical method
- Cytogenetic method

Correct answer:

- Biochemical method

276. Phenylketonuria is an autosomal recessive disease at which disturbance of phenylalanine metabolism is characterized by variable expressivity. What is the main method of prevention and treatment of this disease?

- Application of a diet without amino acids
- Application of a diet with low concentration of phenylalanine
- Use of special medicines
- Application of herbs
- Application of a diet without fats

Correct answer:

- Application of a diet with low concentration of phenylalanine

277. By means of cytogenetic method, the woman's karyotype with syndrome X trisomy was established: 47,XXX. How many masses of sex chromatin are present in a nucleus of one cell in this case?

- One
- Four
- No mass
- Two
- Three

Correct answer:

- Two

278. During oogenesis (meiosis I) in a woman, an oocyte II with 22 chromosomes and a polar body with 24 chromosomes were formed owing to nondisjunction of sex chromosomes (X chromosomes). What is the probability of appearance of a child with Turner's syndrome, if the formed ovum will be fertilized by a spermatozoon with normal chromosome number?

- 0%
- 25%
- 50%
- 75%
- 100%

Correct answer:

- 100%

279. Scoliosis is a spinal curvature. According to scientists, in 60–70 years of the 20th century, this disease was considered to inherit according to autosomal dominant type. But by analysis of different genealogical families with cases of scoliosis, it was proved that the trait is characterized by variable expressivity and incomplete penetrance. Appearance of a trait is increased in families of patients. Such features of manifestation of a trait specify:

- autosomal dominant type of inheritance
- autosomal recessive type of inheritance
- X-linked type of inheritance
- multifactorial type of inheritance
- dependence of trait manifestation on external factors only

Correct answer:

- multifactorial type of inheritance

280. To a newborn child who refuses food and has periodic vomiting, a diagnosis was made: Niemann-Pick disease. What metabolic disorder this disease is associated with?

- Amino acids
- Lipids
- Carbohydrates
- Nucleic acids
- Mineral substances

Correct answer:

- Lipids

281. A child with Down syndrome with a karyotype of 46 chromosomes was born to healthy parents. However, one of chromosomes of group D had the extended short arm. The unbalanced translocation of the additional 21st chromosome was revealed. What form of variation this case belongs to?

- Genomic mutation
- Modification
- Gene mutation
- Chromosome mutation
- Recombination

Correct answer:

- Chromosome mutation

282. Increased "folded" tongue that protrudes from the mouth, high palate, wrong growth of teeth, diastema, cross stripes on lips, and epicanthus are observed in a child. What disease is present in the child?

- Down syndrome
- Patau syndrome
- Edwards' syndrome
- Turner's syndrome
- Klinefelter's syndrome

Correct answer:

- Down syndrome

283. Changes of genes or chromosomes in gametes of parents lead to that a zygote carries the corresponding mutation from the moment of its formation. Malformations caused by such genetic changes are called:

- multifactorial
- exogenous
- environmental
- hereditary
- phylogenetic

Correct answer:

- hereditary

284. A woman gave birth to a child with pathology of maxillofacial area (cleft lip and cleft hard palate). What method of diagnostics needs to be used to confirm hereditary character of the given pathology?

- Twin study
- Cytogenetic method
- Population-statistical method
- Genealogical method
- Biochemical method

Correct answer:

- Cytogenetic method

285. In the cases of metabolic disorders, deviations from normal composition of urine are observed. Content of what acid is increased in urine in the case of alkaptonuria?

- Homogentisic
- Phenylpyruvic
- Acetoacetic
- Uric
- Pyruvic

Correct answer:

- Homogentisic

286. Konovalov-Wilson's disease is diagnosed in a patient. An increase in what microelement in urine does confirm this diagnosis?

- Sulfur
- Sodium
- Copper
- Potassium
- Calcium

Correct answer:

- Copper

287. Blood test showed that a patient has abnormal hemoglobin S and erythrocytes have abnormal shape. The patient complains of increased fatigue. Which of the following is the most likely diagnosis?

- Phenylketonuria
- Sickle-cell anemia
- Gout
- Hemophilia
- Galactosemia

Correct answer:

- Sickle-cell anemia

288. Disturbance of normal color perception is a recessive trait linked with the X chromosome. A mother is the carrier of the gene of daltonism, and a father is the color-blind person. In this family the probability of the birth of a child with abnormal color perception will make:

- 0.125
- 0.75
- 0.5
- 0.25
- 1

Correct answer:

- 0.5

289. The provisional diagnosis – Turner's syndrome – was made to a girl. Karyotyping is carried out. On the anaphase stage of mitosis, a number of chromosomes in one cell will make:

- 45
- 90
- 46
- 92
- 94

Correct answer:

- 90

290. Analysis of amniotic fluid that was obtained as a result of amniocentesis (puncture of amniotic sac) revealed cells with nuclei that contain sex chromatin (Barr body). What can it be evidence of?

- Genetic disorders of fetus development
- Development of male fetus
- Polyploidy
- Development of female fetus
- Trisomy

Correct answer:

- Development of female fetus

291. Based on the phenotypic diagnosis, a female patient has been provisionally diagnosed with X-chromosome polysomia. Cytogenetic method is used to clarify the diagnosis. The diagnosis will be confirmed if the patient's karyotype is:

- 46,XX
- 48,XXXY
- 48,XXYY
- 47,XXY
- 47,XXX

Correct answer:

- 47,XXX

292. During medico-genetic counseling, it was revealed that hemophilia skips generation and appears in males only. What method of medical genetics was used for this purpose?

- Twin study
- Genealogical method
- Dermatoglyphics
- Cytogenetic method
- Amniocentesis

Correct answer:

- Genealogical method

293. Niemann-Pick disease is a hereditary disease caused by disturbance of metabolism of lipids. Accumulation of sphingomyelin in liver, brain, spleen, kidneys, and skin is noted. Girls and boys are ill equally. The disease appears during the first months of life and leads to death in early children's age. What is the type of inheritance of this disease?

- Autosomal dominant
- X-linked dominant
- X-linked recessive
- Autosomal recessive
- Y-linked

Correct answer:

- Autosomal recessive

294. A 19-year-old girl has such group of clinically revealed traits: low height, sexual infantilism, and lag in intellectual and sexual development, heart disease. What is the most possible reason of this pathology?

- Trisomy of the 13th chromosome
- Trisomy of the 20th chromosome
- Partial monosomy
- Trisomy of the 18th chromosome
- Monosomy of the X chromosome

Correct answer:

- Monosomy of the X chromosome

295. An analysis of a genealogy of a family with cases of teeth anomaly (dark enamel) showed that the disease is transmitted from a mother to daughters and sons equally, and from a father only to his daughters. What is the type of inheritance of this trait?

- Autosomal recessive
- X-linked recessive
- Autosomal dominant
- X-linked dominant
- Codominant

Correct answer:

- X-linked dominant

296. A child with cleft lip and cleft palate, anomalies of thumbs of a hand) and microcephaly was born to healthy spouses. Karyotype of the child is 47,18+. What type of a mutation caused this hereditary disease?

- Monosomy of an autosome
- Monosomy of the X chromosome
- Polyploidy
- Nullisomy
- Trisomy of an autosome

Correct answer:

- Trisomy of an autosome

297. A 22-year-old woman consulted a doctor with a complaint of infertility. During examination, it was revealed that the karyotype is 45,XO, height is 145 cm, wing-shaped folds are present on a neck, secondary sexual traits are underdeveloped. What disease this phenotype indicates to?

- Klinefelter's syndrome
- Turner's syndrome
- Patau syndrome
- Trisomy X
- Trisomy Y

Correct answer:

- Turner's syndrome

298. A woman, who took alcoholic beverages during pregnancy, gave birth to a deaf child with cleft upper lip and cleft palate. These traits resemble manifestation of some chromosomal anomalies. What process has led to such consequences?

- Carcinogenesis
- Ontogenesis
- Teratogenesis
- Phylogenesis
- Mutagenesis

Correct answer:

- Teratogenesis

299. A man, his son and daughter have no small molars. Such anomaly was observed also in the grandfather on the father's side. What is the most possible type of inheritance of this anomaly?

- Autosomal dominant
- Autosomal recessive
- Dominant, linked with the X chromosome
- Recessive, linked with the X chromosome
- Y-linked

Correct answer:

- Autosomal dominant

300. Enamel hypoplasia is caused by a dominant gene localized in the X chromosome. Mother has normal enamel, and father has enamel hypoplasia. Which of children will have this anomaly?

- All children
- Only daughters
- Only sons
- Half of daughters
- Half of sons

Correct answer:

- Only daughters

301. A 17-year-old young man addressed to genetic consultation concerning deviations in physical and sexual development. During microscopy of cells of mucous membrane of a mouth, one Barr body was revealed. Specify the most probable karyotype of the young man.

- 45, XO
- 47, XXY
- 47, 21+
- 47, 18+
- 47, XYY

Correct answer:

- 47, XXY

302. Examination of a 7-year-old child revealed the following symptoms: small height, broad roundish face, closely placed eyes with narrow palpebral fissures, half-open mouth. Valvular defect has been also diagnosed. These clinical presentations are most likely typical for Down's syndrome. Name the cause of such pathology:

- Trisomy of chromosome 21
- Trisomy of chromosome 13
- Trisomy of the X chromosome
- Partial monosomy
- Nondisjunction of sexual chromosomes

Correct answer:

- Trisomy of chromosome 21

303. Very big teeth are a Y-linked sign. Mother's teeth are of normal size, and her son's teeth are very big. Probability of father's having very large teeth is:

- 12.5%
- 25%
- 50%
- 75%
- 100%

Correct answer:

- 100%

304. An 8-month-old child has non-closed palate, a number of eye defects, microcephaly, disorder of cardiovascular system. Cytogenetic analysis revealed 47 chromosomes with an additional chromosome 13. What diagnosis can be made on the basis of clinical observations and cytogenetic examinations?

- Cat cry syndrome
- Edwards' syndrome
- Down's syndrome
- Klinefelter's syndrome
- Patau's syndrome

Correct answer:

- Patau's syndrome

305. A group of students has representatives of different races. One of the students has straight black hair and overhanging skin fold of superior eyelid – epicanthus. What race does this student most probably represent?

- Negroid
- Mongoloid
- Caucasoid
- Australoid
- Ethiopian

Correct answer:

- Mongoloid

Note.

During exam in 2007, incorrect word "Europeoid" was used. Correct term is "Caucasoid".

306. Tetracycline taking in the first half of pregnancy causes abnormalities of fetus organs and systems, including tooth hypoplasia and alteration of their colour. What type of variability is the child's disease related to?

- Combinative
- Mutational
- Modification
- Hereditary
- Recombinant

Correct answer:

- Modification

307. A 1.5-year-old child was taken to a hospital. Examination revealed dementia, disorder of motor functions regulation, skin hypopigmentation, and high rate of phenylalanine in blood. Which of the following is the most likely diagnosis?

- Galactosemia
- Tyrosinosis
- Down's syndrome
- Mucoviscidosis
- Phenylketonuria

Correct answer:

- Phenylketonuria

308. Tricho-dento-osteal syndrome is one of ectodermic dysplasias, which is characterized by damage of teeth, hair, and bones. An analysis of a family tree revealed existence of pathology in each generation in men and women. On what type this syndrome is inherited?

- Autosomal recessive
- Recessive, X-linked
- Autosomal dominant
- Dominant, X-linked
- Y-linked

Correct answer:

- Autosomal dominant

309. A 25-year-old patient consulted a doctor about dysmenorrhea and infertility. Examination revealed that the patient was 145 cm high and had underdeveloped secondary sex characteristics, alar folds on the neck. Cytological study didn't reveal any Barr bodies in somatic cells. What diagnosis was made?

- Trisomy X syndrome
- Turner's syndrome
- Klinefelter syndrome
- Morris syndrome
- Down syndrome

Correct answer:

- Turner's syndrome

310. During examination of man's epithelium of the cheek mucosa, it was established that nuclei in most cells had Barr bodies. What syndrome is it typical of?

- Turner's syndrome
- Klinefelter's syndrome
- Trisomy of the X chromosome
- Down's syndrome
- Edwards' syndrome

Correct answer:

- Klinefelter's syndrome

311. Mucoviscidosis is shown not in each generation, women and men inherit a trait with equal frequency, and healthy parents transmit the trait to their children with equal frequency. On what type is it inherited?

- Autosomal dominant
- Mitochondrial
- Linked with the X chromosome
- Autosomal recessive
- Linked with the Y chromosome

Correct answer:

- Autosomal recessive

312. A disease, which is caused by a dominant gene localized in the X chromosome, was revealed in a man. Who from children will have this disease if the wife is healthy?

- Only sons
- Only daughters
- All children
- Half of daughters
- Half of sons

Correct answer:

- Only daughters

313. During examination of buccal epithelium of a man with eunuchoid traits, sexual X chromatin was revealed in many cells. What chromosomal disease this is characteristic for?

- Klinefelter's syndrome
- Down's syndrome
- Trisomy of the X chromosome
- Turner's syndrome
- Marfan's syndrome

Correct answer:

- Klinefelter's syndrome

314. For some hereditary diseases that were incurable earlier, possibility of curing by means of substitutive dietotherapy has appeared with development of medical genetics. At present it most of all concerns:

- anemia
- mucoviscidosis
- phenylketonuria
- cystinuria
- achondroplasia

Correct answer:

- phenylketonuria

315. A man consulted a doctor concerning infertility. He has high height, decrease in intelligence, and underdevelopment of sexual glands. Sexual chromatin (1 Barr body) is revealed in an epithelium of mucous membrane of oral cavity. About what pathology one can think?

- Klinefelter's syndrome
- Acromegaly
- Adrenogenital syndrome
- DiGeorge syndrome
- Cushing's syndrome

Correct answer:

- Klinefelter's syndrome

316. A woman was infected with a measles virus during pregnancy. A child was born with malformations, which are called cleft lips and cleft palate. These defects are manifestation of:

- polyploidy
- combinational variation
- chromosome mutations
- modification variation
- aneuploidy

Correct answer:

- modification variation

317. A man addressed to genetic consultation concerning infertility. In nuclei of the majority of cells of epithelium of mucous membrane of a cheek, one Barr body was revealed. The cause of such state can be:

- Trisomy X
- Turner's syndrome
- Down's syndrome
- Klinefelter's syndrome
- Trisomy Y

Correct answer:

- Klinefelter's syndrome

318. A mother had been taken synthetic hormones during pregnancy. Her daughter was born with hirsutism¹ formally resembling to adrenogenital syndrome. Such manifestation of variability is called:

- mutation
- recombination
- replication
- heterosis
- phenocopy

¹ Excessive hairiness.

Correct answer:

- phenocopy

319. Parents of a newborn with damage of the maxillofacial system (micrognathia, microstomia, short upper lip) addressed to genetic consultation. A doctor suspected that this is a chromosomal disease. What method needs to be used for specification of the diagnosis?

- Immunogenetic
- Dermatoglyphic
- Cytogenetic
- Genealogical
- Biochemical

Correct answer:

- Cytogenetic

320. A child was born with many malformations; nonclosure of upper lip and palate, microphthalmia, syndactyly, heart diseases, anomalies of kidneys. He died at the age of one month. During karyotyping, the set of chromosomes 47, 13+ was revealed in his cells. What type of a mutation caused this disease?

- Duplication
- Translocation
- Inversion
- Polyploidy
- Trisomy

Correct answer:

- Trisomy

321. In case of alkaptonuria, excess release of homogentisic acid with urine happens. With disturbance of metabolism of what amino acid this disease is developed?

- Methionine
- Tyrosine
- Phenylalanine
- Asparagine
- Alanine

Correct answer:

- Tyrosine

322. Amniocentesis revealed two sex chromatin bodies (Barr bodies) in each cell of the sample. What disease is this character typical for?

- Patau syndrome
- Trisomy X
- Klinefelter syndrome
- Turner's syndrome
- Down's syndrome

Correct answer:

- Trisomy X

323. A man according to the recommendation of an andrologist addressed to the genetic consultation concerning deviations of physical and mental development. The following was objectively established: high growth, asthenic constitution, gynecomasty, and mental retardation. By microscopy of cells of a mucous membrane of a mouth, sexual chromatin (one Barr body) was revealed in 30% of cases. Which of the following is the most likely diagnosis?

- Cushing's syndrome
- Down syndrome
- DiGeorge syndrome
- Recklinghausen's disease
- Klinefelter's syndrome

Correct answer:

- Klinefelter's syndrome

324. For diagnosing of some chromosomal diseases, determination of sexual chromatin is used. Name a disease, for which this determination is necessary:

- Down syndrome
- E trisomy
- Turner's syndrome
- hemophilia
- Bruton's disease

Correct answer:

- Turner's syndrome

325. An individual is characterized by rounded face, broad forehead, mongolian type of eyelid fold, flattened nasal bridge, permanently open mouth, projecting lower lip, protruding tongue, short neck, flat hands, and stubby fingers. What diagnosis can be made to the patient?

- Alkaptonuria
- Down's syndrome
- Super male
- Turner's syndrome
- Klinefelter's syndrome

Correct answer:

- Down's syndrome

326. A healthy woman has three sons affected by color blindness who were born after her two marriages. Children of her both husbands are healthy. What is the most possible pattern of inheritance of this disease?

- X-linked recessive
- Autosomal-recessive
- Y-linked
- Autosomal-dominant
- X-linked dominant

Correct answer:

- X-linked recessive

327. Woman accepted tranquilizers from the group of petroldiazepines in the second half of pregnancy. Childbirth came in time, proceeded normally, but a child with numerous anomalies of development (cleft lip, polydactyly) was born. How the described action of a remedy is called?

- Fetotoxic effect
- Mutagenic effect
- Teratogenic effect
- Blastomogenic effect
- Embryotoxic effect

Correct answer:

- Teratogenic effect

328. A child with normal karyotype is diagnosed with cleft lip and hard palate, defects of the cardiovascular system, microcephaly. The child's mother suffered from rubella during pregnancy. This pathology in the child may be an example of:

- phenocopy
- incomplete dominance
- trisomy
- genocopy
- monosomy

Correct answer:

- phenocopy

329. A child with encephalopathy was born to young spouses. A doctor established that the disease is associated with disturbance of mitochondrial DNA. How mitochondrial pathologies are inherited?

- From mother to sons only
- From both parents to all their children
- From father to sons only
- From mother to all her children
- From father to daughters only

Correct answer:

- From mother to all her children

330. A child with multiple malformations was born to healthy parents which heredity is not burdened. The cytogenetic analysis revealed trisomy of chromosome 18 (Edwards's syndrome) in somatic cells of the child. With what phenomenon the birth of such child is associated?

- Nondisjunction of a pair of chromosomes during gametogenesis
- Somatic mutation in an embryo
- Dominant mutation
- Chromosome mutation – duplication
- Influence of teratogens

Correct answer:

- Nondisjunction of a pair of chromosomes during gametogenesis

331. During an analysis of a family tree of a proband, it was revealed that a trait appears with an identical frequency in representatives of both sexes, sick persons are present in all generations (straight up), and across – in sibs (brothers and sisters of a proband) in approximately large families. What is the mode of inheritance of this trait?

- Y-linked
- Autosomal dominant
- Autosomal recessive
- X-linked recessive
- X-linked dominant

Correct answer:

- Autosomal dominant

332. Determination of X chromatin in somatic cells is used for express diagnostics of hereditary diseases caused by variations in number of gonosomes. What is karyotype of a man if overwhelming majority of his cells contains one body of X chromatin?

- 47, XXY
- 45, XO
- 49, XXXXY
- 46, XY
- 48, XXXY

Correct answer:

- 47, XXY

333. A doctor found rickets in a child, that was caused by deficiency of vitamin D, but this rickets on its manifestations was similar to hereditary vitamin-resistant rickets (curvature of tubular bones, deformation of joints of the lower extremities, tooth abscesses). How developmental anomalies, which resemble hereditary ones but are not inherited, are called?

- Phenocopies
- Genocopies
- Monosomies
- Trisomies
- Gene diseases

Correct answer:

- Phenocopies

334. Detection of X chromatin in somatic cells is used for quick diagnosis of hereditary diseases associated with a change in the sex chromosome number. Vast majority of a man's cells have three X-chromatin bodies. What is the man's karyotype?

- 45, X
- 46, XY
- 49, XXXXY
- 47, XXY
- 48, XXY

Correct answer:

- 49, XXXXY

335. When examining a female patient, a doctor observed the following: misshapen auricles, elevated palate, teeth growth disorder; mental retardation; no disruption of reproductive function. Provisional diagnosis is the "super woman" syndrome. Point out the karyotype of this disease.

- 47,XXX
- 47,XXY
- 47,YYY
- 47,XYY
- 45,X0

Correct answer:

- 47,XXX

336. A sixteen-year-old girl presents with height of 139 cm, a wing-shaped neck, undeveloped chest glands, primary amenorrhea. Most possibly, she has such karyotype:

- 46, XX / 46, XY
- 45, X0
- 47, XXX
- 46, XX
- 46, XY

Correct answer:

- 45, X0

337. Vitamin D-resistant rickets is determined by a dominant gene localized in the X chromosome. What genotype does a healthy boy have, if a mother in his family is healthy and this form of rickets is diagnosed for the father?

- AA
- aa
- X^aY
- Aa
- X^AY

Correct answer:

- X^aY

338. A woman is diagnosed with Turner's syndrome (karyotype 45, X0). How many autosomal pairs would her somatic cells contain?

- 24
- 23
- 44
- 45
- 22

Correct answer:

- 22

339. A karyotype of a female organism with trisomy syndrome – 47,XXX – is analyzed. By drawing up an ideogram of this set, such number of pairs of homologous chromosomes will be present:

- 21 pairs
- 22 pairs
- 23 pairs
- 47 pairs
- 24 pairs

Correct answer:

- 23 pairs

340. Malformations of a fetus can be caused by such diseases of mother as rubella, syphilis, toxoplasmosis, cytomegaly, herpes, clamidiosis. What form of variability such malformations belong to?

- Mutational
- Genomic imprinting
- Modification
- Combinational
- Epimutational

Correct answer:

- Modification

341. The diagnosis Klinefelter's syndrome was made to a patient. The karyotype at this disease is 47, XXY. In this set, there will be such number of gonosomes:

- none
- forty-four
- two
- three
- one

Correct answer:

- three

342. A woman with A (II), Rh-negative blood gave birth to a child with B (III), Rh-positive blood. Hemolytic disease of the newborn is diagnosed for the child. What is the most probable cause of the development of this disease?

- Hereditary chromosomal pathology
- ABO incompatibility
- Intrauterine intoxication
- Rhesus incompatibility
- Intrauterine infection

Correct answer:

- Rhesus incompatibility

343. Cytogenetic analysis allowed to determine a patient's karyotype – 47, XY, +21 / 46, XY. Such state is called:

- deletion
- mosaicism
- translocation
- genocopy
- phenocopy

Correct answer:

- mosaicism

344. Nondisjunction of autosomes occurred in a woman during meiosis. An ovum with the additional 18th chromosome was formed. The ovum was fertilized by normal spermatozoid. Future child will have such syndrome:

- Klinefelter
- Shereshevsky-Turner
- Down
- Edwards
- Patau

Correct answer:

- Edwards

345. A mother of the 2-year-old child, who has lag in physical and intellectual development, addressed to a medico-genetic consultation. What method of research will allow to exclude chromosomal pathology?

- Population-statistical
- Biochemical
- Cytogenetic
- Cytologic
- Genealogical

Correct answer:

- Cytogenetic

Note.

Actually, the difference between cytologic and cytogenetic methods is absent. If the cytologic method is directed on research of chromosomes, it is possible to name it cytogenetic method. Stomatologists had this question in 2019.

346. A patient with Leber's hereditary optic neuropathy comes for genetic counseling. After the family history taking, the genetic counselor constructs pedigree, which displays a distinct mode of inheritance: his disease is transmitted only from affected females to their offspring. Both males and females are affected. None of the offspring of an affected male is affected. Which of the following modes of inheritance is identified by the counselor?

- Autosomal dominant
- X-linked dominant
- X-linked recessive
- Mitochondrial
- Autosomal recessive

Correct answer:

- Mitochondrial

Questions that are not included into the main text

Question. *Amino acids join to each other in ribosomes of granular endoplasmic reticulum. Knowing the sequence of amino acids and applying genetic code, it is possible to determine the sequence of nucleoids in: a) carbohydrates; b) introns; c) mRNA; d) proteins; e) rRNA. This question was used during examination for stomatologists in 2017, but it has mistakes! First, the word "nucleotides" must be used instead of "nucleoids". Second, it is impossible to determine nucleotide sequence of mRNA (this answer was proposed as correct one) because the genetic code is degenerate! Moreover, mRNA has untranslated regions (and eukaryotic mRNA has introns!), and their sequences can NOT be determined on the base of amino acid sequence!*

POPULATION GENETICS AND EVOLUTION

1. In one population, the part of a recessive allele makes 0.1, in another population is 0.9. In what of these populations marriages of heterozygotes are more probable?

- In both populations they are identical
- In the first
- In the second
- The event is impossible
- All answers are wrong

Correct answer:

- In both populations they are identical

2. In the area with a population of 280 000 people, 14 albinos and 9 patients with phenylketonuria are registered. All traits are hereditary and are determined by autosomal recessive genes. By what formula it is possible to determine probability of marriage of carriers of these genes?

- $p^2 + 2pq + q^2$
- pq^2
- $2p_1q_1 \times 2p_2q_2$
- $p + q$
- $p^2 + 2pq$

Correct answer:

- $2p_1q_1 \times 2p_2q_2$

3. Hardy-Weinberg's law allows to determine genetic structure of population, i.e. frequency of dominant and recessive genes, a ratio of homo- and heterozygotes. It establishes that:

- the ratio of genotypes in population changes
- the ratio of genes in population remains constant
- the ratio of genes in population changes
- the ratio of alleles of alternative manifestations of a trait remains constant
- the ratio of alleles of alternative manifestations of a trait changes

Correct answer:

- the ratio of alleles of alternative manifestations of a trait remains constant

4. An Rh-positive fetus develops in an Rh-negative woman. There was rhesus incompatibility, which threatens health of future child. To what type of natural selection it is necessary to belong this phenomenon?

- Selection against homozygotes
- Selection against heterozygotes
- Selection in favor of heterozygotes
- Directional selection
- Stabilizing selection

Correct answer:

- Selection against heterozygotes

5. Under the influence of a mutagen the structure of a gene changed and a recessive mutation appeared that got into a gamete and then into the formed zygote. After reproduction of an organism it got into some individuals. What happens with this mutation further according to the Hardy-Weinberg's law if it does not influence viability?

- From generation to generation, its frequency will decrease, and it will gradually disappear
- From generation to generation, its frequency will increase
- Its frequency in population remains to be constant
- Frequency of this mutation can incidentally decrease or increase, or remain constant
- Frequency of this mutation will sharply decrease, and it will quickly disappear

Correct answer:

- Its frequency in population remains to be constant

6. The disease sickle-cell anemia is caused by presence of a recessive gene. People, who have this disease, as a rule, die at children's age. However, the frequency of a gene is quite high. Explain why the gene of sickle-cell anemia does not disappear as a result of natural selection:

- high frequency of mutations
- panmixia
- inbreeding
- survival of heterozygotes
- large distribution of the gene

Correct answer:

- survival of heterozygotes

7. The fundamental law of population genetics describes change of frequencies of genes (alleles) or genotypes in populations. It has the name:

- Vavilov's law of homological series
- Hardy-Weinberg's law
- 1st Mendel's law
- 2nd Mendel's law
- 3rd Mendel's law

Correct answer:

- Hardy-Weinberg's law

8. Malarial plasmodium – a causative agent of tertian malaria – has two strains: southern and northern. They differ in duration of the incubatory period: it is short in the southern strain, and it is long in the northern strain. In this phenomenon, what action is apparent?

- Genetic drift
- Isolation
- Population waves
- Natural selection
- Struggle for existence

Correct answer:

- Natural selection

9. In a human population that is close to ideal population according to their characteristics, 84% of individuals are Rh-positive. Frequency of occurrence of this trait through three generations will make:

- 24%
- 94%
- 6%
- 84%
- 16%

Correct answer:

- 84%

10. A married couple came to a genetic counseling. The husband suffers from insulin-dependent diabetes mellitus, while the wife is healthy. What is the probability that this couple will have an insulin-dependent child?

- The same as in a population
- Lower than in a population
- 100%
- Higher than in a population
- 50%

Correct answer:

- Higher than in a population

Note.

In 2017 and 2019, the same question was present, but insulin-independent diabetes was described.

11. Mennonite sect that lives in Lancaster (Pennsylvania, USA) is 1400 persons in number, frequency of closely related (family, incest) marriages is 95%, natural increase in the population size is 25%, migration from other groups is 1%. What name this community of people has received?

- Ideal population
- Isolate
- Real population
- Deme
- Species

Correct answer:

- Isolate

12. In what human populations there will be large portion of old men?

- In quickly growing populations
- In populations which are in a steady state
- In populations where number of inhabitants decreases
- All answers are correct
- All answers are wrong

Correct answer:

- In populations where number of inhabitants decreases

13. In the region, which is endemic on the falciparum malaria, a large number of people with sickle-cell anemia were revealed. What type of selection's action it can be associated with?

- Selection in favor of heterozygotes
- Selection in favor of homozygotes
- Stabilizing selection
- Disruptive selection
- Directional selection

Correct answer:

- Selection in favor of heterozygotes

14. In human populations, the allelic structure of genotypes depends on system of marriages. What system of marriages supports the high level of heterozygosity?

- Positive assortative marriages
- Closely related marriages
- Inbreeding
- Incest marriages
- Outbreeding

Correct answer:

- Outbreeding

15. A hereditary disease – sickle-cell anemia, which is inherited on autosomal recessively type, is very widespread in tropical countries of Africa. Endemism of this disease is associated with the fact that in tropical countries:

- heterozygotic carriers are more prolific
- malaria is widespread
- hemoglobin aggregates in erythrocytes are not formed
- less homozygous descendants are born
- survival of sick patients is higher

Correct answer:

- malaria is widespread

16. Closely related marriages are forbidden. How the genetic structure of population in the case of such marriage will change?

- Recessive homozygosity increases
- Recessive homozygosity decreases
- Heterozygosity increases
- Heterozygosity and dominant homozygosity increase
- Heterozygosity and dominant homozygosity decrease

Correct answer:

- Recessive homozygosity increases

17. In small population of people, which number does not exceed 1500 people, the frequency of intra group marriages makes over 90%. Thereof through 4 generations (about 100 years), all members of this population are at least the second cousins. Such population is called:

- ideal
- deme
- nation
- nationality
- isolate

Correct answer:

- isolate

18. In a population of inhabitants of Odessa region, a dominant gene of right-handedness meets with the frequency of 0.8, a recessive gene of left-handedness – 0.2. How many percents of heterozygotes are in this population?

- 32%
- 46%
- 58%
- 64%
- 100%

Correct answer:

- 32%

19. In a population, the part of Rh-positive people is 84%, and Rh-negative is 16%. What frequency of the recessive allele of the gene *d* is in this population?

- 0.16
- 0.25
- 0.4
- 0.5
- 0.84

Correct answer:

- 0,4

20. In ancient times in Egypt, marriages between relatives of the first degree of relationship (brother–sister) were observed that led to the birth of mentally retarded and sick children. How such marriage is called?

- Unrelated
- Panmictic
- Positive assortative
- Incest
- Negative assortative

Correct answer:

- Incest

21. A malarial plasmodium – the pathogen of vivax malaria – has two strains: southern and northern. They differ by duration of their incubation period: the southern has short and the northern – long one. What selection works in this case?

- Artificial
- Sexual
- Cutting
- Moving
- Stabilizing

Correct answer:

- Cutting

22. People, who live in different areas of Earth, differ phenotypically: Negroids, Mongoloids, and Caucasians. With what form of selection this can be explained?

- Stabilizing selection
- Disruptive selection
- Artificial selection
- Directional selection
- Sexual selection

Correct answer:

- Disruptive selection

23. In a population of inhabitants of Odessa region, a dominant gene of the positive Rhesus factor meets with frequency 0.6, a recessive gene of lack of Rhesus factor – 0.4. How many percent of heterozygotes are present in this population?

- 54%
- 62%
- 48%
- 92%
- 100%

Correct answer:

- 48%

24. In some populations, which are isolated in their reproduction, genes frequencies can differ considerably. Therefore, the frequency of the blood type II (A) among Indians of a tribe "black legs" makes 80% and among Indians of the State of Utah makes 2%. What elementary evolutionary factors define such differences?

- Selection in favor of heterozygotes
- Founder effect and genetic drift
- Population waves
- Mutations and natural selection
- Stabilizing selection and isolation

Correct answer:

- Founder effect and genetic drift

25. Studying incidence in the Crimean population, doctors-geneticists came to conclusion that the number of patients with phenylketonuria and heterozygotes on this gene increased in recent years. What law was used for determination of genetic structure of the population?

- G. Mendel
- Hardy-Weinberg
- T. Morgan
- N. Vavilov
- Haeckel-Muller

Correct answer:

- Hardy-Weinberg

26. Analysis of a family history of children with Van der Woude syndrome revealed that one of parents in their families had typical defects for this syndrome (cleft lip and palate, lip pits regardless of gender). What is the type of inheritance of this syndrome?

- Multifactorial
- Autosomal recessive
- X-linked dominant
- X-linked recessive
- Autosomal dominant

Correct answer:

- Autosomal dominant

GENERAL BIOLOGY

1. As a result of expression of some genome components, embryo cells acquire typical morphological, biochemical, and functional properties. Name this process:

- capacitation
- reception
- determination
- differentiation
- induction

Correct answer:

- differentiation

2. Multiple sclerosis was revealed in a 72-year-old man. During this disease, reactions directed against tissues of the central nervous system develop. What is the disease?

- Autoimmune
- Alloimmune
- Hemolytic
- Homeostatic
- Transplant

Correct answer:

- Autoimmune

3. During experiment with a frog blastula, one blastomere was removed at a stage of 16 blastomeres. An isolated cell continued to develop normally and gave rise to a new embryo. What important property of blastomeres was shown?

- Formation of poles of an embryo
- Totipotency
- Ability to differentiation
- Formation of germ layers
- Ability to embryonic induction

Correct answer:

- Totipotency

4. During the postembryonic development in a man's organism some age-related changes occur. They are skin elasticity loss, visual and hearing impairment. What do we call the period of individual development when such changes occur?

- Aging
- Adolescence
- First mature
- Juvenile
- Youth

Correct answer:

- Aging

5. In a transplantation centre, a patient has been transplanted a heart. What cells of immune system can influence graft cells?

- Macrophages
- Plasma cells
- T lymphocytes
- B lymphocytes
- Lymphoblasts

Correct answer:

- T lymphocytes

6. In a certain time of day, an increase in blood clotting is observed in a man. What biological regularity can explain this phenomenon?

- Physiological regeneration
- Reparative regeneration
- Genotype
- Biological rhythms
- Regeneration and genotype

Correct answer:

- Biological rhythms

7. Antibiotic actinomycin D is known to have no toxic effect on a maternal organism; on the other hand, it impairs the formation of tissues and organs of ectodermic origin in an embryo organism. A woman was taking actinomycin D during pregnancy. What organs or systems of a fetus can be impaired as a result?

- Sex glands
- Skeleton muscles
- Locomotion system
- Urogenital system
- Nervous system

Correct answer:

- Nervous system

8. How highlands conditions influence development and passing of life cycle by a man?

- Accelerate all stages of postnatal development
- Do not influence menarche, but reduce the period of starting of menopause
- Slow down processes of puberty and aging
- Change human biorhythms
- Slow down processes of puberty and strengthen aging processes

Correct answer:

- Slow down processes of puberty and aging

9. At the stage of blastocyst, the beginning of a human embryo implantation into the womb wall was recorded. What term of embryogenesis does it occur at?

- 10–12 days
- 3–4 days
- 6–7 days
- 24–26 days
- 30–35 days

Correct answer:

- 6–7 days

10. Existence of life at all its levels is defined by structure of the lowest level. What level of organization provides existence of a cellular level of life?

- Tissue
- Organismal
- Biocenotic
- Population and species
- Molecular

Correct answer:

- Molecular

11. During the postembryonic development of a human, two lordoses and two kyphoses are formed. It can be explained as the human ability to:

- sit
- walk vertically
- swim
- creep
- lie

Correct answer:

- walk vertically

12. In parallel experiments on rats, which were subjected to long direct solar radiation, and rats, which were in chambers closed by glass, development of tumors on hairless parts of skin in animals that were in open chambers. With influence of what factors listed below this phenomenon is associated?

- Solar heat
- Biological carcinogens
- Ultraviolet radiation
- Infrared radiation
- Exogenous chemical carcinogens

Correct answer:

- Ultraviolet radiation

13. Skin of a donor was repeatedly transplanted to a 38-year-old woman, but it was rejected much quicker, than after the first transplantation. This reaction happens due to activity of part of thymocytes, which:

- have immunological memory
- are capable to absorb and digest pathogenic bacteria
- have antihistaminic action
- stimulate reproduction of B lymphocytes
- turn B lymphocytes into plasmablasts

Correct answer:

- have immunological memory

14. A tissue slice from a region of chronic stomach ulcer was sent to the pathomorphologic office. During histologic research, necrosis, granulation tissue, excessive development of sclerous tissue and metaplasia of an epithelium were revealed in the wall of the ulcer. What type of regeneration these changes indicate to?

- Pathological regeneration with disturbance of change of phases
- Reparative regeneration – substitution
- Physiological regeneration
- Reparative regeneration – restitution
- Hypertrophy

Correct answer:

- Pathological regeneration with disturbance of change of phases

15. At a definite stage of embryogenesis, mother's and fetus's circulatory systems are becoming physiologically connected. What provisional organ fulfils this function?

- Amnion
- Yolk sac
- Placenta
- Serosa
- Allantois

Correct answer:

- Placenta

16. Knowledge of poisonous plants is necessary for a man because poisonings due to their similarity to the nonpoisonous plants occur quite often. Henbane – a grassy two-year plant from the family Solanaceae – is very dangerous for man. What clinical sign is the most characteristic at poisoning with henbane?

- Disorders of function of digestion
- Headache
- Nervous excitement
- Paralysis of respiratory muscles
- Edema, hemorrhages

Correct answer:

- Nervous excitement

17. Autotransplantation of skin was made to a patient after burn. Rejection of a transplant did not happen. How it can be explained?

- Genes coding synthesis of autoantibodies are not inherited
- There is natural immunological tolerance
- Substances of skin cells are not antigens
- Owing to the burn disease, the condition of immunological insufficiency occurred
- Artificial immunological tolerance was created

Correct answer:

- There is natural immunological tolerance

18. Data of paleoanthropology, which were received by anthropologists owing to long-term archeological excavations, indicate that such diseases as deforming arthrosis and spondylosis were widespread during Mesolithic and Neolithic eras. About what things these finds indicate first?

- Existence of causative agents of diseases
- Disturbance of ossification of bones
- Insufficient food
- Excessive physical activities
- Attack of predators on man

Correct answer:

- Excessive physical activities

19. In a man, the mature plasma cell lost ability to reproduction and started to secrete antibodies – immunoglobulins. At what stage of life cycle it occurs?

- G_1
- S period
- G_2
- Prometaphase
- Differentiation

Correct answer:

- G₁

20. In the process of anthropogenesis, a number of changes of skull, throat, and brain were observed in man in comparison with monkeys. What of these signs are associated with development of the articulate speech first of all?

- Stronger projection of a brain skull concerning the plane of a face
- More developed parietal parts
- Increase in sizes of hemispheres of a brain
- Reduction of sizes of canines
- Growth of precentral and frontal gyri

Correct answer:

- Growth of precentral and frontal gyri

21. Composition of blood in a man has changed at long stay in highlands conditions. What changes are observed in blood?

- Amount of gamma globulins increases
- Viscosity of blood decreases
- Leukocyte count increases
- Thrombocyte count increases
- Erythrocyte count and hemoglobin level increase

Correct answer:

- Erythrocyte count and hemoglobin level increase

22. Toxic agents of an animal origin are used in small doses with medical purpose. For treatment of what disease it is most expedient to use snake poison, which is rich in coagulants?

- Epilepsy
- Bronchial asthma
- Rheumatism
- Hemophilia
- Gout

Correct answer:

- Hemophilia

23. For studying features of a structure of human body, depending on object for studying, scientists use different anthropological methods: somatometry, osteometry, somatoscopy, etc. Choose, what from described methods belongs to craniometry first of all?

- Preparing of masks, dental models
- Studying the head shape
- Measuring the remains of bones of a body
- Measuring skulls
- Using models

Correct answer:

- Measuring skulls

24. A newborn boy presents with multiple malformations. What of the listed defects has phylogenetic conditionality?

- Natural dislocation of hip
- Spinal curvature
- Reduced jaw
- Anophthalmos
- Additional ribs on cervical vertebrae

Correct answer:

- Additional ribs on cervical vertebrae

25. On autopsy of a still-born infant, heart abnormalities have been revealed: ventricles are not separated, a single arterial trunk originates from the right part. For what class of vertebrates is such heart construction characteristic?

- Fishes
- Birds
- Mammals
- Amphibian
- Reptiles

Correct answer:

- Amphibian

26. Relationships between organisms, which are connected with food, lead to appearance of food chains. Each food chain includes, as a rule, no more than 4–5 levels because, due to energy losses; general biomass of each subsequent level is about 10 times less than the previous one. What of the listed organisms needs to place on a top of an ecological pyramid?

- Wheat
- Man
- Plague bacteria
- Flea
- Souslik

Correct answer:

- Plague bacteria

27. What functional indicators of an organism do not decrease when aging, but, on the contrary, increase?

- Cholesterol level in blood
- Hormonal activity of thyroid gland
- Contractile ability of cardiac muscle
- Visual acuity
- Activity of enzymes

Correct answer:

- Cholesterol level in blood

28. Recently, increase in concentration of CO₂ in the atmosphere is observed. What biological consequences this change in gas structure of the atmosphere can lead to?

- Exhaustion of ozone layer that protects all living things from radiation
- Creation of "greenhouse effect", warming of climate on the planet, thawing of ices in Polar Regions
- Harm to plants
- Falling of sulfuric and nitric acids with rain, dew, snow, hoarfrost
- Falling of global sea level

Correct answer:

- Creation of "greenhouse effect", warming of climate on the planet, thawing of ices in Polar Regions

29. A newborn child has microcephalia. Doctors consider that this disorder is the result of mother's taking actinomycin D during pregnancy. What germinal layer was affected by this teratogen?

- Ectoderm
- All germinal layers
- Entoderm
- Mesoderm
- Entoderm and mesoderm

Correct answer:

- Ectoderm

Note.

In the collection of test questions in the Internet site <http://testcentr.org.ua/> (2013) as well as during exam in 2006, incorrect terms "leaf", "leaves", "ectoderma", "entoderma", and "mesoderma" were used instead of "layer", "layers", "ectoderm", "entoderm", and "mesoderm". During exam in 2016, correct terms were used.

30. When determining process of aging of a human body, weakening of T-system activity was revealed at senile age. It is known that processes breaking homeostasis occur in an organism at cellular and molecular levels. What function of T-lymphocytes killers is broken first of all?

- Transformation of plasmablasts into plasmocytes
- Recognition and destruction of mutant cells of an organism
- Stimulation of reproduction of B lymphocytes
- Release of immunoglobulins by B lymphocytes
- Inhibition of the immune answer of B cells

Correct answer:

- Recognition and destruction of mutant cells of an organism

31. Defect of the interventricular septum was established at a newborn. In a ventricle, the arterial and venous blood is mixed. At what representatives of a class of vertebrates heart has such structure?

- Fishes
- Amphibians
- Reptiles
- Birds
- Mammals

Correct answer:

- Reptiles

32. A 14-year-old boy is characterized by lag in growth (small growth), but proportions of a body and sexual development are normal. What hormonal changes can occur in this case?

- Deficiency of somatotropic hormone
- Deficiency of sex hormones
- Deficiency of thyroid hormones
- Excess of somatotropic hormone
- Excess of thyroid hormones

Correct answer:

- Deficiency of somatotropic hormone

33. Clinical death is registered in a person. What vital functions have stopped thus?

- Renewal of cells
- Processes of metabolism
- Heartbeat and breath
- DNA replication
- Mobility

Correct answer:

- Heartbeat and breath

34. Operation on heart transplantation was performed to a sick person with congenital heart disease. In 24 hours, process of rejection of a donor transplant began. What provided this process?

- Macrophages
- T lymphocytes killers
- T lymphocytes helpers
- T lymphocytes suppressors
- Antibodies (immunoglobulins)

Correct answer:

- Antibodies (immunoglobulins)

35. Serious hereditary disease of skin – lack of sweat glands (anhidrosis) – was revealed in a child; thereof important functions of skin – perspiration and thermal control – are broken. This defect is a consequence of disturbance during embryogenesis of anlage of:

- splanchnotom
- ectoderm
- sclerotome
- entoderm
- dermatome

Correct answer:

- ectoderm

36. During various inflammatory processes in a man, leukocyte count in blood increases. This regularity is manifestation of:

- regeneration
- reparation
- adaptation
- transplantation
- degeneration

Correct answer:

- adaptation

37. The part of a liver was removed in a man after trauma. The left part of a liver regenerates to the normal size, but its form remains changed. What regeneration takes place?

- Compensatory hypertrophy
- Epimorphosis
- Morphallaxis
- Regeneration hypertrophy
- Substitutive hypertrophy

Correct answer:

- Regeneration hypertrophy

38. In experimental conditions, the eye bubble was transplanted under skin of ventral area of an embryo (G. Spemann, 1901). What operation consequences will occur?

- Nervous tube will be formed
- Eye crystalline lens will be formed
- Chord will be formed
- Somites will be formed
- Entoderm will be formed

Correct answer:

- Eye crystalline lens will be formed

39. A large number of mutant cells appeared in a man for one day after radiation. But after a while, the majority of them were recognized and destroyed due to activity of:

- T-lymphocytes suppressors
- B lymphocytes
- plasmablasts
- T-lymphocytes killers
- stem cells

Correct answer:

- T-lymphocytes killers

40. A 14-year-old boy presents with lag in growth (small growth), disturbance of body proportions, and lag in sexual development. About lesion of what structures of endocrine system this can indicate?

- Forward part of hypophysis
- Middle part of hypophysis
- Back part of hypophysis
- Thyroid gland
- Sexual glands

Correct answer:

- Forward part of hypophysis

41. In a human embryo, the anlage of axis organs has begun. How this development stage is called?

- Blastula
- Zygote
- Cleavage
- Neurula
- Gastrula

Correct answer:

- Neurula

42. After radiation by high dose of radiation, the lymphoid system considerably suffered in a teenager; disintegration of a large number of lymphocytes occurred. Due to activity of what organ, restoration of normal blood count is possible?

- Thyroid gland
- Liver
- Pancreas
- Thymus
- Adrenal gland

Correct answer:

- Thymus

43. A newborn presents with dry skin covering with a thick layer of horny scales, – ichthyosis. Representatives of what class of vertebrates have skin of similar structure?

- Reptiles
- Fishes
- Mammals
- Birds
- Amphibians

Correct answer:

- Fishes

44. A patient has been badly burnt; as a result, he has skin defects. To liquidate these defects, surgeons have grafted a piece of skin from another part of the patient's body. What type of transplantation is it?

- Homotransplantation
- Explantation
- Allotransplantation
- Xenotransplantation
- Autotransplantation

Correct answer:

- Autotransplantation

45. Nuclei of blastula cells were transplanted into denucleated ova of a frog. Normal embryos developed from an ovum in 80% of cases. Explain this phenomenon:

- it happens due to inactivation (stable repression) of groups of genes
- nuclei of cells had lost genetic information
- there is no loss of genes in the process of cell differentiation
- nuclei of blastula cells are genetically full (totipotent)
- nuclei of cells contain the same number of different genes, as well as in impregnated egg

Correct answer:

- nuclei of blastula cells are genetically full (totipotent)

46. There is a theory that mitochondria are descendants of prokaryotic cells that at a certain stage of evolution penetrated into cytoplasm of eukaryotic cells and live at present in symbiosis with host cells. This theory is confirmed by the fact that in mitochondria:

- oxidizing phosphorylation occurs
- biosynthesis of protein begins with formylmethionine
- cristae are present
- double membrane is present
- cycle of citric acid occurs

Correct answer:

- biosynthesis of protein begins with formylmethionine

47. During ontogenesis, some changes in human organism appear; the vital capacity of his lungs decreases, his arterial pressure increases, and the progress of atherosclerosis takes place. What do we call the period of individual development in which all these changes happen?

- Youth
- Elderly
- Adolescence
- Juvenile
- First mature

Correct answer:

- Elderly

48. As a result of road accident, a 36-year-old patient got an open fracture of bones of a shin. During the process of union, excess bone callosity was formed in the place of fracture. What type of regeneration the formation of this callosity should be referred to?

- Restitution
- Pathological regeneration
- Reparative regeneration
- Substitution
- Physiological regeneration

Correct answer:

- Pathological regeneration

49. A patient is prepared for operation of kidney transplantation. All try to find a donor. What antigens of the donor and recipient from the listed ones have the greatest value for successful engraftment?

- MN blood type system
- ABO blood system
- Rh system
- Duffy system
- HLA system

Correct answer:

- HLA system

50. Pulmonary stagnation was revealed in a five-month girl. During examination, connection between ascending aorta and pulmonary artery, which in norm is observed in some amphibious and reptiles, was found. What is a congenital malformation?

- Defect of interatrial septum
- Defect of interventricular septum
- Development of the right arch of aorta
- Nonclosure of the Botallo's duct
- Transposition of main vessels

Correct answer:

- Nonclosure of the Botallo's duct

51. In experiment, processes of transcription in nuclei of nervous cells were blocked in the head end of an embryo of a frog at a neurula stage. To what congenital defect it can result in?

- Anencephalia
- Nonclosure of hard palate
- Spinal hernia
- Hydrocephaly
- Cleft lip

Correct answer:

- Anencephalia

52. During autopsy of a young man who was a driver and died after road accident, a doctor-pathologist was surprised with the considerable size of heart, which almost twice surpassed normal size. In what kind of activity the driver was engaged?

- Cookery
- Programming
- Heavy athletics
- Transportation of passengers
- Wine tasting

Correct answer:

- Heavy athletics

53. A man lived a long time in highlands conditions. What changes will be present in his blood system?

- Increase in diameter of blood vessels
- Decrease in leukocyte count
- Pulse becomes rarer
- Increase in hemoglobin level
- Increase in leukocyte count

Correct answer:

- Increase in hemoglobin level

54. Human embryos with abnormal number of chromosomes are nonviable in most cases. What form of selection can explain this?

- Stabilizing
- Sexual
- Directional
- Disruptive
- Artificial

Correct answer:

- Stabilizing

55. The mutant line "nude" of mice was received in genetic laboratory; it has no thymus and no cellular immune answer. Experiments with transplantation of allogenic tissues to these mice showed that rejection of the transplanted material in mice does not occur. With lack of what cells this phenomenon is associated?

- Macrophages
- B lymphocytes
- Monocytes
- T-lymphocyte killers
- Plasma cells

Correct answer:

- T-lymphocyte killers

56. Albinism is observed among all classes of vertebrate animals. This hereditary pathology is also present in man and is caused by autosomal recessive gene. What law is manifested by existence of albinism in a man and representatives of different classes of vertebrate animals?

- Vavilov's law of homologous series of hereditary variation
- Haeckel-Muller's biogenetic law
- Mendel's law of dominance
- Mendel's law of independent assortment
- Morgan's law of inheritance of linked genes

Correct answer:

- Vavilov's law of homologous series of hereditary variation

57. At examination of a patient, insufficient amount of immunoglobulins was revealed. What cells of immune system of the patient have broken function that can cause such symptom?

- T killers
- Plasmablasts
- T suppressors
- Plasma cells
- T helpers

Correct answer:

- Plasma cells

58. A child having a deep mental deficiency with cleft lip, cleft palate and heart defects was born to a woman who uses drugs. In what period of ontogenesis listed abnormalities could appear?

- In the period of gametogenesis and the postnatal period
- In the periods of histogenesis and organogenesis
- In the period of morphogenesis and the postnatal period
- In the periods of gametogenesis and embryogenesis
- In the period of development of a fetus and in the postnatal period

Correct answer:

- In the periods of gametogenesis and embryogenesis

59. Rudimental organs are organs that lost their function, but remain in embryonal state in adult organisms. What of the listed human organs are rudimentary?

- Existence of more than two mammary glands
- Tail
- Head
- Cervical fistula
- Tailbone

Correct answer:

- Tailbone

60. During an active physical activity, concentration of carbonic acid in blood of a man increases. It leads to deepening and acceleration of breath, owing to this, concentration of carbonic acid and ions of hydrogen in blood decreases. This supports:

- immunity
- ontogenesis
- homeostasis
- phylogeny
- anabiosis

Correct answer:

- homeostasis

61. At different levels of the organization, adaptation is maintained in biological systems. Adaptation is believed to be the adaptation of the living thing to environmental conditions that change continuously. Without adaptations, support of normal existence is impossible. What is the cornerstone of adaptations?

- Heredity and variation
- Irritability and proper responses
- Metabolism and energy
- Discretization and integrity
- Homeostasis and reproduction

Correct answer:

- Irritability and proper responses

62. A young man of military age is examined in a clinic. Lack of teeth on the lower jaw is revealed. It is found that defect of teeth is observed in the patient since the childhood. What could serve as the reason of this anomaly?

- Infectious disease
- Reception of medicines
- Disturbance of organogenesis during embryogenesis
- Alimentary insufficiency
- Vitamin deficiency

Correct answer:

- Disturbance of organogenesis during embryogenesis

63. Tooth was extracted in a 50-year-old woman. New tissue regenerated on a place of tooth removal. Based on functions of cellular organelles, specify the most active of them during repair of tissues:

- centrosomes
- mitochondria
- ER
- lysosomes
- ribosomes

Correct answer:

- ribosomes

64. A boy, whose body is covered with hairs (hypertrichosis), was born to a family. This defect is caused by fact that a large number of hair follicles is formed at a stage of organogenesis, nevertheless, later, during embryogenesis, reduction of their most part occurs. Insufficient reduction of excess number of the described structures is the reason of developing of this congenital malformation. Disturbance of what anlage causes this abnormality?

- Splanchnotom
- Ectoderm
- Dermatome
- Sclerotome
- Entoderm

Correct answer:

- Ectoderm

65. Transplantation of donor skin was made to a patient with considerable burns. For the 8th days, the transplant swelled, its color changed, and for the 11th days, it started being rejected. What cells take part in this process?

- B lymphocytes
- Eosinophils
- T lymphocytes
- Erythrocytes
- Basophils

Correct answer:

- T lymphocytes

66. At parents who are sick with alcoholism, children are born dead or have a deep mental deficiency, strabismus, with cleft palate and heart diseases (fetal alcohol syndrome). During what period these disturbances can occur?

- Formations of gametes
- Postembryonic period
- Embryonic period
- Gastrulation stage
- Stage of organogenesis

Correct answer:

- Embryonic period

67. Gastrulation, or formation of germ layers of an embryo, happens in different ways. By what way ectoderm and entoderm in a man are formed?

- Epiboly
- Invagination
- Immigrations
- Immigration and delamination
- Invagination and delamination

Correct answer:

- Immigration and delamination

68. Choose, what components of primary anlagen remain in sexual system of females of amniotes:

- Muller's and Wolffian ducts
- Muller's duct and rudiments of ductules of a head kidney
- Wolffian duct
- rudiments of ductules of a primordial kidney
- all answers are wrong

Correct answer:

- Muller's duct and rudiments of ductules of a head kidney

69. Transplantation of a kidney to a patient according to vital indications was carried out. Less than in a month, the patient died owing to rejection of the transplanted organ. Incompatibility on what system became the rejection reason?

- MN
- HLA
- ABO
- Rhesus factor
- Erythrocytic antigens

Correct answer:

- HLA

70. Development of general adaptation syndrome and stress in an organism is followed by a complex of nonspecific reactions. What of stages of stress is critical and can lead to development of diseases of dysadaptation?

- Alarm stage
- Resistance stage
- Tolerance stage
- Anxiety stage
- Exhaustion stage

Correct answer:

- Exhaustion stage

71. Representatives of a certain human population have elongated body, height variability, reduced volume of muscles, extended extremities, decreased size and volume of rib cage, increased perspiration, decreased indices of base metabolism and fat synthesis. What adaptive type of people this population belongs to?

- Arctic adaptive type
- Adaptive type of a zone of temperate climate
- Tropical adaptive type
- Intermediate adaptive type
- Mountain adaptive type

Correct answer:

- Tropical adaptive type

72. A man has strongly developed musculo-skeletal system, large sizes of a thorax, the raised content of mineral substances in bone tissue, high level of hemoglobin, proteins (albumine and globulins) and cholesterol in blood, ability of an organism to oxidize metabolism products is increased, energy metabolism is strengthened, thermal control is stable. What is the adaptive type?

- Adaptive type of a zone of temperate climate
- Mountain adaptive type
- Intermediate adaptive type
- Tropical adaptive type
- Arctic adaptive type

Correct answer:

- Arctic adaptive type

73. In an experimental laboratory, a pig's kidney has been grafted to a cow. What do we call this way of transplantation?

- Explantation
- Autotransplantation
- Allotransplantation
- Xenotransplantation
- Homotransplantation

Correct answer:

- Xenotransplantation

74. Restoration of the lost organ begins with lysis of tissues adjacent to a wound, intensive reproduction of cells of regeneration rudiment; differentiation of cells leads to formation of an organ. What type of regeneration it is a matter of?

- Epimorphosis
- Heteromorphosis
- Endomorphosis
- Morphallaxis
- Regeneration hypertrophy

Correct answer:

- Epimorphosis

75. How natural processes of change of biogeocenosis occur?

- Owing to increase in number of individuals in population
- Owing to decrease in number of individuals in population
- Owing to gradual change of natural factors of the environment
- Owing to expansion of an area of population
- Owing to appearance of new ecological niches

Correct answer:

- Owing to gradual change of natural factors of the environment

76. The allogenic transplant was transplanted to a patient. But after a while, rejection of the transplanted tissue occurred. Owing to activity of what cells it happened?

- Stem cells
- Thrombocytes
- Cells of thymus
- T lymphocytes
- Cells of spleen

Correct answer:

- T lymphocytes

77. Resection of a kidney was carried out to a man after a trauma. The remained kidney regenerated with increase in size. What processes took place during regeneration?

- Increase in sizes of cells
- Increase in quantity of an intercellular substratum
- Differentiation of undifferentiated cells with their further proliferation
- Proliferation of differentiated cells
- Proliferation of undifferentiated cells with their further differentiation

Correct answer:

- Proliferation of undifferentiated cells with their further differentiation

78. A boy with tail part of a backbone was born. A doctor explained his parents that human embryo has 8–11 tail vertebrae during 1.5–3 months of embryogenesis, nevertheless, then, until birth, the part of them is reduced, and only 4–5 vertebrae, which form a tailbone, remain. Disturbance of processes of their reduction is the reason of the described defect, which the doctor suggested to eliminate surgically. Disturbance of what anlage this defect is associated with?

- Splanchnotom
- Chords
- Myotome
- Dermatome
- Sclerotome

Correct answer:

- Sclerotome

79. A child with signs of long starvation, owing to what dehydration of an organism occurred, was hospitalized in a hospital. What solution can restore normal balance?

- Sucrose solution
- Solution of proteins
- Glucose solution
- Isotonic solution of sodium chloride
- Hypertensive solution of sodium chloride

Correct answer:

- Isotonic solution of sodium chloride

80. The HLA region (the main complex of histocompatibility) is located in chromosome 6. Each gene has some allelic variants. What causes a variety of genotypes in populations?

- Combination of alleles
- Polymeric interaction
- Complementary interaction
- Epistatic influence
- Domination

Correct answer:

- Combination of alleles

81. The anlage of axial organs was disturbed in a human embryo. At what stage of embryogenesis it was happened?

- Organogenesis
- Gastrulations
- Histogenesis
- Blastula
- Cleavage

Correct answer:

- Organogenesis

82. In experiment, thymus was cut out in newborn rats. What of the listed changes will occur in an organism of these animals?

- Increase in lymphocyte count
- T lymphocytes will not form
- Rejection of a transplant
- Disturbance of motor reactions
- Antibodies will not form

Correct answer:

- T lymphocytes will not form

83. Dark skin of a man of the equatorial race prevents penetration of ultraviolet rays, and curly hairs protect from a heat. What level of adaptation the given traits correspond to?

- Molecular
- Organismal
- Population and species
- Biocenotic
- Biospheric

Correct answer:

- Population and species

84. In a human organism some abnormalities, connected with disorder of teeth differentiation and changes in their number (homodont tooth system), were found. What type of evidence of human evolution can such abnormalities belong to?

- Cytological
- Rudiments
- Recapitulation
- Atavisms
- Biochemical

Correct answer:

- Atavisms

85. In provinces with the excess content of molybdenum in the environment, synthesis of uric acid is broken at locals. What disease develops thereof?

- Giantism
- Chondrodystrophy
- Endemic goiter
- Phenylketonuria
- Endemic gout

Correct answer:

- Endemic gout

86. Owing to defective diet of maternal organism, the death of an embryo during the first critical period was established. Why it happened?

- Blastocyst is not capable to implantation
- Shortage of vitamins caused a mutation in embryonic cells
- Blastocyst started to divide unevenly
- Epithelium of a uterus is not ready to attach an embryo at blastocyst stage
- Deficiency of vitamins caused a mutation in cells of uterus epithelium

Correct answer:

- Epithelium of a uterus is not ready to attach an embryo at blastocyst stage

87. A kidney was transplanted to a patient in a clinic. What of the listed cells of immune system can have direct impact on cells of a transplant?

- Plasmablasts
- T helpers
- T killers
- Plasma cells
- Thymocytes

Correct answer:

- T killers

88. In some unicellular organisms, for example, in amoebae, nutrition happens by means of phagocytosis. In what human cells is phagocytosis a way of protection of an organism from foreign agents (for example, microorganisms)?

- Leucocytes
- Erythrocytes
- Epitheliocytes
- Myocytes
- Thrombocytes

Correct answer:

- Leucocytes

89. In a transplantation center, a 40-year-old patient has been transplanted a kidney which was taken from a donor perished in an automobile accident. To avoid graft rejection, the patient's graft immunity is suppressed with the help of:

- Antibiotics
- Vitamins
- Immunodepressants
- Antiseptics
- Immunostimulants

Correct answer:

- Immunodepressants

90. As a result of radiation by ultraviolet rays, skin of a man darkens that is protective reaction of an organism. What protective substance – derivative of amino acids – is synthesized in cells under the influence of ultraviolet?

- Arginine
- Melanin
- Methionine
- Phenylalanine
- Thyroxin

Correct answer:

- Melanin

91. During primary agammaglobulinaemia, the content of immunoglobulins in blood serum is sharply lowered, plasma cells are absent in lymphoid organs. What part of immunity is broken in this case?

- Synthesis of lactic acid
- Lysozyme synthesis
- Antibody formation
- Phagocytosis
- Formation of T lymphocytes

Correct answer:

- Antibody formation

92. A highly injured person has gradually died. Please choose the indicator of biological death:

- disarray of chemical processes
- autolysis and decay of cells
- absence of movements
- absence of palpitation and breathing
- loss of consciousness

Correct answer:

- autolysis and decay of cells

93. In a newborn, five pairs of nipples of mammary glands were revealed (polythelia) that though has especially cosmetic value, nevertheless disturbed parents. A doctor explained that, at the beginning of embryogenesis, five pairs of nipples are layered and four of them are reduced before child's birth. Disturbance of what anlage caused this congenital malformation?

- Myotome
- Ectoderm
- Sclerotomes
- Splanchnotom
- Dermatome

Correct answer:

- Ectoderm

94. Dog tapeworm was found in the liver of a patient of age of 58 years. In this regard, a surgeon executed a resection of part of the liver with larva of dog tapeworm. What type of regeneration will occur in the liver?

- Epimorphosis
- Metamorphoses
- Endomorphosis
- Morphallaxis
- Heteromorphosis

Correct answer:

- Endomorphosis

95. An inspector of forest protection found a forest lake, which is completely filled up with garbage. In the protocol, the disturbed ecosystem was specified. What natural system was destroyed?

- Biotope
- Biome
- Ecosphere
- Ecological niche
- Biogeocenosis

Correct answer:

- Biogeocenosis

96. In cells of human body, intensity of synthesis of DNA and RNA is reduced, synthesis of necessary proteins and mitotic activity is slightly broken. To what period of ontogenesis such changes most likely correspond?

- Teenage age
- Advanced age
- Young age
- Beginning of mature age
- Youthful age

Correct answer:

- Advanced age

97. In the case of repeated skin transplantation from the same donor, process of rejection in a recipient happened much quicker, than after the first transplantation. With existence of what cells this is associated?

- T lymphocytes
- Plasmablasts
- Thrombocytes
- Erythrocytes
- Stem cells

Correct answer:

- T lymphocytes

98. For people who live in highlands conditions long ago, many adaptations are characteristic. What of the following adaptations is not typical for inhabitants of mountains?

- Raised content of hemoglobin
- Increase in vital capacity of lungs
- Reduction of length of feet in comparison with length of hands
- Strengthening of pulmonary ventilation
- Increased content of myoglobin in muscles

Correct answer:

- Reduction of length of feet in comparison with length of hands

99. A young man came to a hospital with complaints of disturbed urination. Examination of his external genitalia revealed that a urethra is split on the top side, and urine flowing out of this opening. What type of external genitalia maldevelopment is observed in this case?

- Paraphimosis
- Hypospadias
- Hermaphroditism
- Phimosi
- Epispadias

Correct answer:

- Epispadia

100. How organ's transplantation from one man to another is called?

- Allotransplantation
- Autotransplantation
- Explantation
- Xenotransplantation
- Heteromorphosis

Correct answer:

- Allotransplantation

101. A human body is influenced at the same time by different socioecological factors, thus action of one factor depends on the force and modifying influence of other factors. This regularity has the name:

- ecological valency
- adaptation
- effect of compensation
- interaction of factors
- restrictive factor

Correct answer:

- interaction of factors

102. Toxic substances, which are present in poison of snakes, have different properties. What property is used when snake poison is used as remedy?

- Cytotoxic
- Hemolytic
- To increase blood clotting
- Neurotoxic
- Cardiotoxic

Correct answer:

- To increase blood clotting

103. During embryonal development, the process of realization of genetic information and of the development of an organism can be broken by some chemical compound; as a result, malformation occurs. How such compound is called?

- Fibrinogen
- Antigen
- Comutagen
- Teratogen
- Agglutininogen

Correct answer:

- Teratogen

104. For the purpose of myocardium infarction treatment, a patient was injected with embryonal stem cells derived from the same patient by means of therapeutic cloning. What transplantation type is it?

- Isotransplantation
- Autotransplantation
- Allotransplantation
- Heterotransplantation
- Xenotransplantation

Correct answer:

- Autotransplantation

105. Examination of newborn boy's genitalia revealed a urethral fissure that opens on the underside of his penis. What malformation is it?

- Cryptorchidism
- Monorchism
- Epispadia
- Hermaphroditism
- Hypospadias

Correct answer:

- Hypospadias

106. A patient in a transplantation centre underwent heart transplantation. The organ was taken from a donor who died in a road accident. Foreign heart can be rejected as a result of development of transplantation immunity. It is usually prevented by means of:

- immunosuppressors
- X-ray therapy
- chemotherapy
- enzymes
- ultrasound

Correct answer:

- immunosuppressors

107. An alcoholic woman has born a girl with mental and physical developmental lag. Doctors diagnosed the girl with fetal alcohol syndrome. What effect is the cause of the girl's state?

- Malignization
- Carcinogenic
- Mechanic
- Teratogenic
- Mutagenic

Correct answer:

- Teratogenic

108. A child with nonclosure of arches of vertebrae and cleft palate was born to young spouses. How malformations, which resemble appropriate organs of ancestral groups of a man, are called?

- Non-phylogenetic
- Atavistic
- Genocopies
- Phenocopies
- Allogenic

Correct answer:

- Atavistic

109. For more precise definition of the mechanism of development of cheiloschisis and palate in human, similar anomaly was studied in mice in the laboratory of experimental biology. What method of genetics was used?

- Cytogenetic
- Dermatoglyphics
- Twin
- Population-statistical
- Modelling

Correct answer:

- Modelling

110. Ability to adaptation varies in the wide range, which gives the possibility to distinguish some functional types of the constitutional reaction among people. How the organism, which is intermediate type with an optimum and adequate way of response to different changes of environment, is called?

- Asthenic
- Mixed body
- Stayer
- Normosthenic
- Sprinter

Correct answer:

- Mixed body

III. The majority of parasitic unicellular organisms die in environmental conditions. However, these species exist already millions of years. Existence of parasitic species does not stop thanks to existence in their life cycles of different forms of:

- reproduction
- phylogeny
- ontogenesis
- metabolism
- homeostasis

Correct answer:

- reproduction

112. In the process of human embryogenesis, a blastocyst starts to form for the 6–7th days after fertilization; this blastocyst significantly differs in certain signs of its structure from a typical blastula of a lancelet. These characteristic signs are the presence of:

- large number of blastomeres
- primary mouth
- trophoblast and embryoblast
- animal and vegetative poles
- secondary mouth

Correct answer:

- trophoblast and embryoblast

113. Ability to adaptation varies in the wide range, which gives the possibility to distinguish some functional types of the constitutional reaction among people. Specify human type with potential tendency to strong physiological reactions, which provide high reliability at apparent, but short-term actions of environment.

- Mixed body
- Asthenic
- Normosthenic
- Stayer
- Sprinter

Correct answer:

- Sprinter

114. Surgical procedure was performed. On the place of section, scar was formed. Specify what of organellas are most active at restoration of epithelial tissue, proceeding from the carried-out functions.

- Centrosomes
- Vacuoles
- Lysosomes
- Ribosomes
- Golgi's complex

Correct answer:

- Ribosomes

115. Fertilization is a process of fusion of male and female gametes therefore a zygote having a diploid set of chromosomes is formed. In the process of fertilization, a spermatozoon carries out acrosome reaction. What enzyme takes part in its providing?

- Hyaluronidase
- Ligase
- Glucose-6-phosphate dehydrogenase
- Restrictase
- Ribonuclease

Correct answer:

- Hyaluronidase

116. Ability to adaptation varies in the wide range, which gives the possibility to distinguish some functional types of the constitutional reaction among people. Specify type of human body, which is capable to maintain steadily long and monotonous physiological loadings.

- Stayer
- Asthenic
- Mixed body
- Normosthenic
- Sprinter

Correct answer:

- Stayer

117. Scientists investigated development of not fertilized ova of a rabbit after their activation by low temperature. How this form of reproduction is called?

- Natural parthenogenesis
- Schizogony
- Copulation
- Artificial parthenogenesis
- Conjugation

Correct answer:

- Artificial parthenogenesis

118. Birth of two, three, four and even seven uniovular twins in a man is associated with fact that an isolated blastomere develops into a full-fledged organism. What name this phenomenon has?

- Embryonic induction
- Labile differentiation
- Decoding organization
- Totipotency
- Stable differentiation

Correct answer:

- Totipotency

119. In embryogenesis of a man, as well as of vast majority of vertebrata, six pairs of branchial arteries from which reach vessels of the fourth pair are the best developed. What human vessel is homologous to this pair of branchial arteries?

- Left arch of an aorta
- Right arch of an aorta
- Carotid
- Pulmonary artery
- Superior vena cava

Correct answer:

- Left arch of an aorta

120. Strict restriction in stay time at the height over 800 meters above sea level without oxygen cylinders exists for a man. What factor is limiting for life in this case?

- Partial pressure of oxygen in air
- Level of ultraviolet radiation
- Humidity level
- Temperature
- Force of terrestrial gravitation

Correct answer:

- Partial pressure of oxygen in air

121. A four-year-old girl has three bones in the hand thumb instead of two ones. The similar structure of a thumb is present in amphibians and reptiles. How this anomaly of development is called?

- Polydactyly
- Oligodactyly
- Polyphalangism
- Brachydactyly
- Syndactyly

Correct answer:

- Polyphalangism

122. In applied medicine of Ukraine because of shortage of human donor material, the transplantation problem is solved over thirty years by use of organs and tissues of an animal origin (valves of heart of a pig, connective tissues of pig and cow origin, etc.). How this type of transplantation is called?

- Xenotransplantation
- Isotransplantation
- Allotransplantation
- Autotransplantation
- Heterotransplantation

Correct answer:

- Xenotransplantation

123. Operation on removal of the left kidney was performed to a forty-five-year-old patient with malignant tumor. In two years, according to ultrasonic research, it was revealed that the right kidney increased in sizes approximately by one and half times. Results of the general analysis of urine and other laboratory investigations showed gradual improvement of functioning of the right kidney. On what type regeneration processes occurred in this case?

- Compensatory hypertrophy
- Regeneration hypertrophy
- Morphallaxis
- Epimorphosis
- Heteromorphosis

Correct answer:

- Compensatory hypertrophy

124. By means of D. Gurdon's experiments made in 1964–1966, it was proved that during transplantation of nuclei of somatic cells at different stages of development into denucleated (without nucleus) ovum of a frog, normal development of a tadpole occurs and, though is very rare, an adult frog is developed. What was proved by these experiences?

- Totipotency of cells
- Phenomenon of embryonic induction
- Genes are inactive in a zygote
- All cells have identical genes
- Differentiation of cells of a germ

Correct answer:

- All cells have identical genes

125. Operation on transplantation of the left kidney owing to its hydronephrosis was appointed to a patient. His monozygotic twin brother was chosen as the donor of a kidney. What name this type of transplantation received?

- Isotransplantation
- Heterotransplantation
- Autotransplantation
- Allotransplantation
- Xenotransplantation

Correct answer:

- Isotransplantation

126. At a pregnant woman who is sick with toxoplasmosis, process of mesoderm formation was broken during embryogenesis of a fetus. What pathology of system or organs can arise in the newborn?

- Nervous
- Intestines epithelium
- Liver
- Secretory system
- Pancreas

Correct answer:

- Secretory system

127. Depending on a way of introduction of poison to an organism of the victim, poisonous animals are divided on armed and unarmed animals. The armed poisonous animal, which lives in the desert on the coast of the Black and Mediterranean seas, has poisonous gland on the end of abdomen. Poison is removed through a needle by means of muscles that surround this gland. Toxicity is shown in tachycardia, an increase in arterial pressure, weakness, adynamia, and disturbance of thermal control; edema of lungs can occur. Determine this animal.

- Spider *Latrodectus tredecimguttatus*
- Scorpion
- Bee
- Gadfly
- Bird spider

Correct answer:

- Scorpion

128. A twelve-year-old girl had leukemia and was doomed to death. Searches of donor marrow were unsuccessful. Doctors advised parents of the girl to give birth to other child with hope that embryonic blood from an umbilical cord will become a source of stem hemopoietic cells and will help to prevent rejection reaction. What type of transplantation helped to rescue the girl?

- Xenotransplantation
- Isotransplantation
- Allotransplantation
- Autotransplantation
- Heterotransplantation

Correct answer:

- Allotransplantation

129. In a women who became pregnant during mass use of pesticides in rural areas, the laying of ectoderm of an embryo was disturbed. Congenital malformations of what systems or organs can arise in newborns in this situation?

- Skeleton
- Nervous
- Derm
- Liver
- Pancreas

Correct answer:

- Nervous

130. At a stage of a late gastrula of human embryo, the third germ layer (mesoderm) is formed by movement of group of cells of endoderm, which are not united in uniform layer. What is the type of gastrulation?

- Delamination
- Invagination
- Immigration
- Epiboly
- Mixed

Correct answer:

- Immigration

131. For use of animals as donors of organs for a man, transgenic pigs are created by means of a method of genetic engineering. Their cells are deprived of one of the main antigens, which cause reaction of rejection of tissues in a man. What is the type of transplantation?

- Xenotransplantation
- Allotransplantation
- Autotransplantation
- Homotransplantation
- Isotransplantation

Correct answer:

- Xenotransplantation

132. A two-layer embryo of human embryo in the first phase of gastrulation is formed by dividing of cells of an ectoderm into layers. What is the type of gastrulation?

- Immigration
- Epiboly
- Invagination
- Delamination
- Mixed

Correct answer:

- Delamination

133. Primordial germ cells arise when sexual glands did not begin development yet. Later these undifferentiated sex cells migrate in gonads and occupy them. Entoderm of what provisional (temporary) organ is the source of these cells?

- Allantois
- Vitelline sac
- Placenta
- Chorion
- Amnion

Correct answer:

- Vitelline sac

134. Because of action of teratogenic factor, development of blood system of an embryo was disturbed. In what germ layer this disturbance occurred?

- Mesoderm
- Entoderm
- Ectoderm
- Entoderm and mesoderm
- Entoderm and ectoderm

Correct answer:

- Mesoderm

135. Ecological factors directly or indirectly influence activity of organisms. What abiotic factor on the planet is primary in ensuring trophic needs of all living beings?

- Light
- Warm
- Ionizing radiation
- Water
- Air

Correct answer:

- Light

136. In experiments with development of a toad when an embryo was at a stage of two blastomeres, V. Roux killed one blastomere, and another left intact, but normal development of an embryo was broken. Why?

- Owing to totipotency of blastomeres
- Owing to embryonic induction
- Owing to disturbance of gene regulation
- Owing to disturbance of metabolism intensity
- Owing to disturbance of differentiation of blastomeres

Correct answer:

- Owing to embryonic induction

137. A family came to a hospital with symptoms of poisoning: abdominalgia, strong diarrhea and continuous vomiting, thirst, spasms of gastrocnemius muscles, and hemoglobinuria. Symptoms of poisoning were shown in 10 hours after the use of mushrooms that had a white cap in the form of a hand bell, with a diameter of 10–12 cm. A stem has white sagging ring under a cap. What mushrooms caused poisoning?

- Fly agaric
- *Amanita phalloides*
- Satan's mushroom
- Russule
- *Inonotus obliquus*

Correct answer:

- *Amanita phalloides*

138. Examination of a pregnant woman who has been taking alcohol revealed disturbed anlage of ectoderm during the fetal life. What derivatives of this germ layer have defects?

- Kidneys
- Bowels epithelium
- Neural tube
- Liver
- Sexual glands

Correct answer:

- Neural tube

Note.

During exam in 2007, incorrect term "germ leaf" was used instead of "germ layer".

139. Maldevelopments happening at a zygote stage during prenatal ontogenesis are called:

- blastopathies
- embryopathies
- fetopathies
- gametopathies

Correct answer:

- gametopathies

140. It was established that intensity of basal metabolism of a healthy person has a daily rhythm of fluctuations. Specify its correct circadian rhythm.

- It gradually increases during daylight hours and decreases at night
- It gradually decreases during daylight hours and raises at night
- It is low during daylight hours and high at night
- It is high during daylight hours, decreases in the first half of night, and it is high in the second half of night
- It is low during daylight hours, raises in the first half of night, and it is low in the second half of night

Correct answer:

- It gradually increases during daylight hours and decreases at night

141. Development of teeth of a person was studied during the embryonic and postembryonic period. It was established that they are derivatives of:

- entoderm and mesoderm
- only mesoderm
- ectoderm and mesoderm
- only ectoderm
- ectoderm and entoderm

Correct answer:

- ectoderm and mesoderm

142. A newborn child was revealed to have congenital malformations of digestive system that is associated with action of teratogenic factors at the beginning of pregnancy. What of germ layers teratogen influenced on?

- All layers
- Ectoderm
- Mesoderm
- Endoderm and mesoderm
- Endoderm

Correct answer:

- Endoderm

143. During examination of external genitals of a boy, full closing of urethra at above was revealed. The urethral canal remains open from below in the form of a small fissure. What type of developmental anomaly of external genitals is observed in this case?

- Phimosis
- Hypospadias
- Paraphimosis
- Epispadias
- Hermaphroditism

Correct answer:

- Hypospadias

144. The provisional diagnosis "multiple sclerosis" was made to a person as a result of perversion of immune reaction. You will carry this disease to:

- Autoimmune
- Infectious
- Invasive
- Genomic
- Chromosomal

Correct answer:

- Autoimmune

145. During heart transplantation from one person to another, graft immunity is suppressed for prevention of rejection with the help of:

- infrared radiation
- ultrasound
- antimutagens
- immunodepressants
- mutagens

Correct answer:

- immunodepressants

146. In human populations, some people have three generations of teeth during their life instead of two generations. This is manifestation of the law:

- biogenetic
- of independent inheritance
- Hardy-Weinberg's
- of homological series of hereditary variation
- of embryonic induction

Correct answer:

- biogenetic

147. A physician obtains a patient's history of the postembryonic period of ontogenesis from birth to puberty. In this case we are talking about:

- first period of adulthood
- senile age
- second period of adulthood
- advanced age
- juvenile period

Correct answer:

- juvenile period

148. Examination of uterine cavity revealed an embryonated ovum that wasn't attached to the endometrium. The embryo is in the following stage of development:

- Zygote
- Blastocyst
- Morula
- Gastrula
- Neurula

Correct answer:

- Blastocyst

149. An embryo has signs of disturbed process of dorsal mesoderm segmentation and somite generation. What part of skin is most likely to have developmental abnormalities?

- Hair
- Sebaceous glands
- Derma
- Epidermis
- Sudoriferous glands

Correct answer:

- Derma

150. During embryogenesis, the epithelial band also known as vestibular plate gives rise to development of vestibule of mouth. What biological mechanism of the programmed death of cells provides growth of buccolabial sulcus from epithelial plate?

- Necrosis
- Meiosis
- Paraneerosis
- Amitosis
- Apoptosis

Correct answer:

- Apoptosis

151. It is known that people who permanently live in highland have an increased concentration of erythrocytes per each blood volume unit. Owing to this fact blood can optimally fulfil the following function:

- amino acid transport
- haemostasis participation
- gas transport
- maintenance of acid–base balance
- maintenance of ionic equilibrium

Correct answer:

- gas transport

152. During embryogenesis, trophoblast develops into a rudimentary organ that has endocrinal function. What rudiment is it?

- Yolk sac
- Allantois
- Amnion
- Villous chorion
- Umbilical cord

Correct answer:

- Villous chorion

153. A 30-year-old patient has undergone keratoplasty in the transplantation centre, cornea has been taken from a donor, who died in a road accident. What kind of transplantation was performed?

- Explantation
- Allotransplantation
- Xenotransplantation
- Heterotransplantation
- Autotransplantation

Correct answer:

- Allotransplantation

154. Research of an organism of the inhabitant of Pamir revealed a high level of base metabolism, extension of a thorax, an increase in oxygen capacity of blood due to increased erythrocyte count, and high hemoglobin level. To what adaptive ecological type it is necessary to refer this person?

- Desert
- Mountain
- Arctic
- Tropical
- Subtropical

Correct answer:

- Mountain

155. A pediatrician noticed absence of the act of defecation at a newborn child within the first day. What malformation this fact indicates?

- Esophageal atresia
- Cleft lip
- Esophageal diverticulum
- Anal atresia
- Jejunal diverticulum

Correct answer:

- Anal atresia

156. Reduction of compact and spongy substances of a bone tissue is observed at a person. Facial part of a skull changes, gray hair appears, skin loses elasticity. At what stage of ontogenesis there are these changes?

- Senile age
- Youthful age
- Teenage age
- Childhood
- Infancy

Correct answer:

- Senile age

157. In Western Europe, nearly half of all congenital malformations occur in children of mothers conceived in the period when pesticides were used extensively in the region. These congenital conditions result from the following influence:

- carcinogenic
- malignization
- mutagenic
- teratogenic
- mechanical

Correct answer:

- teratogenic

158. Irrespective of racial or ethnic origin, the complex of morphological, functional, biochemical, and immunological traits, which cause the best biological fitness of a person to the corresponding physical environment, develops at a person. What type of biological response is provided at a person?

- Adaptive type
- Tropical type
- Mountain type
- Type of a zone of temperate climate
- Arctic type

Correct answer:

- Adaptive type

159. Parasitizing of several species of parasites in a patient's body was suspected. How such set of parasites occupying an organism is called?

- Biogeocenosis
- Biotope
- Parasitocenosis
- Ecosystem
- Phytocenosis

Correct answer:

- Parasitocenosis

160. An embryo of a lancelet is on one of development stages during which the number of its cells increases, but the total amount of an embryo practically does not change. At what stage of its development there is an embryo?

- Gastrulation
- Organogenesis
- Histogenesis
- Neurulation
- Cleavage

Correct answer:

- Cleavage

161. A newborn boy was found to have hydrocephaly. Doctors consider that this malformation is caused by teratogenic factors. What germ layers are affected by teratogen?

- All germinal layers
- Ectoderm
- Endoderm
- Endoderm and mesoderm
- Mesoderm

Correct answer:

- Ectoderm

162. Irrespective of their race, the people living in conditions of Arctic climate have a number of adaptations to environment. Representatives of the Arctic adaptive type in comparison with aboriginals of the Central Africa have such characteristic features:

- thickened layer of subcutaneous fat
- smaller need for fats
- thin body
- legs are longer than hands
- sweating increase

Correct answer:

- thickened layer of subcutaneous fat

163. Ingestion of plants and mushrooms gathered along highways is dangerous due to risk of lead poisoning. What is the main source of environmental pollution with this chemical element?

- Chemical fertilizers
- Herbicides
- Sewage
- Acid rains
- Exhaust fumes

Correct answer:

- Car exhaust fumes

PROTOZOANS

1. In the preparation of red marrow punctate painted according to Romanowsky, intracellular small oval little bodies were revealed, 3 microns in size; a nucleus occupies $\frac{1}{3}$ of a cell, a nucleolus is present inside a nucleus. What the diagnosis can be made?

- Toxoplasmosis
- Trypanosomosis
- Visceral leishmaniasis
- Balantidiasis
- Malaria

Correct answer:

- Visceral leishmaniasis

2. A woman gave birth to a dead child with numerous malformations (incompletely separated auricles and ventricles, microphthalmos, microcephaly). What protozoan disease could cause intrauterine death of a fetus?

- Balantidiasis
- Toxoplasmosis
- Malaria
- Leishmaniasis
- Trypanosomosis

Correct answer:

- Toxoplasmosis

3. Inflammation of urogenital tracts was revealed in a patient. In a smear from a mucous membrane of a vagina, oval cells with large nucleus, an edge at the end of a body and an undulating membrane were revealed; flagella are located at the forward end. Name this disease;

- lambliosis
- trichomoniasis
- balantidiasis
- leishmaniasis
- amebiosis

Correct answer:

- trichomoniasis

4. Antelopes from coast of Victoria Lake were delivered in a zoo of one of the cities of Ukraine. Trypanosomes were revealed in blood smears of animals. What the most appropriate preventive measures need to be carried out?

- Preventive measures are not necessary
- To take blood smears from persons who were in contact with animals
- To cure animals
- Quarantine measures
- To kill animals as carriers of trypanosomes

Correct answer:

- Preventive measures are not necessary

5. A patient with provisional diagnosis "amebiasis" got to the office of the infectious diseases hospital. For laboratory diagnostics it is necessary to use such material:

- blood plasma
- cells of marrow
- dental plaque
- duodenal contents
- excrements

Correct answer:

- excrements

6. What protozoan disease one can catch through blood transfusion?

- Trichomoniasis
- Malaria
- Leishmaniasis
- Lambliosis
- Toxoplasmosis

Correct answer:

- Malaria

7. In liquid feces of a patient with mucus and blood, large oviform cells were revealed; large nucleus in them is similar to haricot, and some blinking is noticeable around an envelope. What is the parasite?

- *Toxoplasma*
- *Trichomonas hominis*
- *Balantidium*
- *Lamblia*
- *Entamoeba histolytica*

Correct answer:

- *Balantidium*

8. A patient with complaints of often repeating wearisome attacks, which are followed by fever, heat and sweat, consulted a doctor. For statement of the final diagnosis it is necessary to investigate:

- duodenal contents
- cerebrospinal fluid
- discharge of genitals
- blood
- excrements

Correct answer:

- blood

9. Excrements of a patient who has chronic inflammation of thick gut were investigated in the laboratory. Roundish cysts up to 18 microns in size with 8 and 16 nuclei were revealed. What parasite they belong to?

- *Entamoeba histolytica*
- *Balantidium*
- *Lamblia*
- *Toxoplasma*
- *Entamoeba coli*

Correct answer:

- *Entamoeba coli*

10. A child with gross abnormalities of skull structure, without eyes and hands, and with almost total absence of external genitals was born. Mother had two abortions earlier. What the disease can be present?

- Toxoplasmosis
- Trypanosomosis
- Visceral leishmaniasis
- Amebiosis
- Malaria

Correct answer:

- Toxoplasmosis

11. Formed excrements without impurity of mucus and blood from a patient with chronic amoebic dysentery were brought to the laboratory. What forms of amoeba can be found in them?

- cysts with 8 and 16 nuclei
- Cyst with 4 nuclei and minute form
- Oocyst with 8 sporozoites
- Tissue form
- Cyst with 4 nuclei, minute and tissue forms

Correct answer:

- Cyst with 4 nuclei and minute form

12. A patient consulted a doctor about weakness, increased fatigue, sleeplessness at night and drowsiness in the afternoon, headache, apathy, and lethargy. What method of diagnostics should be used?

- Microscopy of cerebrospinal fluid
- Microscopy of stool
- Microscopy of breast bone punctate
- Inoculation of blood on a nutrient medium, microscopy
- Microscopy of drop and smear of blood

Correct answer:

- Microscopy of cerebrospinal fluid

13. Children sick with lambliosis were treated in the gastroenterologic office. Their infection occurred:

- transplacentally
- owing to stings of mosquitoes
- when swallowing cysts with water and food
- through injury of skin (through scratch)
- when swallowing vegetative forms with water and food

Correct answer:

- when swallowing cysts with water and food

14. In a 3-year-old child, temperature sharply increased, diarrhea and rashes on skin appeared, spleen and liver enlarged. A cat, that has lacrimation and has lost sight, lives in a family. What disease is possible in the child?

- Balantidiasis
- Visceral leishmaniasis
- Trichomoniasis
- Amebiosis
- Toxoplasmosis

Correct answer:

- Toxoplasmosis

15. Liquid excrements from a patient with chronic gastrointestinal disease have brought to the laboratory. On the basis of what result of investigation the diagnosis of amebiosis is made?

- Only after identification of tissue form of an amoeba
- After identification of tissue form of an amoeba and positive results of the immunological test
- There is enough to detect impurity of blood in stool
- After identification of any form of an amoeba (tissue or minute form, or cyst)
- After identification of minute form or cyst of an amoeba

Correct answer:

- Only after identification of tissue form of an amoeba

16. Provisional diagnosis "urogenital trichomoniasis" was made to a patient. For specification of the diagnosis, it is necessary:

- to reveal cysts in excrements
- to perform immunological test
- to reveal vegetative forms in excrements
- to reveal vegetative forms in discharge of genitals
- to reveal vegetative forms in blood

Correct answer:

- to reveal vegetative forms in discharge of genitals

17. Blood was found in liquid excrements with mucus taken from a patient with ulcer damage of intestines. What protozoan disease is more probable to assume?

- Leishmaniasis
- Toxoplasmosis
- Amebiosis
- Trichomoniasis
- Lambliosis

Correct answer:

- Amebiosis

18. Fever is observed in a patient during one and a half weeks. Attacks of high temperature repeat after 2 days. When it is necessary to take blood for the analysis?

- At any time
- In the period of fever and temperature increase
- Between attacks
- In the period of heat, at very high temperature
- At decrease in temperature

Correct answer:

- At any time

19. A woman had two spontaneous abortions. A doctor revealed toxoplasmosis. What is the most probable way this woman caught the disease?

- Alimentary
- Contact and household (through a basket and a towel) or sexual
- Transmissible
- Transplacental
- During blood transfusion

Correct answer:

- Alimentary

20. A group of Ukrainian biologists caught gerbils in Central Asia. Skin ulcers were revealed in some members of expedition. What species of a protozoan is the most probable causative agent of the disease?

- *Balantidium coli*
- *Plasmodium falciparum*
- *Leishmania major*
- *Trypanosoma cruzi*
- *Toxoplasma gondii*

Correct answer:

- *Leishmania major*

21. Small curved mooned bodies were found in a punctate of lymph nodes of a patient. When staining according to Romanowsky, cytoplasm is blue and nucleus is red. Flagella are absent. What is it?

- *Leishmania*
- *Toxoplasma*
- *Lamblia*
- *Trypanosoma*
- *Trichomonas*

Correct answer:

- *Toxoplasma*

Note.

There is a similar question in database, but in this case blood smear was investigated, and the wrong answer is "*Balantidium*" instead of "*Trichomonas*".

22. Liquid excrements with blood impurity from a patient with chronic amoebic dysentery were brought to the laboratory. What forms of dysenteric amoeba can be found there?

- Cysts with 8 and 16 nuclei
- Tissue form
- Cyst with 4 nuclei, minute and tissue forms
- Cyst with 4 nuclei and minute form
- Tissue form, minute form, and uninuclear cyst

Correct answer:

- Tissue form

23. A patient presents with headache and muscle pain; his temperature suddenly increased, towards evening decreased with strong perspiration. Skin is icteric, liver and spleen are enlarged. What methods of diagnostics are necessary?

- Microscopy of punctates of internal organs
- Intracutaneous allergic test with toxoplasmic antigen
- Immunological reactions of patient's blood with antigens
- Protozoological investigation of feces of a patient
- Microscopy of a drop and smears of blood

Correct answer:

- Microscopy of a drop and smears of blood

24. Oval cysts with the size of 50×30 micron, with well noticeable envelope and two nuclei of different size, were revealed in native smear of feces of a clinically healthy person. These cysts belong to:

- *Giardia lamblia*
- *Entamoeba gingivalis*
- *Entamoeba histolytica*
- *Amoeba proteus*
- *Balantidium coli*

Correct answer:

- *Balantidium coli*

25. A 14-year-old child with normal development was hospitalized with the diagnosis of toxoplasmosis. Infection could happen:

- through hands contaminated by oocysts
- by swallowing cysts with water
- through injuries of skin (through scratch)
- transplacentally
- through mucous membranes of a nose

Correct answer:

- through hands contaminated by oocysts

26. A female student complains of stomach pain, appetite loss, and liquid stool with mucus impurity. Oval masses of 12 microns with a double envelope, and 2–4 nuclei inside were found in excrements. What is it?

- *Balantidium*
- Cyst of amoeba
- Tissue form of amoeba
- *Lambli*a cyst
- Minute form of amoeba

Correct answer:

- *Lamblia cyst*

27. A patient has typical symptoms of malaria: chill, heat, and sweating. These attacks repeat after certain intervals of time. What stage of *Plasmodium* is detected in the patient's blood during each attack?

- Sporozoite
- Oocyst
- Ookinete
- Sporocyst
- Merozoite

Correct answer:

- Merozoite

Note.

This answer is not good (it is difficult to find merozoites on a slide, because they are present in the blood before the attack during very short period). Correct answer must be "trophozoites" but it is absent.

28. Foreign student who arrived from India addressed to a polyclinic. Vegetative forms of dysenteric amoeba were found in excrements. Name the most probable way of penetration of the causative agent to the patient's organism:

- parenteral
- alimentary
- transmissible
- sexual
- airborne

Correct answer:

- alimentary

29. Patient's excrements with suspicion on amebiosis were brought to the laboratory in an hour after defecation. Amoebas were not found. Whether it excludes the diagnosis of amebiosis?

- No, because vegetative forms are quickly destroyed in environment
- No, because it is necessary to make additional blood test and immunological research
- Yes, because all forms of amoeba are absent (minute form, tissue form, and cyst)
- Yes, because minute forms and cysts are absent
- Yes, because tissue forms are absent

Correct answer:

- No, because vegetative forms are quickly destroyed in environment

30. A patient presents with inflammation of duodenum and gall bladder. Oval cysts of 12 microns in size and with four nuclei and well-outlined thick envelope were revealed in feces. What disease can be in the patient?

- Toxoplasmosis
- Trichomoniasis
- Lambliosis
- Balantidiasis
- Amebiosis

Correct answer:

- Lambliosis

31. A patient with a provisional diagnosis of liver abscess was delivered to a surgical department of a hospital. The patient was staying in Ukraine. He had stomach disorder, indigestion, and frequent bloody diarrhea. The patient hadn't consulted a doctor before. Which protozoan illness could the patient be ill with?

- Malaria
- Trypanosomiasis
- Leishmaniasis
- Amebiasis
- Toxoplasmosis

Correct answer:

- Amebiasis

Note.

In a database, another variant of the question is found: "The patient had been staying for a long time on business in one of African countries" instead of the sentence "The patient was staying in Ukraine".

32. Slime, blood and protozoa 30–200 microns long have been revealed in man's feces. The body is covered with cilia and has correct oval shape with a little bit narrowed anterior and wide round shaped posterior end. At the anterior end, a mouth is visible. In cytoplasm, there are two nuclei and two small vacuoles. What are the described features typical for?

- *Balantidium*
- *Lamblia*
- Intestinal amoeba
- *Trichomonas*
- Dysenteric amoeba

Correct answer:

- *Balantidium*

33. A dead child with numerous malformations was born to a woman. What material needs to be investigated for confirmation of the diagnosis of toxoplasmosis?

- Placenta and histologic sections of organs of a fetus
- Mother's stool
- Immunological test of mother's blood with antigen
- Contents of intestines of fetus
- Punctate of an internal of mother

Correct answer:

- Placenta and histologic sections of organs of a fetus

34. Protozoans, which move by means of protrusions of ectoplasm and had phagocytosed erythrocytes, were found in fresh bloody and mucous excrements of a patient with dysfunction of intestines. What species of protozoans was found most possibly?

- *Trichomonas hominis*
- *Toxoplasma gondii*
- *Entamoeba histolytica*
- *Balantidium coli*
- *Lamblia intestinalis*

Correct answer:

- *Entamoeba histolytica*

35. Pear-shaped protozoans of 10–20 microns in size were found in liquid excrements. They have 5 flagella and quickly move. Undulating membrane and large nucleus are noticeable. The body has an axostyle at the end of a cell. What protozoan was found?

- *Lambliia*
- *Trichomonas*
- *Entamoeba coli*
- *Trichomonas hominis*
- *Balantidium*

Correct answer:

- *Trichomonas hominis*

36. A patient has large ulcers (10–15 cm) on the lower extremities, which are painful at palpation, with large sanioserous exudate. A month ago, he was in rural areas of the Asian country where sand flies and rodents live. Name the disease and its causative agent:

- zoonotic cutaneous leishmaniasis, *Leishmania major*
- kala azar, *Leishmania donovani*
- trypanosomosis, *Trypanosoma brucei gambiense*
- allergic reaction to stings of sand flies
- anthroponotic cutaneous leishmaniasis, *Leishmania tropica*

Correct answer:

- zoonotic cutaneous leishmaniasis,
Leishmania major

37. Existence of *Entamoeba histolytica* forma minuta was established among intestinal microflora by careful laboratory investigations of intestines content of healthy man. Under what conditions can amebiasis develop in this person?

- After use of fermented milk products
- Owing to malnutrition
- Owing to long stay in the sun
- As a result of partial loss of blood
- After contact with person that is ill with flu

Correct answer:

- Owing to malnutrition

38. Fever, enlargement of spleen and liver are observed in a patient; reduction of erythrocyte count in blood is established. By microscopic investigation of smears of the punctate of breastbone, large number of small monocellular nonflagellated parasites is revealed in cells of bone marrow. One nucleus is located in their cytoplasm. A rhabdoid blepharoplast is noticeable. During cultivation of the parasite on artificial nutrient medium, it turns into a flagellate form. What disease can be assumed?

- Trichomoniasis
- Amebiosis
- Visceral leishmaniasis
- Trypanosomosis
- Chagas' disease

Correct answer:

- Visceral leishmaniasis

39. Armadillos from South America were delivered into a zoo of one of the cities of Ukraine. In their blood *Trypanosoma cruzi* were revealed. Whether these animals represent epidemiological danger?

- Epidemiological hazard is absent
- They are dangerous only to man
- They are dangerous to pets and man
- They are dangerous only to dogs
- They are dangerous to other armadillos and dogs

Correct answer:

- Epidemiological hazard is absent

40. A duodenal content smear of a patient with indigestion contains protozoa 10–18 μm large. They have four pairs of flagella, two symmetrically located nuclei in the broadened part of body. What kind of the lowest organisms is it?

- Dysentery amoeba
- Intestinal amoeba
- *Trichomonas*
- *Lamblia*
- *Balantidium*

Correct answer:

- *Lamblia*

41. A group of Ukrainian tourists brought gerbils from Samarkand. At examination of these small animals in the customs office, ulcers were found on their skin. What species of a protozoan is the most probable causative agent of this disease of animals if vectors are sand flies?

- *Balantidium coli*
- *Leishmania major*
- *Trypanosoma cruzi*
- *Plasmodium falciparum*
- *Toxoplasma gondii*

Correct answer:

- *Leishmania major*

Note.

Old Latin name of *Leishmania major* is *Leishmania tropica major*.

42. Tsetse fly (*Glossina palpalis*), which just left a pupa, has sucked blood of a person sick with African sleeping sickness. In a week the same fly bit a healthy person, but he did not get sick with trypanosomosis because:

- development of the invasive stage of trypanosome in an organism of a fly needs 20 days
- this person did proper preventive vaccination in due time
- vector of the causative agent of trypanosomosis is not tsetse fly, but sand fly is
- a person had congenital immunity
- trypanosomosis is natural and focal disease, and repeated sting happened, obviously, outside the natural focus

Correct answer:

- development of the invasive stage of trypanosome in an organism of a fly needs 20 days

43. During investigation of a blood smear of a patient with suspicion on malaria taken in the remission period, plasmodia were not revealed. In what period of the disease it was necessary to take blood, and what preparations should be prepared for confirmation of the diagnosis?

- Microscopic investigation of the smear of peripheral blood taken in fever time
- Microscopic investigation of blood drop taken during remission
- Infection of laboratory animals with patient's blood taken in any period
- Microscopic investigation of blood drop and smear of peripheral blood, taken in the attack period
- Serological investigations during any period

Correct answer:

- Microscopic investigation of blood drop and smear of peripheral blood, taken in the attack period

44. What clinical picture can be observed in a patient with tertian malaria (infecting agent is *Plasmodium vivax*), if we will measure temperature every day and mark days when it raises?

- 40–37–37–40–37–37–...
- 40–37–40–37–40–37–...
- 40–37–37–37–40–37–37–37–...
- 40–40–37–40–40–37–40–40–37–...
- 40–40–40–37–40–40–40–37–...

Correct answer:

- **40–37–40–37–40–37–...**

45. A patient consulted a doctor because of complaints of general weakness, pain in bowels, indigestion, frequent cases of bloody diarrhea (3–5 times a day). Laboratory analysis showed that patient's feces contained vegetative forms of protozoans with an unstable body shape. Their cytoplasm contained food vacuoles with erythrocytes. What representative of Protozoa was found in patient's feces?

- *Giardia intestinalis*
- *Balantidium coli*
- *Entamoeba coli*
- *Trichomonas vaginalis*
- *Entamoeba histolytica*

Correct answer:

- *Entamoeba histolytica*

Note.

Similar question has answers with common English names of causative agents.

46. By using in food of insufficiently boiled meat of mammals, it is possible to catch:

- trypanosomosis
- lambliosis
- toxoplasmosis
- balantidiasis
- leishmaniasis

Correct answer:

- toxoplasmosis

47. Having returned from Turkmenia, a patient with ulcers on his face came to a doctor. The doctor diagnosed cutaneous leishmaniasis. How did the disease agent get into the patient's organism?

- By inoculable way
- By respiratory way
- By direct contact
- By sexual contact
- By food

Correct answer:

- By inoculable way

48. During medical examination, cysts containing 4 nuclei of the identical size are revealed in excrements of a worker of a dining hall. For what protozoan such cysts are characteristic?

- *Entamoeba coli*
- *Balantidium coli*
- *Entamoeba histolytica*
- *Trichomonas vaginalis*
- *Toxoplasma gondii*

Correct answer:

- *Entamoeba histolytica*

49. Some antelopes were brought to the Kyiv zoo from Africa. *Trypanosoma gambiense* were found in their blood. Are these antelopes epidemically dangerous?

- Dangerous to domestic animals and human
- Dangerous only to human
- Are not epidemically dangerous at all
- Dangerous to other antelopes
- Dangerous only to predators

Correct answer:

- Are not epidemically dangerous at all

50. Chronic (asymptomatic) toxoplasmosis was established in a person. Hospitalization was not made, and confused relatives isolated the patient from any contacts. A doctor pointed to inexpediency of isolation, because:

- man is infected with toxoplasmosis only antenatally
- man cannot be a source of infection for other person
- the causative agent of toxoplasmosis is transferred by the airborne way
- all family is already infected with *Toxoplasma* and it is necessary to treat all persons
- it will provoke an exacerbation of disease

Correct answer:

- man cannot be a source of infection for other person

51. Two cases of malaria were revealed in a settlement located near a reservoir. The diagnosis was confirmed by blood test, which showed existence of the causative agent of tertian malaria. It is:

- *Plasmodium vivax*
- *Plasmodium falciparum*
- *Plasmodium malariae*
- *Plasmodium ovale*
- *Plasmodium berghei*

Correct answer:

- *Plasmodium vivax*

52. As a result of examination, the diagnosis of visceral leishmaniasis was made to a patient. The causative agent of this disease is localized in:

- muscles
- erythrocytes
- cells of a brain
- lungs
- cells of liver and spleen

Correct answer:

- cells of liver and spleen

53. A patient with heavy disorder of intestines consulted a doctor; liquid excrements with mucus was found to have blood. Bacterial dysentery was suspected, but the diagnosis was not confirmed in the laboratory. What protozoan disease is the most probable in this patient?

- Toxoplasmosis
- Lambliosis
- Trichomoniasis
- Amebiosis
- Leishmaniasis

Correct answer:

- Amebiosis

54. A worker of a farmyard caught balantidiasis. Choose stage that is invasive for a man:

- oocyst
- large vegetative form
- pseudocyst
- cyst
- sporozoite

Correct answer:

- cyst

55. Blood of a donor who arrived from Angola was transfused to a female patient during delivery. In two weeks, the recipient had a fever. It was assumed that the patient has malaria. By means of what laboratory investigation it is possible to specify this diagnosis?

- Studying leukocytic blood count
- Investigation of blood drop
- Determination of the causative agent by method of inoculation of blood on a nutrient medium
- Carrying out serological tests
- Investigation of a punctate of lymph nodes

Correct answer:

- Investigation of blood drop

56. What stages of life cycle of *Toxoplasma* occur in a human body?

- Endogonic development
- Schizogony
- Sporogony
- Gametogenesis
- Fertilization

Correct answer:

- Endogenic development

57. Inflammation and enlargement of lymph nodes, ulcers of skin and surrounding tissues were found in a patient. The microscopic investigation of discharge from ulcers revealed intracellular forms of flagellates. What disease the patient can have?

- Coccidiosis
- Balantidiasis
- Visceral leishmaniasis
- Toxoplasmosis
- Dermatotropic leishmaniasis

Correct answer:

- Dermatotropic leishmaniasis

58. Blood for investigation was taken from a patient with malaria in the period of fever and temperature increase. What stages of erythrocytic schizogony will prevail?

- Multinuclear schizonts
- Ameboid trophozoites
- Trophozoites in a ring stage
- Sexual forms
- Disintegration of schizonts and release of merozoites

Correct answer:

- Disintegration of schizonts and release of merozoites

59. A patient complains of general weakness, bad appetite, and nausea. After examination, pear-shaped protozoans with 4 pairs of flagella and two nuclei were found in duodenal aspirates. Which disease could the patient be ill with?

- Trichomoniasis
- Leishmaniasis
- Giardiasis
- Toxoplasmosis
- Malaria

Correct answer:

- Giardiasis

60. A woman delivered a dead child with multiple developmental defects. What protozoan disease might have caused the intrauterine death?

- Leishmaniasis
- Toxoplasmosis
- Amebiasis
- Lambliasis
- Malaria

Correct answer:

- Toxoplasmosis

Note.

In the book "*Collection of tasks...*", this question is written as follows: "A woman gave birth to a dead baby with a lot of failures of development. What protozoan disease could cause the fetus's death?"

Another variant of the answer "Lambliasis" is "Giardiasis".

61. A patient with complaints of frequent liquid excrements, pain in stomach, and vomiting consulted the infectious diseases hospital. During protozoan research of excrements, small vegetative forms without erythrocytes were revealed. Excrements were placed in a refrigerator, and cysts with four nuclei were found in a day. The cause of such state can be:

- *Trichomonas*
- *Entamoeba histolytica*
- *Balantidium*
- *Entamoeba coli*
- *Lambliia*

Correct answer:

- *Entamoeba histolytica*

62. Malaria is a serious protozoan disease, which is characterized by wearisome attacks of fever. These attacks occur because:

- spleen and bone marrow are affected
- organism's sensitization occurs
- hemolysis of erythrocytes occurs owing to schizogony
- antibodies are formed against erythrocytes, and they cause hemolysis
- cells of a liver are broken off owing to schizogony

Correct answer:

- hemolysis of erythrocytes occurs owing to schizogony

63. Oval cysts with 2–4 nuclei and of 10–14 microns in size, and with an envelope that is separated in the form of a half moon, were found in excrements of a patient with symptoms of inflammations of duodenum, gall bladder, and bile ducts. What protozoa parasitize in the patient?

- *Lamblia*
- *Balantidium*
- *Entamoeba histolytica*
- *Trypanosome*
- *Leishmania*

Correct answer:

- *Lamblia*

64. A businessman came to India from South America. On examination, a physician found that the patient was suffering from Chagas disease. What was the way of invasion?

- Through dirty hands
- With contaminated fruits and vegetables
- As a result of mosquito's bites
- After contact with a sick dog
- As a result of bug's bites

Correct answer:

- As a result of bug's bites

65. A patient with bile ducts inflammation was admitted to a gastrointestinal department. In bile, active pear-shaped protozoans with 2 nuclei and 4 pairs of flagella were found. What protozoan disease did the patient have?

- Giardiasis
- Toxoplasmosis
- Balantidiasis
- Trichomoniasis
- Amebiasis

Correct answer:

- Giardiasis

66. A 42-year-old man with complaints of weakness of muscles, fatigue, drowsiness, and decrease in mental work consulted a doctor. It was found that 5 years ago he was in Ethiopia. What actions of the doctor are most expedient for making of the diagnosis?

- To take excrements for research
- To analyze a smear taken from genitals
- To carry out microscopy of blood smears
- To investigate punctates of lymph nodes and cerebrospinal fluid
- To investigate biopsy material of muscles

Correct answer:

- To investigate punctates of lymph nodes and cerebrospinal fluid

67. At what human protozoan disease brain and eyes are invaded?

- Leishmaniasis
- Lambliosis
- Trichomoniasis
- Toxoplasmosis
- Amebiosis

Correct answer:

- Toxoplasmosis

68. By means of blood-sucking vectors human can be infected by:

- *Lambli*a
- *Leishmania*
- trichomonads
- amoebas
- *Toxoplasma*

Correct answer:

- *Leishmania*

69. Due to birth of a child with numerous malformations (microcephaly, idiocy etc.), spouses consulted the genetic consultation. The woman during pregnancy was ill, but she did not use mutagens and teratogens. Karyotype of parents and child is normal. A doctor has found that the family keeps a cat in the apartment. What can be a probable cause of malformation of the newborn child?

- Woman had leishmaniasis during pregnancy
- Woman had dysentery during pregnancy
- Woman had balantidiasis during pregnancy
- Woman was ill trichomoniasis during pregnancy
- Woman had toxoplasmosis during pregnancy

Correct answer:

- Woman had toxoplasmosis during pregnancy

70. A patient with attacks of wasting fever and the body temperature rising up to 40°C was admitted to an infectious department of a hospital. Attacks repeated rhythmically every 48 hours. It was known from anamnesis that the patient had recently returned from South Africa where he had been staying for 3 years. What was the causative organism of the disease?

- Agent of Gambian trypanosomiasis
- Agent of giardiasis
- Agent of quartan malaria
- Agent of toxoplasmosis
- Agent of tertian malaria

Correct answer:

- Agent of tertian malaria

Note.

In the book "*Collection of tasks...*", incorrect word combinations "three-days' malaria" and "four-days' malaria" were used.

71. A diagnosis of amebiasis is made in the case of identification in excrement of:

- cysts with four nuclei
- uninuclear cysts
- minuta forms
- cysts with eight nuclei
- large tissue forms

Correct answer:

- large tissue forms

72. A patient presents with bloody feces, defecation occurs 3–10 and more times per day. What protozoan disease can be present in the patient?

- Leishmaniasis
- Trypanosomosis
- Amebiosis
- Malaria
- Trichomoniasis

Correct answer:

- Amebiosis

73. Visceral leishmaniasis is revealed in a child from Central Asia. Name internal organ in which parasites can be located:

- spinal cord
- brain
- heart
- lungs
- red bone marrow

Correct answer:

- red bone marrow

74. What clinical picture can be observed in a patient with quartan malaria (*Plasmodium malariae* is an infecting agent), if we will measure temperature every day and mark days when it raises?

- 40–37–40–37–40–37–...
- 40–37–37–37–40–37–37–37–...
- 40–40–40–40–37–40–40–40–40–37–
...
• 40–37–37–40–37–37–...
- 40–40–37–37–40–40–37–37–...

Correct answer:

- **40-37-37-40-37-37-...**

75. A doctor is staying in one of Asian countries taking care of 10-year-old sick children. Symptoms of a disease are exhaustion, fever, anemia, hepatomegaly, and splenomegaly. As there are a lot of mosquitoes in this country, these children are likely to be sick with:

- visceral leishmaniasis
- balantidiasis
- toxoplasmosis
- giardiasis
- amebiasis

Correct answer:

- visceral leishmaniasis

76. Examination of the duodenal contents revealed some pear-shaped protozoa with two nuclei and four pairs of flagella. In addition, organisms had two axostyles¹ between the nuclei and the ventral adhesive disc. What representative of protozoa was found in the patient?

- *Toxoplasma*
- *Lambia*
- Intestinal trichomonad
- *Trypanosome*
- *Leishmania*

¹ Supporting filaments.

Correct answer:

- *Lamblia*

77. A 25-year-old woman liked to eat crude livestock products (milk, eggs, meat). When she became pregnant, during examination, doctors found high titers of antibodies in blood that was evidence of an invasion. There was a question of induced abortion. What disease was revealed in this woman?

- Trypanosomosis
- Toxoplasmosis
- Trichomoniasis
- Lambliosis
- Malaria

Correct answer:

- Toxoplasmosis

78. Professional diseases most often happen in people of certain profession, What of protozoan diseases can belong to professional diseases?

- Balantidiasis
- Amebiosis
- Lambliosis
- Malaria
- Leishmaniasis

Correct answer:

- Balantidiasis

79. A patient with complaints of increased temperature and diarrhea with mucus and blood consulted a doctor. During examination, colourless oocysts of 23–33 microns in size, of extended oviform shape, with extended forward end on which there is a shallow constriction, were revealed in excrements of the patient. An oocyst has double envelope and granular layer inside. For what species of protozoans the described features are characteristic?

- *Balantidium coli*
- *Lamblia intestinalis*
- *Isospora belli*
- *Toxoplasma gondii*
- *Entamoeba histolytica*

Correct answer:

- *Isospora belli*

80. For what protozoans the transmissible way of distribution of an infecting agent is possible?

- *Lamblia, Toxoplasma*
- Malarial plasmodia, *Toxoplasma*
- Trichomonads, trypanosomes
- Malarial plasmodia, *Leishmania*
- *Lamblia, Balantidium*

Correct answer:

- Malarial plasmodia, *Leishmania*

81. Parents with an ill child consulted the infection disease doctor. They had been working in one of the Asian countries for a long time. The child has sallow skin, loss of appetite, laxity, enlarged liver, spleen, peripheral lymph nodes. What protozoan illness can be suspected?

- Visceral leishmaniasis
- Toxoplasmosis
- Amebiasis
- Lambliasis
- Balantidiasis

Correct answer:

- Visceral leishmaniasis

82. A man of middle age lost sight on the right eye and consulted a doctor on deterioration of sight on the left eye. What protozoan disease the doctor can suspect?

- Leishmaniasis
- Toxoplasmosis
- Trypanosomosis
- Lambliosis
- Trichomoniasis

Correct answer:

- Toxoplasmosis

83. During microscopy of smear of excrements, cysts with four nuclei were revealed. What protozoan parasite they belong to?

- *Leishmania*
- *Balantidium*
- *Entamoeba histolytica*
- *Trichomonas*
- *Toxoplasma*

Correct answer:

- *Entamoeba histolytica*

84. During microscopic research of native preparation of excrement of a patient which have bloody and mucous character, spherical microorganisms in which cytoplasm contains erythrocytes and small cysts with 4 nuclei were found. What causative agent one can think about?

- *Entamoeba histolytica*
- *Entamoeba coli*
- *Lamblia intestinalis*
- *Trichomonas hominis*
- *Leishmania donovani*

Correct answer:

- *Entamoeba histolytica*

85. A woman who had some spontaneous abortions is investigated in the clinic for women. Based on the epidemiological anamnesis, chronic toxoplasmosis was suspected. What laboratory investigation is more effective for confirmation of the diagnosis?

- Microscopy of blood smear
- Microscopy of vaginal smear
- Serological reactions
- Skin test
- Microscopy of smear of excrements

Correct answer:

- Serological reactions

86. Two weeks after blood transfusion, a recipient has developed fever. What protozoal disease can be suspected?

- Trypanosomiasis
- Malaria
- Leishmaniasis
- Toxoplasmosis
- Amebiasis

Correct answer:

- Malaria

87. Examination of a patient showed that he had toxoplasmosis. Which material was used for diagnosing the disease?

- Feces
- Blood
- Urine
- Duodenal contents
- Sputum

Correct answer:

- Blood

Note.

Another variant of incorrect answer:

- Phlegm

88. What protozoan disease belongs to natural and focal diseases?

- Leishmaniasis
- Lambliosis
- Trichomoniasis
- Amebiosis
- Balantidiasis

Correct answer:

- Leishmaniasis

89. A patient with complaints of headache was taken to a hospital. He is ill during 1.5 weeks. A disease began with sharp increase in a body temperature to 39.9°C. In 3 hours, it decreased, and perspiration began. Attacks repeat rhythmically each 48 hours. The patient was at excursion in one of the African countries. Doctors suspected malaria. What method of laboratory investigation needs to be used?

- Immunological test
- Blood test
- Analysis of excrements
- Analysis of discharge from vagina
- Analysis of urine

Correct answer:

- Blood test

90. A female patient has symptoms of inflammation of urogenital tracts. Examination of a vaginal smear revealed big unicellular pear-shaped organisms with a sharp spike at the posterior end of the body, big nucleus and undulating membrane. What protozoa were found in the smear?

- *Trypanosoma gambiense*
- *Trichomonas hominis*
- *Trichomonas vaginalis*
- *Trichomonas buccalis*
- *Lamblia intestinalis*

Correct answer:

- *Trichomonas vaginalis*

91. Patients applied to a doctor with similar complaints of weakness, pain in the intestines, and disorder of GIT. Examination of faeces revealed that one patient with four nucleus cysts should be hospitalized immediately. What protozoa such cysts are typical for?

- *Balantidium*
- Dysenteric amoeba
- *Lambliia*
- Intestinal amoeba
- *Trichomonas*

Correct answer:

- Dysenteric amoeba

92. For the purpose of parasitological confirmation of a diagnosis and for isolation of the causative agent of infantile leishmaniasis, sternal puncture of bone marrow of patients was carried out. What causative agent can be revealed in marrow preparations (choose the Latin name)?

- *Leishmania tropica minor*
- *Leishmania donovani*
- *Leishmania infantum*
- *Lamblia intestinalis*
- *Trypanosoma cruzi*

Correct answer:

- *Leishmania infantum*

93. A woman who had two miscarriages came to a maternity welfare centre. Which protozoan illness could provoke miscarriages?

- Balantidiasis
- Trichomoniasis
- Toxoplasmosis
- Giardiasis
- Amebiasis

Correct answer:

- Toxoplasmosis

Note.

In the book "*Collection of tasks...*", incorrect word combination "women's consulting centre" is used. Correct term is "maternity welfare centre".

94. A patient having painless ulcers covered with brown-red crusts on the open part of a body consulted a doctor. After removal of these crusts, the surface covered with granulations was opened. During microscopic investigation of preparations stained according to Romanowsky–Giemsa, microorganisms of spherical and oval shape were revealed. Duration of a disease was more than one year. What microorganism can cause this disease?

- *Lambliia intestinalis*
- *Leishmania tropica* var. *major*
- *Trichomonas hominis*
- *Leishmania tropica* var. *minor*
- *Leishmania donovani*

Correct answer:

- *Leishmania tropica* var. *minor*

95. During microscopy of smear of human feces, eight-nuclear cysts were revealed. What protozoan they belong to?

- *Balantidium*
- Intestinal amoeba
- *Lambliia*
- Intestinal trichomonad
- *Toxoplasma*

Correct answer:

- Intestinal amoeba

96. Nausea, vomiting, frequent (20 times per day) liquid stool with impurity of mucus and blood are observed in a patient. During microscopic investigation of excrements, vegetative forms, having 2 nuclei and cilia, and uninuclear cysts were found. Which of the following is the most likely diagnosis for this patient?

- Toxoplasmosis
- Amebiosis
- Lambliosis
- Balantidiasis
- Intestinal trichomoniasis

Correct answer:

- Balantidiasis

97. During examination of a pregnant woman, *Trichomonas vaginalis* was revealed. In what biological form this parasite is usually present in a human body?

- Cyst with 4 nuclei
- Trophozoite
- Cyst with 8 nuclei
- Uninuclear cyst
- Merozoite

Correct answer:

- Trophozoite

98. Examination of a man revealed a protozoan disease that affected brain and caused vision loss. Blood analysis revealed unicellular half-moon-shaped organisms with pointed end. The causative agent of this disease is:

- *Leishmania*
- *Toxoplasma*
- *Lamblia*
- *Amoeba*
- Trichomonad

Correct answer:

- *Toxoplasma*

99. Patients with complaints of general weakness, pain in intestines, and disorder of digestion got to a hospital. During investigation of excrements, round cysts with four nuclei were found. For what protozoan such cysts are characteristic?

- *Balantidium*
- Intestinal amoeba
- Oral amoeba
- Dysenteric amoeba
- Intestinal trichomonad

Correct answer:

- Dysenteric amoeba

100. Parasitic protozoans were found in cavities of carious teeth. It is determined that they belong to the Sarcodina class. It is considered that they can cause some complications at stomatologic diseases. These monocellular organisms are:

- *Entamoeba coli*
- *Amoeba proteus*
- *Entamoeba histolytica*
- *Lamblia intestinalis*
- *Entamoeba gingivalis*

Correct answer:

- *Entamoeba gingivalis*

101. When doctors of sanitary and epidemiologic station inspect workers of the sphere of public catering, they often reveal asymptomatic carrier condition when clinically healthy person is a source of cysts that infect other people. During parasitizing of what causative agent in human this is possible?

- Malarial plasmodium
- + Dysenteric amoeba
- Trypanosomes
- Dermatotropic *Leishmania*
- Viscerotropic *Leishmania*

Correct answer:

- Dysenteric amoeba

Note.

During exams in 2007, 2008 and 2009 (among students studying stomatology), incorrect question was used: "What causative agent **cannot** parasitize in such a way?"

102. In woman's anamnesis, there were two miscarriages. The third pregnancy ended in a birth of a baby with a lot of malformations (upper extremities were absent and lower extremities were underdeveloped). The presence of what protozoans in the woman's body could cause such abnormalities?

- *Entamoeba histolytica*
- *Giardia intestinalis*
- *Balantidium coli*
- *Trichomonas hominis*
- *Toxoplasma gondii*

Correct answer:

- *Toxoplasma gondii*

103. A patient presents with fever characterized by an increase in temperature up to 39–40°C twice a day, enlargement of spleen and liver. Blood test showed anemia. What disease can be suspected at the patient?

- Leishmaniasis
- Giardiasis
- Trichomoniasis
- Balantidiasis
- Trypanosomosis

Correct answer:

- Leishmaniasis

104. A journalist's body temperature has sharply increased in the morning three weeks after his mission in India; it was accompanied with shivering and bad headache. A few hours later the temperature decreased. Attacks began to repeat in a day. He was diagnosed with tropical malaria. What stage of development of *Plasmodium* is infective for anopheles female?

- Sporozoites
- Schizonts
- Gametocytes
- Merozoites
- Microgamete

Correct answer:

- Gametocytes

105. During investigation of blood smear taken from a sick person and stained by Romanowsky's method, a doctor revealed protozoa and diagnosed Chagas' disease. What protozoan caused this disease?

- *Leishmania donovani*
- *Toxoplasma gondii*
- *Leishmania tropica*
- *Trypanosoma brucei*
- *Trypanosoma cruzi*

Correct answer:

- *Trypanosoma cruzi*

106. A child had nausea, vomiting and pains in right hypochondrium. During investigation of stool, oval cysts (8–14 microns) with 2–4 nuclei were found. What disease can be suspected in the patient?

- Giardiasis
- Amebiosis
- Trichomoniasis
- Trypanosomosis
- Leishmaniasis

Correct answer:

- Giardiasis

107. Cells of malarial plasmodium, which occupy almost the whole erythrocyte, were found in blood smear of a patient with malaria. Nuclei are large, pigment is observed. What stage of erythrocytic schizogony was found in the preparation?

- Sporozoites
- Trophozoites
- Ring trophozoites
- Merozoites
- Oocysts

Correct answer:

- Merozoites

108. A woman with complaints, which are characteristic for inflammatory process in vagina, consulted a gynecologist. What species of protozoans can cause these complaints?

- *Plasmodium malariae*
- *Toxoplasma gondii*
- *Trichomonas vaginalis*
- *Entamoeba coli*
- *Lamblia intestinalis*

Correct answer:

- *Trichomonas vaginalis*

109. During investigation of the Romanowsky stained smear of cerebrospinal fluid, mooned protozoans with the narrowed end, blue cytoplasm and red nucleus were revealed. What disease one can talk about?

- Leishmaniasis
- Malaria
- Toxoplasmosis
- Trypanosomosis
- Amebiosis

Correct answer:

- Toxoplasmosis

110. A man, who lived in an endemic focus, had tertian malaria. In one and a half years after moving to other district, he got sick with malaria again. What is the most probable form of this disease?

- Superinfection
- Reinfection
- Long-lasting infection
- Recurrence
- Secondary infection

Correct answer:

- Recurrence

III. A patient working at a pig farm complains of paroxysmal abdominal pain, liquid feces with admixtures of mucus and blood, headache, weakness, and fever. Examination of large intestine revealed ulcers from 1 mm up to several cm in diameter, feces contained oval unicellular organisms with cilia. What disease should be suspected?

- Amebiasis
- Lambliasis
- Balantidiasis
- Toxoplasmosis
- Trichomoniasis

Correct answer:

- Balantidiasis

112. Give an example of a natural and focal disease that is caused by flagellates.

- Trichomoniasis
- Trypanosomosis
- Toxoplasmosis
- Lambliosis
- Balantidiasis

Correct answer:

- Trypanosomosis

113. There are free-living and parasitic forms among unicellular organisms. Diseases, which are caused by parasitic unicellular organisms, have the general name:

- protozoan diseases
- trematodiasis
- filariases
- nematodosis
- cestodiasis

Correct answer:

- protozoan diseases

114. A patient with complaints of abdominalgia, frequent liquid excrements with impurity of mucus and blood consulted a doctor. During investigation of excrements, vegetative forms of protozoans of 30–40 microns in size, which contain a large number of phagocytized erythrocytes, were revealed in smears. What protozoan disease is present in this patient?

- Leishmaniasis
- Trichomoniasis
- Lambliosis
- Toxoplasmosis
- Amebiosis

Correct answer:

- Amebiasis

Note.

Another variant of the answer "Lambliasis" is "Giardiasis".

115. Some protozoans form cysts in difficult environments. Specify such animal:

- malarial plasmodium
- trypanosome
- intestinal trichomonad
- dysenteric amoeba
- vaginal trichomonad

Correct answer:

- dysenteric amoeba

116. Oval monocellular animals covered with short cilia were revealed in excrements of a patient with disorder of digestive tract. Their cytoplasm contains two pulsing vacuoles, micro- and a macronucleus. What disease these signs indicate to?

- Amebiosis
- Balantidiasis
- Toxoplasmosis
- Viscerotropic leishmaniasis
- Lambliosis

Correct answer:

- Balantidiasis

117. A pregnant woman has a suspicion on toxoplasmosis. What effective method of diagnosis of toxoplasmosis will confirm the diagnosis?

- Polymerase chain reaction
- Clinical blood test
- Blood microscopy
- DNA analysis
- Kasson's reaction

Correct answer:

- Blood microscopy

118. African sleeping sickness is found in a patient. What insect, when biting the patient, could transmit to him the causative agent of this disease?

- *Wohlfahrtia*
- Typhoid fly
- Stable fly
- Tsetse fly
- Bed bug

Correct answer:

- Tsetse fly

119. Cysts of protozoans were revealed in smears of feces of a patient. What types of listed below they can belong to?

- *Lamblia intestinalis*
- *Trichomonas tenax*
- *Trichomonas hominis*
- *Chilomastix mesnili*
- *Trichomonas vaginalis*

Correct answer:

- *Lamblia intestinalis*

120. After sting of sand fly, an ulcer was formed on the face of woman living in Turkmenistan. After microscopy of discharge from the ulcer, a diagnosis was made: dermatotropic leishmaniasis. What stage of *Leishmania* was found in cells of skin of the patient?

- Flagellate
- Ciliary
- Nonflagellated
- With pseudopodia
- Cyst

Correct answer:

- Nonflagellated

121. By studying smear from urinogenital tracts of a man under a microscope, a laboratory assistant has found protozoans having following traits: pear-shaped body of 20 microns in size, 4 flagella, undulating membrane, a nucleus, vacuoles, and an axostyle. Define this parasite.

- Vaginal trichomonad
- *Lambliia*
- Intestinal trichomonad
- *Trypanosome*
- *Toxoplasma*

Correct answer:

- Vaginal trichomonad

122. During three pregnancies, abortions are observed in a woman. By examination, it was noted that the woman spent holidays in the south of Ukraine for a long time; she lived in a family where there was a cat. What parasite this woman could catch so that it can be the cause of abortions?

- *Lamblia*
- *Amoeba*
- *Plasmodium*
- *Toxoplasma*
- *Balantidium*

Correct answer:

- *Toxoplasma*

123. During sanitary inspection of a reservoir in which children from a recreation camp bathe, oval cysts of 50–60 microns in size in the diameter, in which 2 nuclei (large and small) are visible in a cytoplasm, were revealed. What cysts of protozoans were found in water?

- *Lamblia*
- *Balantidium*
- *Toxoplasma*
- *Amoeba*
- *Euglena*

Correct answer:

- *Balantidium*

124. Protozoans of pear-shaped form that have a body length of 6–13 microns were found during microscopic investigation of discharge from gums of a patient having periodontosis. There is one nucleus in a cell, 4 flagella are located on the forward end, undulating membrane is present. What protozoa were found in the patient?

- *Leishmania*
- *Trichomonads*
- *Amoebas*
- *Balantidium*
- *Lambliia*

Correct answer:

- *Trichomonads*

125. A patient in a serious condition, with symptoms of dehydration, intestines pains, anemia, and blood diarrhea got to the infectious diseases hospital. A doctor suspected existence of amoebic dysentery, but the diagnosis during laboratory investigation was not confirmed. What protozoan disease, except dysentery, can cause similar symptoms in human?

- Balantidiasis
- Lambliosis
- Trichomoniasis
- Toxoplasmosis
- Trypanosomosis

Correct answer:

- Balantidiasis

126. A female patient complains of bad dream, reduced working capacity, itch, feeling of heartburn around genitals, and purulent foamy discharge. During differential diagnostics, unicellular organisms of a pear-shaped form with 4 flagella and a thorn on the opposite end of a body were revealed. What is a species of organisms?

- *Lambliia intestinalis*
- *Trichomonas hominis*
- *Trichomonas vaginalis*
- *Toxoplasma gondii*
- *Entamoeba gingivalis*

Correct answer:

- *Trichomonas vaginalis*

127. Recently the disease toxoplasmosis quite often meets at newborns. What is the reason of it?

- Non-compliance of rules of personal hygiene
- Hereditary factors
- Environment factors
- Birth injuries
- Intrauterine infection from sick mother

Correct answer:

- Intrauterine infection from sick mother

128. During microscopic investigation of fresh excrements of a patient with complaints of frequent liquid excrements with blood ("raspberry jelly"), large cells with one nucleus and phagocytized erythrocytes were revealed. What protozoan is such morphological structure typical for?

- *Giardia lamblia*
- *Campylobacter jejuni*
- *Toxoplasma gondii*
- *Entamoeba histolytica*
- *Balantidium coli*

Correct answer:

- *Entamoeba histolytica*

Note.

"Raspberry jelly" is the same as "crimson jelly" (this variant is also possible). During examination in 2017, incorrect phrase "absorbed red blood cells" was used; we have replaced it by "phagocytized erythrocytes".

129. A woman with complaints of drowsiness, fast fatigue, exhaustion, and fever consulted a doctor. It is known that she returned from travel across Africa recently. What main method of laboratory investigation is necessary for making a diagnosis?

- Microscopic investigation of blood smears and punctate of lymph nodes
- Biochemical research
- Immunological reactions
- Clinical blood test
- Biological method

Correct answer:

- Microscopic investigation of blood smears and punctate of lymph nodes

130. A 25-year-old woman with complaints of liquid excrements, abdominal distension, and loss of appetite consulted a doctor. During microscopy of smears of excrements, *Lamblia* was found. What main mechanism of transmission of the causative agent?

- Parenteral
- Faecal and oral
- Sexual
- Transmissible
- Contact

Correct answer:

- Faecal and oral

131. During examination of workers of cafe, vegetative forms of *Balantidium coli* were revealed in excrements of one of workers. What measures need to be taken in order to avoid distribution of an invasion?

- To isolate the carrier of an invasion and to treat him
- To do protective immunizations to all workers of cafe
- To discharge of operation of the carrier of an invasion
- To carry out disinfection of a working room
- No measures are necessary

Correct answer:

- To isolate the carrier of an invasion and to treat him

132. Unicellular organisms of pear-shaped form with 4 flagella were found in deposit on gums of a patient with periodontosis. What of the listed protozoans was in deposit?

- *Balantidium coli*
- *Trichomonas hominis*
- *Entamoeba gingivalis*
- *Trichomonas tenax*
- *Acanthamoeba*

Correct answer:

- *Trichomonas tenax*

133. A woman gave birth to a child with multiple malformations (hydrocephaly, underdeveloped extremities). There is a suspicion on toxoplasmosis. What method needs to be used for clarifying of a diagnosis?

- Clinical blood test
- Serological tests
- Investigation of smears of excrements
- Biochemical blood test
- Investigation of punctate of breastbone

Correct answer:

- Serological tests

134. During investigation of smears from an oral cavity of a patient, vegetative forms of *Trichomonas tenax* were found. To what type of symbiosis it is possible to belong them?

- Ectoparasitism
- Endoparasitism
- Commensalism
- Mutualism
- Common inhabitation

Correct answer:

- Commensalism

135. A lymph node punctate of a patient with suspected protozoal disease was examined. Examination of the stained specimen (Romanowsky stain) revealed some crescent bodies with pointed tips, blue cytoplasm and red nuclei. What protozoans were revealed in smears?

- Visceral leishmania
- Toxoplasmas
- Malarial plasmodia
- Trypanosomes
- Dermotropic leishmania

Correct answer:

- Toxoplasmas

136. Cysts were found in feces of a restaurant worker. They had 4 nuclei of the same size. Which of protozoans did the cysts belong to?

- *Entamoeba coli*
- *Balantidium coli*
- *Entamoeba histolytica*
- *Trichomonas vaginalis*
- *Toxoplasma gondii*

Correct answer:

- *Entamoeba histolytica*

137. A gynaecologist was examining a patient and revealed symptoms of genital tract inflammation. A smear from vagina contains pyriform protozoa with a spine, flagella at their front; there is also an undulating membrane. What disease can be suspected?

- Lambliasis
- Intestinal trichomoniasis
- Toxoplasmosis
- Urogenital trichomoniasis
- Balantidiasis

Correct answer:

- Urogenital trichomoniasis

138. A patient with inflammation symptoms in a mouth consulted a stomatologist. Protozoans with changeable shape of a body, which changes owing to formation of pseudopodia, were revealed in smears taken from a surface of teeth and gums. The size of a body is 6–30 microns. Specify a species of a protozoan.

- Intestinal amoeba
- Dysenteric amoeba
- Intestinal trichomonad
- Lamblia
- Oral amoeba

Correct answer:

- Oral amoeba

139. A patient had felt weakness, headache, and periodic temperature increase in 15 days after return from many months swimming in the Areas of Mediterranean and the Western Africa. A doctor suspected malaria in the patient. What of the listed methods is the most adequate in diagnosis of this disease?

- Microbiological
- Microscopic
- Serological
- Allergic
- Biological

Correct answer:

- Microscopic

140. Cysts with 8 nuclei were found in feces examined through a microscope. Which protozoans did those cysts belong to?

- *Balantidium coli*
- *Entamoeba coli*
- *Giardia intestinalis*
- *Trichomonas hominis*
- *Toxoplasma gondii*

Correct answer:

- *Entamoeba coli*

141. During the checkup of restaurant workers, doctors often notice asymptomatic parasitosis: a completely healthy person is a carrier of cysts that infect other people. Parasitism of which parasites makes it possible?

- *Entamoeba histolytica*
- *Plasmodium vivax*
- *Trypanosoma gambiense*
- *Leishmania donovani*
- *Leishmania infantum*

Correct answer:

- *Entamoeba histolytica*

142. Blood for confirmation of the clinical diagnosis "toxoplasmosis" was taken from a pregnant woman. What of the listed serological reactions has diagnostic value?

- Neutralization reaction
- Hemadsorption test
- Agglutination reaction
- Hemagglutination-inhibition reaction
- Complement-fixation reaction

Correct answer:

- Complement-fixation reaction

Note.

Other variants of incorrect answers:

- Precipitation test
- Widal test
- Wassermann test

143. According an anamnesis, a woman had three abortions; as a result of the fourth pregnancy, a child with lesion of the central nervous system and an eye, and enlargement of lymph nodes and spleen was born. It is known that two cats live in the house of the patient. During microscopic investigation of blood smears and punctates of lymph nodes, little mooned bodies were found in her cells; one end of these bodies is pointed and has a structure in the form of a sucker, another end is rounded. What parasite is found in the woman?

- *Toxoplasma gondii*
- *Lamblia intestinalis*
- *Balantidium coli*
- *Trichomonas hominis*
- *Plasmodium vivax*

Correct answer:

- *Toxoplasma gondii*

144. By microscopic research of scraping of a gum of a 60-year-old woman with heavy form of periodontosis, uninuclear protozoa of 3–60 microns in size with wide pseudopodia were revealed. What protozoa were revealed in the patient?

- *Entamoeba gingivalis*
- *Trichomonas tenax*
- *Entamoeba histolytica*
- *Toxoplasma gondii*
- *Balantidium coli*

Correct answer:

- *Entamoeba gingivalis*

145. A person after sting of sand fly had skin ulcers. An analysis of contents of an ulcer revealed nonflagellated unicellular organisms. What is the provisional diagnosis?

- Trypanosomosis
- Balantidiasis
- Dermatotropic leishmaniasis
- Visceral leishmaniasis
- Toxoplasmosis

Correct answer:

- Dermatotropic leishmaniasis

146. In the feces of a person with chronic colitis, round cysts with 4 nuclei, 10 micrometers in diameter were found. Which of protozoans do they belong to?

- *Entamoeba gingivalis*
- *Entamoeba coli*
- *Entamoeba histolytica*
- *Giardia intestinalis*
- *Balantidium coli*

Correct answer:

- *Entamoeba histolytica*

147. A patient, who has recently arrived from an endemic area, has elevated body temperature, headache, chills, and malaise, which are symptoms typical for common cold. What laboratory tests are necessary to prove or to disprove the diagnosis of malaria?

- Study of lymph node punctate
- Urinalysis
- Study of cerebrospinal fluid
- Microscopy of bone marrow punctate
- Microscopy of blood smears

Correct answer:

- Microscopy of blood smears

148. During examination of duodenal aspirates of a patient with indigestion, pear-shaped protozoans measuring 10–18 micrometers with 4 pairs of flagella were found. In a large part there were 2 symmetrically placed nuclei. Which of protozoans parasitized within the patient's body?

- *Entamoeba coli*
- *Entamoeba histolytica*
- *Trichomonas hominis*
- *Giardia intestinalis*
- *Balantidium coli*

Correct answer:

- *Giardia intestinalis*

149. A patient was taken to a hospital with complaints of general weakness, pain in bowels, indigestion. Feces examination revealed cysts with 4 nuclei. Which protozoan are these cysts most typical of?

- *Giardia intestinalis*
- *Entamoeba coli*
- *Balantidium coli*
- *Entamoeba gingivalis*
- *Entamoeba histolytica*

Correct answer:

- *Entamoeba histolytica*

150. At scatological research, roundish cysts, which have four nuclei as characteristic trait, were revealed by doctors of sanitary and epidemiologic station in workers of a coffee house. Most likely, this organism asymptotically parasitizes at these workers:

- intestinal amoeba
- dysenteric amoeba
- *Lambliia*
- *Balantidium*
- intestinal trichomonad

Correct answer:

- dysenteric amoeba

151. A patient addressed to a stomatologist with symptoms of inflammation of the mucous membrane of an oral cavity. In smears received from parodontal pockets, protozoa with a changeable shape of a body, 6–60 microns in size, capable to form pseudopodia, were revealed. What protozoans are these?

- *Entamoeba coli*
- *Lamblia intestinalis*
- *Entamoeba gingivalis*
- *Entamoeba histolytica*
- *Trichomonas hominis*

Correct answer:

- *Entamoeba gingivalis*

152. During sanitary assessment of a pond, where children from a recreation summer camp take their swims, oval cysts 50–60 microns in diameter with 2 nuclei visible in their cytoplasm (macronucleus and micronucleus) were detected. What protozoa do these cysts belong to?

- *Lamblia*
- *Toxoplasma*
- *Euglena*
- *Balantidium*
- *Amoeba*

Correct answer:

- *Balantidium*

HELMINTHS

I. What is used as diagnostics of trichinosis from listed laboratory examinations?

- Analysis of feces on the presence of eggs of helminths
- Analysis of urine on the presence of eggs of helminths
- Identification of parasites and their eggs in scraping from perianal area
- Analysis of duodenal contents on the presence of eggs of helminths
- Biopsy of muscles

Correct answer:

- Biopsy of muscles

2. A patient presents with enlarged liver, nausea, increased temperature, and hepatic colics. Large (140×80 micron) yellow oval eggs with lid are found in feces. What disease can be present?

- Fascioliasis
- Opisthorchiasis
- Ascariasis
- Echinococcosis
- Dicrocoeliasis

Correct answer:

- Fascioliasis

3. A patient, who lived in Western Siberia, complains of weakness, loss of appetite, nausea, headache, and pain in right hypochondrium. He likes to eat fish and pork. What helminthosis should be expected?

- Ascariasis
- Taeniasis
- Diphyllbothriasis
- Trichinosis
- Opisthorchiasis

Correct answer:

- Opisthorchiasis

4. A sanitary station forbade sale of batch of fish infected with plerocercoids. These larvae can cause:

- trichinosis
- ancylostomiasis
- diphyllbothriasis
- taeniasis
- trichocephaliasis

Correct answer:

- diphyllbothriasis

5. A child uneasily sleeps, gnashes teeth during dream, and scratches perianal area. Thin white worms 1 cm long with pointed ends are revealed. What helminthosis one can think about?

- Trichocephaliasis
- Ascariasis
- Trichinosis
- Enterobiasis
- Strongyloidosis

Correct answer:

- Enterobiasis

6. Little mobile red worms of 1 cm in size are found in feces of a patient with apparent anemia and allergic manifestations. What disease is the most probable?

- Ascariasis
- Ancylostomiasis
- Dracunculosis
- Loiasis
- Trichinosis

Correct answer:

- Ancylostomiasis

7. A doctor prescribed a patient the dietary food including dishes of crude beef liver. What consequences can arise in this case?

- Infection with cysticercosis is possible
- Infection with fascioliasis is possible
- Infection with opisthorchiasis is possible
- Infection with echinococcosis is possible
- Infection with the listed diseases is impossible

Correct answer:

- Infection with the listed diseases is impossible

8. During examination of employees of catering establishment, persons with helminthoses are revealed. In the case of what disease they represent threat for people around?

- Opisthorchiasis
- Paragonimiasis
- Echinococcosis
- Taeniasis
- Wuchereriasis

Correct answer:

- Tachiasis

9. Microscopic examination of sputum of a patient with pneumonia occasionally revealed some larvae. Eosinophiles were detected on blood examination. What helminthiasis can be diagnosed?

- Enterobiosis
- Paragonimiasis
- Ascariasis
- Opisthorchiasis
- Trichocephaliasis

Correct answer:

- Ascariasis

10. During veterinary and sanitary examination of pork in a market, larvae curled into a spiral were revealed. Meat was not allowed to sale because it is infected by:

- assassin worm
- *Trichinella*
- ascarid
- whipworm
- American hookworm

Correct answer:

- *Trichinella*

11. During analysis of stool and sputum on the presence of eggs of helminths, large (100 microns) golden eggs with thick envelope and operculum and a knob on the opposite pole were revealed. Make a diagnosis:

- hymenolepiasis
- paragonimiasis
- hookworm disease
- echinococcosis
- loiasis

Correct answer:

- paragonimiasis

12. Diphyllobothriasis is revealed in a 54-year-old sick woman. By using what products she caught this disease?

- Insufficiently salted fish and caviar
- Crude liver of a cow
- Crude crayfish or crabs
- Insufficiently thermally processed cow meat
- Insufficiently thermally processed meat of a pig

Correct answer:

- Insufficiently salted fish and caviar

13. A student from Yemen presents with edema and pain in the right foot. Whitish elongated structure resembling varicose vein and a bubble with diameter of 1 cm on its end are visible under skin. Formulate a diagnosis:

- onchocercosis
- taeniasis with *T. saginata* or *T. solium*
- dracunculosis
- paragonimiasis
- wuchereriasis

Correct answer:

- dracunculosis

14. Name the most probable way of infection with fascioliasis:

- through unboiled water from stagnant reservoirs, dirty vegetables
- through crude liver of a pig
- through insufficiently fried or boiled thoroughly meat of a pig
- through crude liver of a cow
- through crude or insufficiently processed fish

Correct answer:

- through unboiled water from stagnant reservoirs, dirty vegetables

15. There are three children of younger school age in a family. One of them is sick with hymenolepiasis. For disease prevention among other family members, it is necessary to investigate:

- phlegm
- urine
- blood
- duodenal contents
- feces

Correct answer:

- feces

16. During puncture of a liver cyst (a tumor with liquid), small whitish masses in the form of sand grains are revealed in transparent yellowish liquid. What helminthosis can be expected?

- Echinococcosis
- Fascioliasis
- Schistosomiasis
- Hymenolepiasis
- Cysticercosis

Correct answer:

- Echinococcosis

17. In stool of a patient with disorder of digestion, large oval yellowish eggs with dark brown rough envelope were revealed; dark mass is located in the middle part of these eggs, free spaces in the shape of a moon are present on poles. What is a diagnosis?

- Ascariasis
- Taeniasis
- Fascioliasis
- Trichinosis
- Trichocephaliasis

Correct answer:

- Ascariasis

18. A patient presents with headache, muscle pain during his movement, swallowing, chewing and rotation of eyes, weakness, temperature, and edema of eyelid and face. Eggs are absent in stool and perianal area. What is probable helminthosis?

- Cysticercosis
- Trichinosis
- Ancylostomiasis
- Echinococcosis
- Trichocephaliasis

Correct answer:

- Trichinosis

19. During microscopy of excrements, small (30 microns) yellowish oval eggs with thin envelope are revealed. A lid with noticeable projections of an envelope is present at one pole. What is a species of a parasite?

- Whipworm
- Liver fluke
- Broad tapeworm
- Cat liver fluke
- Ascarid

Correct answer:

- Cat liver fluke

20. A student from Africa complains of pain in the bottom of an abdomen and during urination, blood in urine. Erythrocytes and large (about 120 microns) oval eggs with a spine on one pole are revealed in the sediment of urine. Name the causative agent:

- *Opisthorchis felinus*
- *Schistosoma haematobium*
- *Trichocephalus trichiurus*
- *Onchocerca volvulus*
- *Paragonimus ringeri*

Correct answer:

- *Schistosoma haematobium*

21. Long white tape of helminth, which proglottids have width larger than length and have dark rosette-like mass in their center, was revealed in stool of a patient. How the disease is called?

- Onchocercosis
- Diphyllbothriasis
- Paragonimiasis
- Taeniarhynchosis
- Trichocephaliasis

Correct answer:

- Diphyllbothriasis

22. Roundish colourless masses with double yellowish envelope and three pairs of hooks in the middle part were incidentally revealed in stool of a patient. Threadlike structures are absent. Make a diagnosis:

- taeniasis with *T. saginata* or *T. solium*
- hymenolepiasis
- taeniasis
- taeniarhynchosis
- dicrocoeliasis

Correct answer:

- taeniasis with *T. saginata* or *T. solium*

23. Accidents of opisthorchiasis were revealed in the settlement located on the bank of Dnieper River. For the purpose of prevention, a sanitary station is obliged to warn inhabitants that they need:

- to boil meat well
- to boil and fry thoroughly fish
- to boil drinking water
- to pour boiling water over vegetables and fruit
- do not catch crayfish

Correct answer:

- to boil and fry thoroughly fish

Note.

Other variants of incorrect answers:

- to boil pork well
- to boil beef well

24. A 26-year-old female consulted a doctor about having stool with white flat moving organisms resembling noodles. Laboratory analysis revealed proglottids with the following characteristics: long, narrow, with a longitudinal canal of a uterus with 17–35 lateral branches on each side. What kind of intestinal parasite was found?

- *Hymenolepis nana*
- *Taenia solium*
- *Taeniarhynchus saginatus*
- *Diphyllobothrium latum*
- *Echinococcus granulosus*

Correct answer:

- *Taeniarhynchus saginatus*

25. The dog tapeworm was revealed during autopsy of laboratory rabbits. For this parasite, rabbit, as well as human, is:

- additional host
- intermediate host
- vector
- final host
- reservoir host

Correct answer:

- intermediate host

26. A sick child periodically has abdominalgia, liquid stool, and nausea. Once a cylindrical white worm of 15 cm was excreted during vomiting. What laboratory investigation should be performed?

- Identification of proglottids in stool and determining number of lateral branches of uterus
- Detection of larvae of helminth in muscles by biopsy
- Analysis of perianal zone for the presence of eggs of helminths by method of scraping or by means of an adhesive tape
- Analysis of feces and duodenal contents for the presence of eggs
- Analysis of feces for the presence of eggs

Correct answer:

- Analysis of feces for the presence of eggs

27. A 40-year-old woman has symptoms of mechanical jaundice. As it became clear, she is sick with fascioliasis. By what way the woman caught the disease?

- Through contaminated hands after stroking a stray dog
- Through contaminated hands after stroking a homeless cat
- She ate insufficiently fried pig liver
- She ate dirty strawberry
- She ate beef liver paste

Correct answer:

- She ate dirty strawberry

28. Larvae of helminths were revealed in a student from Africa during microscopy of blood smears stained according to Romanowsky. What helminthosis one can talk about?

- Hookworm disease
- Dicrocoeliasis
- Filariasis
- Strongyloidosis
- Infection with *Taenia solium* or *T. saginata*

Correct answer:

- Filariasis

29. By using meat of what animal human catches trichinosis?

- Crawfish and crab
- Cow
- Pig
- Chicken
- Fish

Correct answer:

- Pig

30. In the case of what disease a patient will be dangerous to people around him?

- Fascioliasis
- Hymenolepiasis
- Echinococcosis
- Diphyllbothriasis
- Taeniarhynchosis

Correct answer:

- Hymenolepiasis

31. White helminths of 5–10 mm were revealed in stool; at the anterior end, they have expansion of gullet that resembles a bubble. Eggs are not found in stool, but are found in scraping from perianal folds; they are colourless, asymmetrical, and oval. What is a diagnosis?

- Hookworm disease
- Enterobiasis
- Taeniasis
- Trichinosis
- Trichocephaliasis

Correct answer:

- Enterobiasis

32. A patient came to a stomatological department complaining of pain in chewing muscles. It was known from anamnesis that he was fond of hunting and often ate meat of wild animals. Encysted larva of what parasite was found in the result of muscle biopsy of the patient?

- *Ancylostoma duodenale*
- *Taenia solium*
- *Dracunculus medinensis*
- *Trichinella spiralis*
- *Wuchereria bancrofti*

Correct answer:

- *Trichinella spiralis*

33. A patient with complaints of periodically developing diarrhea, loss of weight, and abdominal pain consulted a doctor. Earlier he had an itch of skin of feet. Then cough and fever appeared. A month ago, the patient was on a business trip in China. During investigation of stool, oval transparent eggs with thin envelope and the size of 55×30 micron and with larva were found. What helminthosis can be present?

- Strongyloidosis
- Trichocephaliasis
- Hookworm disease
- Ascariasis
- Diphyllbothriasis

Correct answer:

- Hookworm disease

34. During sanitation inspection of carcasses on meat-processing plant, fascioliasis was revealed. What was taken for analysis?

- Liver
- Lungs
- Brain
- Muscles
- Heart

Correct answer:

- Liver

35. A student from Yemen presents with abdominalgia and temperature; early he had itch, weakness, and headache. At home, she bathed and washed in a pond. The most probable disease is:

- schistosomiasis
- ascariasis
- taeniasis
- enterobiasis
- paragonimiasis

Correct answer:

- schistosomiasis

36. Helminth 2 m long was found in feces of a patient after drug treatment. The helminth's body consists of segments, has a little head with hooks and four suckers. Which helminth did the patient have?

- *Taenia solium*
- *Taenia saginata*
- *Hymenolepis nana*
- *Echinococcus granulosus*
- *Diphyllobothrium latum*

Correct answer:

- *Taenia solium*

37. A 42-year-old patient after business trip to India complains of cough with abundant sputum, with blood impurity, breast pain, a dyspnea, and weakness. What helminthosis should be expected first?

- Cysticercosis
- Loiasis
- Echinococcosis
- Paragonimiasis
- Wuchereriasis

Correct answer:

- Paragonimiasis

38. A child complains of general weakness, loss of appetite, a troubled sleep, itching in the perianal area. The provisional diagnosis is enterobiasis. In order to specify this diagnosis it is necessary to perform:

- duodenal contents analysis
- roentgenoscopy
- immune diagnostics
- biopsy of muscle tissue
- scraping from perianal folds

Correct answer:

- scraping from perianal folds

39. A 26-year-old female patient complains of weakness, nausea, abdominal distension, and diarrhea. Sometimes she saw whitish rectangular masses 0.3×1.5 cm in stool and on bed linen. Make a provisional diagnosis:

- hymenolepiasis
- taeniarhynchosis
- fascioliasis
- taeniasis
- enterobiasis

Correct answer:

- taeniarhynchosis

40. White segmented helminths 1 cm long are revealed in excrements after dehelmintization. Four suckers and rostellum with hooks in two rows are noticeable on a head. Determine a disease:

- hymenolepiasis
- taeniasis
- dicrocoeliasis
- taeniarhynchosis
- echinococcosis

Correct answer:

- hymenolepiasis

41. A patient with complaints of general weakness, headache, nausea, vomiting, and liquid stool with impurity of mucus and blood, consulted a doctor. During microscopy of duodenal contents and fresh stool, mobile larvae were revealed. Which of the following is the most likely diagnosis?

- Strongyloidosis
- Dracunculosis
- Paragonimiasis
- Hookworm disease
- Trichocephaliasis

Correct answer:

- Strongyloidosis

42. After expulsion of helminth from intestines, the ovary with two lobes is found in its hermaphroditic proglottid. It is morphological feature of:

- *Hymenolepis nana*
- *Opisthorchis felinus*
- *Taeniarrhynchus saginatus*
- *Schistosoma haematobium*
- *Taenia solium*

Correct answer:

- *Taeniarhynchus saginatus*

43. Cysticercosis is revealed in a patient of the ophthalmologic office. Infection occurred with:

- larvae of *Ascaris lumbricoides*
- larvae of *Taenia solium*
- eggs of *Enterobius vermicularis*
- eggs of *Taenia solium*
- larvae of *Hymenolepis nana*

Correct answer:

- eggs of *Taenia solium*

44. White helminth of 4 cm, with thick posterior end, is revealed in the vermiform appendix. Eggs are found in excrements, they have lemon-shaped form with plugs on poles with the size 50×30 micron. Make a diagnosis:

- trichocephaliasis
- ascariasis
- taeniasis with *T. saginata* or *T. solium*
- opisthorchiasis
- strongyloidosis

Correct answer:

- trichocephaliasis

45. During veterinary examination of pork, fluid-filled cysts resembling rice grain were found. Such meat is not subject to sale as it is infected with larvae of:

- *Echinococcus granulosus*
- *Taenia solium*
- *Diphyllobothrium latum*
- *Echinococcus multilocularis*
- *Taeniarrhynchus saginatus*

Correct answer:

- *Taenia solium*

46. A patient presents with weakness, decrease in working capacity, headache, nausea, salivation, and stomach pain. Anemia is revealed in blood; gray wide oval operculated eggs of 80 microns are revealed in feces. What is a disease?

- Fascioliasis
- Dicrocoeliasis
- Taeniarhynchosis
- Diphyllbothriasis
- Trichocephaliasis

Correct answer:

- Diphyllbothriasis

47. A patient complains of weakness, vertigo, disorder of digestion, vomiting, and epileptic attacks. Before this, he used pork bought from individuals. What helminthosis is characterized by these symptoms?

- Trichinosis
- Cysticercosis
- Malayan filariasis
- Taeniasis
- Taeniarhynchosis

Correct answer:

- Cysticercosis

48. A pale patient presents with weakness, headache, vertigo, feeling of weight in stomach, and anemia. Sometimes he saw red worms of 1 cm in size in stool. Earlier he had itch of feet and urticaria. Which of the following is the most likely diagnosis?

- Cysticercosis
- Hymenolepiasis
- Intestinal schistosomiasis
- Wuchereriasis
- Ancylostomiasis

Correct answer:

- Ancylostomiasis

49. Roundish eggs of 50 microns with colourless oncospheres and threadlike structures are revealed in a 12-year-old boy with complaints of abdominalgia, disorder of digestion, uneasy dream, and nausea. What is a diagnosis?

- Ascariasis
- Hymenolepiasis
- Taeniasis or taeniarhynchosis
- Fascioliasis
- Echinococcosis

Correct answer:

- Hymenolepiasis

50. For prevention of what helminthosis it is necessary to follow rules of personal hygiene?

- Fascioliasis
- Diphyllbothriasis
- Taeniarhynchosis
- Opisthorchiasis
- Echinococcosis

Correct answer:

- Echinococcosis

51. A patient from Eastern Siberia with a complaint of pain in his liver got to a hospital. Eggs of about 30 microns, which resemble seeds of cucumbers in their shape, are found in feces. What diagnosis can be made to the patient?

- Dicrocoeliasis
- Taeniarhynchosis
- Hymenolepiasis
- Opisthorchiasis
- Paragonimiasis

Correct answer:

- Opisthorchiasis

52. A family has a big dog. What helminthosis one can catch from it?

- Echinococcosis
- Paragonimiasis
- Dracunculosis
- Opisthorchiasis
- Hymenolepiasis

Correct answer:

- Echinococcosis

53. Larvae of what cestode can parasitize in human muscles?

- Beef tapeworm
- Trichinella
- Dwarf tapeworm
- Pork tapeworm
- Threadworm

Correct answer:

- Pork tapeworm

54. Choose correct life cycle for *Opisthorchis felineus*:

- egg – oncosphere – fluid-filled cyst (cysticercus)
- egg – larva – adult organism
- egg – rhabditiform larva – filariform larva – adult organism
- egg – rhabditiform larva – strongyloid larva – filariform larva – adult organism
- egg – miracidium – sporocyst – redia – cercaria – metacercaria

Correct answer:

- egg – miracidium – sporocyst – redia – cercaria – metacercaria

55. A patient with complaints of pain and edema of the right foot is hospitalized to a hospital. Threadlike thickening with a bubble on its end is visible under skin. The patient traveled in Yemen last year where he sometimes drank water without boiling. What disease can be suspected?

- Schistosomiasis
- Dracunculosis
- Trichinosis
- Paragonimiasis
- Hymenolepiasis

Correct answer:

- Dracunculosis

56. A worker of a live-stock farm was made a provisional diagnosis of echinococcosis. The diagnosis was confirmed during a surgery. From what animal could the patient get the disease?

- A sheep
- A pig
- A dog
- A rabbit
- A cow

Correct answer:

- A dog

57. It is established that a tapeworm 3 m long that has up to 12 lateral branches of uterus in mature proglottid parasitizes in human intestines. What disease is caused by the larva of this helminth during autoinvasion?

- Echinococcosis
- Cysticercosis
- Diphyllbothriasis
- Taeniarhynchosis
- Taeniasis

Correct answer:

- Cysticercosis

58. During operation, small bubbles, that have insignificant amount of liquid and closely adjoin one to another, are found in the liver of a patient. What helminthosis has revealed in the patient?

- Fascioliasis
- Alveococcosis
- Opisthorchiasis
- Echinococcosis
- Dicrocoeliasis

Correct answer:

- Alveococcosis

59. During investigation of excrements of a patient for the existence of helminthic eggs, *Fasciola* eggs are revealed. Whether the available information is enough for a doctor to make the diagnosis "fascioliasis"?

- It is necessary to take blood for analysis
- To assign repeated examination of excrements in 8 hours
- To assign repeated examination of excrements in 5–7 days, having excluded a liver from a diet
- It is necessary to take duodenal contents
- To assign repeated examination of excrements in 5–7 days, having excluded vegetables from a diet

Correct answer:

- To assign repeated examination of excrements in 5–7 days, having excluded a liver from a diet

60. A patient was treated for anemia. The course of treatment led to relief, but not to recovery. Fragments of the body of broad tapeworm were found in stool. What stage of development was invasive?

- Plerocercoid
- Egg
- Stage of segmented body
- Coracidium
- Proceroid

Correct answer:

- Plerocercoid

61. Schistosomes belong to the most widespread tropical helminths. Despite sanitary and epidemic measures, in the countries of Africa, Asia and South America a number of patients with schistosomiasis strongly increased for the last decade. What reasons facilitate this?

- Land reclamation
- Pollution of reservoirs
- Resistance of schistosomes to drugs
- Illiteracy of a human population
- Use of fish in food

Correct answer:

- Land reclamation

Note.

Land reclamation is the same as land melioration.

62. During microscopy of excrements of a patient who came back to Ukraine from Eastern Siberia, small yellowish eggs reminding cucumber seeds were revealed. A doctor made the diagnosis: opisthorchiasis. In what way infection has occurred?

- When eating meat of wild mammals
- By drink of not boiled water
- When eating sea fish
- When eating fresh-water crayfish and crabs
- When eating fresh-water fishes

Correct answer:

- When eating fresh-water fishes

63. Breast pain and blood spitting appeared in a sheep breeder who shepherded sheep under escort of dogs. Roundish mass was revealed radiologically in lungs. Immunological reactions confirmed provisional diagnosis. Infection of what of the listed helminths these symptoms correspond to?

- Liver fluke
- Broad tapeworm
- Dwarf tapeworm
- Dog tapeworm
- Lung fluke

Correct answer:

- Dog tapeworm

64. For prevention of what helminthosis it is necessary to follow rules of personal hygiene?

- Trichinosis
- Taeniarhynchosis
- Alveococcosis
- Opisthorchiasis
- Diphyllbothriasis

Correct answer:

- Alveococcosis

65. Radiological examination of a patient who has icteric sclerae and skin, pains in liver revealed bubble with daughter bubbles containing scolices. What helminth can parasitize in the organism?

- Trichinella
- Pork tapeworm
- Dwarf tapeworm
- Dog tapeworm
- Broad tapeworm

Correct answer:

- Dog tapeworm

66. A patient consulted a doctor with complaints of presence in stool of structures reminding noodles. In laboratory, they were identified as mature proglottids of the armed tapeworm. What diagnostic sign was used?

- Number of vitelline glands
- Localization of cirrus
- Number of branches of uterus
- Number of testes
- Number of lobes of ovaries

Correct answer:

- Number of branches of uterus

67. A female patient consulted a physician about digestive disorder and extended abdominal pain. Examination revealed drastic decrease in hemoglobin concentration. It is known from anamnesis that while living in the Far East the patient used to eat freshly salted caviar. Some relatives living with her had the similar condition. What is the most likely diagnosis?

- Ascariasis
- Trichiniasis
- Echinococcosis
- Teniasis
- Diphyllbothriasis

Correct answer:

- Diphyllobothriasis

Note.

In the book "*Collection of tasks...*", this question is written as follows: A woman came to a doctor complaining of general weakness, epigastric pain, indigestion. After the examination of the patient anemia connected with vitamin B₁₂ deficiency was found. It was known from anamnesis that living in the Far East she used to eat caviar. Laboratory analysis showed that the feces contained eggs of helminth which were oval-shaped, yellow, and had an operculum on one of the poles. What disease did the patient have?

68. In a family, a father got sick with trichinosis. What preventive measures need to be held to avoid infection of other family members?

- Sanitary cleaning of a room
- Treatment of the patient
- Isolation of the patient
- No any measures
- Protective immunization

Correct answer:

- No any measures

69. Female of a roundworm has size up to 1 cm, a male is of 0.5 cm. They live in the lower parts of a small intestine. Eggs are colourless and have an asymmetric form. Where eggs of these helminths mature?

- In water
- On skin of man
- On soil
- In intestines of man
- In the intermediate host

Correct answer:

- On skin of man

70. Owing to non-observance of rules of personal hygiene, some invasive eggs of *Ascaris lumbricoides* got to a person with food. Careful feces analysis for the presence of eggs of helminths, that was performed in three months and half a year, certified lack of mature parasites in intestines of this person. It happened because:

- mature parasites start lay invasive eggs not earlier than in a year after invasion
- parasites could not break protective barriers of a human body and pass development stages, that are necessary for achievement of sexual maturity
- eggs of parasites should be determined on perianal folds
- this parasite is not invasive for man
- parasite lives not more long than 1 month therefore eggs in excrements are absent

Correct answer:

- parasites could not break protective barriers of a human body and pass development stages, that are necessary for achievement of sexual maturity

71. A treatment of a patient with pneumonia didn't relieve his condition. He began complaining of stomachache, vomiting, indigestion, worsening of his general state. Feces analysis revealed oval-shaped helminth's eggs covered with a thick mammillated envelope. What diagnosis can be made basing on the data mentioned above?

- Fascioliasis
- Trichuriasis
- Diphyllbothriasis
- Enterobiasis
- Ascariasis

Correct answer:

- Ascariasis

Note.

During exam in 2018, incorrect term "lumpy capsule" was used instead of "mammillated envelope".

72. During blood test of a patient with parasitic disease (helminthic invasion), we can find in blood an increase in:

- eosinophils
- basophils
- platelets
- monocytes
- lymphocytes

Correct answer:

- eosinophils

73. A child addressed to a polyclinic with complaints of general weakness, headache, and cough with excretion of phlegm, sometimes with blood streaks. During examination, helminth larvae were revealed in sputum. For what parasitic invasion it is characteristic?

- Dracunculosis
- Taeniasis
- Trichocephaliasis
- Enterobiasis
- Ascariasis

Correct answer:

- Ascariasis

74. In a region where episode of trichinosis is registered, it is necessary to reveal all persons infected with trichinosis. What method of diagnostics needs to be applied?

- Immunological reactions
- Analysis of saliva
- Feces analyses
- Radiology
- Biopsy of muscles

Correct answer:

- Immunological reactions

75. Two children with pinworms were revealed in kindergarten. What preventive measure needs to be held to avoid infection of other children?

- To boil meat and fish well
- Nothing is necessary
- To wash fruit and vegetables well
- To carry out disinfection of toys
- To perform vaccinations

Correct answer:

- To carry out disinfection of toys

76. Name what helminthoses of the listed below can be the cause of chronic appendicitis:

- ascariasis, enterobiasis, trichocephaliasis
- trichinosis, ancylostomiasis, paragonimiasis
- wuchereriasis, trichinosis, ancylostomiasis
- Malayan filariasis, loiasis, opisthorchiasis
- taeniasis, trichocephaliasis, fascioliasis

Correct answer:

- ascariasis, enterobiasis, trichocephaliasis

77. At the same time a man can be the obligate final host and the facultative intermediate host of such helminth from the phylum Flat worms:

- broad tapeworm
- dog tapeworm
- pork tapeworm (armed tapeworm)
- *Echinococcus multilocularis*
- beef tapeworm (unarmed tapeworm)

Correct answer:

- pork tapeworm (armed tapeworm)

78. Papillomatous outgrowths, trophic ulcers, elephantiasis of the lower extremities, edemata of genitals, faces, and hands are observed on skin of a sick person. What disease can be suspected?

- Ascariasis
- Ancylostomiasis
- Trichinosis
- Paragonimiasis
- Wuchereriasis

Correct answer:

- Wuchereriasis

79. Wife of a fisherman consulted a pediatrician about her child who has attacks, and spasms, sometimes with loss of consciousness. During laboratory investigation, oval grayish eggs, with a lid on one pole and a small knob on the other, were found in excrements of the child. What helminth can serve as the causative agent of this disease of the child?

- Cat liver fluke
- Broad tapeworm
- Liver fluke
- Whipworm
- Lancet fluke

Correct answer:

- Broad tapeworm

80. A sick child had recurrent diarrhea, epigastric pain, nausea, vomiting. Once after the child's vomiting his mother found a spindle-shaped helminth 20 cm long. Which disease could cause such a condition?

- Trichuriasis
- Ascariasis
- Ancylostomiasis
- Dracunculiasis
- Trichinosis

Correct answer:

- Ascariasis

81. A patient with the provisional diagnosis of trichinosis was admitted to a hospital. Consuming of what food could cause that disease?

- Pork
- Beef
- Fish
- Crayfish
- Crab

Correct answer:

- Pork

82. Five clinical forms of cysticercosis are distinguished: epileptic, pseudo tumor, hypertension with hydrocephaly, pseudo-paralytic, and disturbance of cerebral blood flow. The reason of any form of cysticercosis is that human is:

- obligate final host of armed tapeworm
- facultative intermediate host of armed tapeworm
- obligate final host of unarmed tapeworm
- facultative intermediate host of unarmed tapeworm
- final host of liver fluke

Correct answer:

- facultative intermediate host of armed tapeworm

83. Larvae of what nematodes migrate through human bloodstream during their development cycle?

- Hookworm, *Trichinella*, ascarid
- Whipworm, threadworm, filariae
- Ascarid, pinworm, assassin worm
- Pinworm, American hookworm, ascarid
- Whipworm, hookworm, threadworm

Correct answer:

- Hookworm, *Trichinella*, ascarid

84. Fragments of helminth were found in feces of a patient after drug treatment. These fragments had a tape-like segmented structure. The width of segments exceeded their length. Rosette-shaped uterus was located in the centre of the segment. Which helminth did the patient have?

- Pork tapeworm
- Fish tapeworm
- Dog tapeworm
- Beef tapeworm
- Dwarf tapeworm

Correct answer:

- Fish tapeworm

85. In the spring of 1999, after the use in food of pork without of appropriate veterinary and sanitary examination, edemata of eyelids and face, headache and muscular ache, high temperature, general weakness, and intestinal frustration started developing in inhabitants of some regions of the Dnepropetrovsk region of Ukraine. A doctor investigated slices of gastrocnemius muscles of patients and found larvae covered with capsules. What diagnosis was made by the doctor to patients?

- Trichocephaliasis
- Hookworm disease
- Opisthorchiasis
- Echinococcosis
- Trichinosis

Correct answer:

- Trichinosis

86. Adult filariae parasitize in various human organs. Larvae (microfilariae) circulate in blood, but their activity is not identical during a day. Larvae of some species of filariae appear in peripheral blood at night, and of other species appear in the afternoon; this is manifestation of:

- abilities to penetrate into the blood-sucking mouthparts of the intermediate host only after becoming the invasive stage
- adaptation of a parasite to a daily rhythm of activity of human
- dependences of development of microfilariae in the intermediate host from temperature conditions
- adaptation of a parasite to activity of insects that serve as vectors
- need to get into a body of the final host where a larva moults twice

Correct answer:

- adaptation of a parasite to activity of insects that serve as vectors

87. What helminth is a hematophagous organism?

- Ascarid
- Pinworm
- Assassin worm
- Dragon worm
- *Trichinella*

Correct answer:

- Assassin worm

88. A patient presents with severe indigestion. Ripe and immovable segments of a tapeworm are found in his feces; a uterus of each segment has 7–12 lateral branches. Which helminth does the patient have?

- Pork tapeworm
- Beef tapeworm
- Fish tapeworm
- Dwarf tapeworm
- Dog tapeworm

Correct answer:

- Pork tapeworm

89. Microscopy revealed yellow-brown knobby-coated eggs of helminths with a thick wall in feces of a schoolboy. Which helminth did the eggs belong to?

- *Trichocephalus trichiurus*
- *Enterobius vermicularis*
- *Ascaris lumbricoides*
- *Hymenolepis nana*
- *Diphyllobothrium latum*

Correct answer:

- *Ascaris lumbricoides*

90. Proglottids of a tapeworm with rosette-like uterus were revealed in feces of a patient with disorders of digestion and malignant anemia. What disease can be present?

- Hymenolepiasis
- Taeniasis
- Echinococcosis
- Taeniarhynchosis
- Diphyllbothriasis

Correct answer:

- Diphyllbothriasis

91. A 48-year-old miner complains of weakness, headache, vertigo, and feeling of weight in a stomach. Earlier he had a strong itch of feet skin and urticaria. During research, anemia was revealed. In his excrements, the patient sometimes saw little mobile red worms about 1 cm long. What the most probable disease a doctor can suspect?

- Trichocephaliasis
- Ascariasis
- Trichinosis
- Ancylostomiasis
- Dracunculosis

Correct answer:

- Ancylostomiasis

92. Choose the correct life cycle for *Taenia solium*:

- egg – oncosphere – fluid-filled cyst (cysticercus)
- egg – miracidium – sporocyst – redia – cercaria – metacercaria
- egg – larva – adult organism
- egg – rhabditiform larva – filariform larva – adult organism
- egg – rhabditiform larva – strongyloid larva – filariform larva – adult organism

Correct answer:

- egg – oncosphere – fluid-filled cyst (cysticercus)

93. A patient is hospitalized in a hospital with complaints of pains in intestines, diarrheas, vertigo, loss of appetite, dyspnea, and periodic fever. As a result of laboratory investigations, oval eggs with big lateral spine were found in excrements of the patient. What species of helminth could cause a similar clinical picture?

- *Paragonimus ringeri*
- *Schistosoma haematobium*
- *Schistosoma mansoni*
- *Schistosoma japonicum*
- *Clonorchis sinensis*

Correct answer:

- *Schistosoma mansoni*

94. A patient with complaints of cutaneous itch, urticaria, and increased temperature got to the infectious diseases hospital. During examination, infiltrates in lungs, bronchitis, and eosinophilic leukocytosis in blood, which reached 50%, were revealed in the patient; larvae of 0.2–0.5 mm in size were found in excrements. What helminthosis can we talk about?

- Ascariasis
- Enterobiasis
- Strongyloidosis
- Ancylostomiasis
- Paragonimiasis

Correct answer:

- Strongyloidosis

95. A patient was in long business trip in Sudan. In a month upon return, he consulted an ophthalmologist with complaints of pains in eyes, edemata of eyelids, lachrymation, and temporary weakening of sight. Helminths with transparent threadlike body and 50–70 mm in size were found under the eye's conjunctiva. What diagnosis the doctor can make?

- Malayan filariasis
- Onchocercosis
- Trichocephaliasis
- Loiasis
- Wuchereriasis

Correct answer:

- Loiasis

96. A patient with complaints of pain in liver and nausea consulted a doctor. Oval eggs of 130–145 microns, with thin, smooth and well expressed envelope were revealed in his excrements. Color of eggs is yellowish. An internal content is granular and uniform. A lid is visible on one pole. What helminth possesses these eggs?

- Lancet fluke
- Liver fluke
- Cat liver fluke
- Dog tapeworm
- Broad tapeworm

Correct answer:

- Liver fluke

97. During three weeks, a female patient presents with frequent diarrheas, which often alternate with constipations. A doctor suspected strongyloidosis. What material needs to be directed for laboratory investigation for finding of the causative agent and confirmation of the diagnosis?

- Phlegm, duodenal contents, excrements
- Excrements, urine
- Scraping from perianal folds
- Phlegm, blood
- Blood, excrements, urine

Correct answer:

- Phlegm, duodenal contents, excrements

98. How a person catches echinococcosis?

- When processing carcasses of wild animals
- By contact with dogs
- By using wild berries
- By using liver that is invaded by *Echinococcus*
- By using insufficiently thermally processed beef

Correct answer:

- By contact with dogs

99. What of the listed helminthoses are contagious for human?

- Hymenolepiasis, opisthorchiasis
- Taeniasis, hymenolepiasis
- Echinococcosis, enterobiasis
- Ascariasis, enterobiasis
- Hymenolepiasis, enterobiasis

Correct answer:

- Hymenolepiasis, enterobiasis

100. A 10-year-old child complains of weakness, nausea, irritability. Helminths of white color and 5–10 mm long were found on the underwear. On microscopy of the scrape from perianal folds, colorless ova of the unsymmetrical form were revealed. Indicate what helminth is parasitising on the child?

- Giant intestinal roundworm
- Tunnel worm
- Pinworm
- Trichina
- Whipworm

Correct answer:

- Pinworm

101. Echinococcosis belongs to the most dangerous helminthoses of a person that needs surgical intervention. What method is used for laboratory diagnosis of this disease?

- Radiological
- Analysis of feces on the presence of eggs of helminths
- Immunological
- Analysis of feces on the presence of larvae of helminths
- Biological tests

Correct answer:

- Immunological

102. A child doesn't sleep well; sometimes he scratches the area around anus. After examination of child's nightwear, white filiform helminths 1 cm long were found. During microscopic examination of a specimen from perianal folds of the child, small ovoid asymmetrical colourless eggs were observed. What is the helminth, which parasitizes in the child's organism, called?

- *Trichinella spiralis*
- *Ascaris lumbricoides*
- *Strongyloides stercoralis*
- *Enterobius vermicularis*
- *Trichocephalus trichiurus*

Correct answer:

- *Enterobius vermicularis*

103. During examination, a patient was diagnosed with opisthorchiasis. With what food could the patient get the agent of opisthorchiasis?

- Cysticercosis beef
- Dirty vegetables
- Cysticercosis pork
- Dirty fruit
- Undercooked fish

Correct answer:

- Undercooked fish

104. A father bought some pork at a market. What disease may the members of his family catch supposed this meat didn't pass the veterinary control?

- Teniosis
- Beef tapeworm infection
- Hymenolepiasis
- Echinococcosis
- Liver fluke infection

Correct answer:

- Teniosis

105. During microscopy of scraping from perianal folds, colourless eggs having the shape of asymmetrical ovals and the size of 50×23 micron, were revealed in a child. What helminth possesses these eggs?

- Ascarid (*Ascaris lumbricoides*)
- Hookworm (*Ancylostoma duodenale*)
- Whipworm (*Trichuris*)
- Pinworm (*Enterobius*)
- Dwarf tapeworm (*Hymenolepis nana*)

Correct answer:

- Pinworm (*Enterobius*)

106. A patient consulted an urologist about pain during urination. Analysis of his urine taken in the daytime revealed eggs with a characteristic sharp point. It is known from anamnesis that the patient has recently returned from Australia. Some relatives living with her had similar condition. What is the most likely diagnosis?

- Intestinal schistosomiasis
- Japanese schistosomiasis
- Opisthorchiasis
- Dicrocoeliasis
- Urogenital schistosomiasis

Correct answer:

- Urogenital schistosomiasis

107. During an operation, white helminths 40 mm long with a thin filiform anterior part of a body were found in an appendix. After preliminary examination of patient's feces, oval-shaped eggs with two prominent plugs on the poles were found. What helminth was found during the operation?

- *Ancylostoma duodenale*
- *Enterobius vermicularis*
- *Ascaris lumbricoides*
- *Trichocephalus trichiurus*
- *Strongyloides stercoralis*

Correct answer:

- *Trichocephalus trichiurus*

108. It is well known that some of helminths at the larval stage parasitize in muscles of fish. What helminthiasis may a person get if he eats raw fish?

- Ascariasis
- Taeniasis
- Enterobiasis
- Trichinosis
- Diphyllbothriasis

Correct answer:

- Diphyllbothriasis

109. During dehelminthization of a patient, helminth up to 2 m long was excreted with feces. Its body consists of proglottids, has a small head with hooks and four suckers. What helminth parasitized in the person?

- Dwarf tapeworm
- Unarmed tapeworm
- Dog tapeworm
- Broad tapeworm
- Armed tapeworm

Correct answer:

- Armed tapeworm

110. After dissection of a woman's dead body larvae of helminths – cysticerci were found in the brain tissue. Which helminth did the larvae belong to?

- *Alveococcus multilocularis*
- *Taenia saginata*
- *Echinococcus granulosus*
- *Hymenolepis nana*
- *Taenia solium*

Correct answer:

- *Taenia solium*

Note.

In the book "*Collection of tasks...*", incorrect phrase is present: "cysticercus were found".

III. A patient with complaints of headache and convulsive attacks got to the therapeutic office. During examination of the patient, increased intracranial pressure and pains when pressing eyelids were revealed. From anamnesis, it is known that the patient often uses pork bought in a market. What helminthosis can we talk about?

- Taeniarhynchosis
- Diphyllbothriasis
- Cysticercosis
- Trichinosis
- Hymenolepiasis

Correct answer:

- Cysticercosis

112. This nematode is characterized by direct development without migration. Eggs need in 25–30 days for maturing in the soil. The use of vegetables, berries or drinking water contaminated by mature eggs can lead to infection of a person. What is a species of helminth?

- Whipworm
- Ascarid
- Pinworm
- Dog tapeworm
- Broad tapeworm

Correct answer:

- Whipworm

113. A mother of a 5-year-old girl found filiform helminths 0.5–1 cm long with sharp tips on the child's nightwear. She brought them to a laboratory. Which disease did these parasites cause?

- Ascariasis
- Diphyllbothriasis
- Taeniasis
- Enterobiasis
- Opisthorchiasis

Correct answer:

- Enterobiasis

114. 18 patients in a serious condition (high temperature, edemata of the face and neck, muscle pain) at the same time got to the regional hospital. Two persons soon died. Questioning of patients revealed that all of them are residents of one village, and they were on a family holiday of the fellow villager a week ago. What parasitic disease can be suspected?

- Ascariasis
- Toxoplasmosis
- Trichocephaliasis
- Strongyloidosis
- Trichinosis

Correct answer:

- Trichinosis

115. During examination of a man who has recently come back from Africa, intestinal schistosomiasis is diagnosed. How could the pathogenic organism penetrate into the organism of the patient?

- While eating meat
- While eating fish
- During river swimming
- Through dirty hands
- Through mosquitoes' bites

Correct answer:

- During river swimming

116. A patient came to a doctor complaining of allergy and epigastric pain. Oval-shaped, yellow eggs measuring 135×80 micrometers with an operculum on one of the poles were found in feces during stool examinations. What disease did the patient have?

- Fascioliasis
- Taeniasis
- Opisthorchiasis
- Diphyllbothriasis
- Echinococcosis

Correct answer:

- Fascioliasis

117. Larvae of roundworms (Nematoda) have been found in the sputum of a patient with the provisional diagnosis of pneumonia. What species of the roundworm is this?

- *Fasciola hepatica*
- *Paragonimus ringeri*
- *Ascaris lumbricoides*
- *Taenia solium*
- *Echinococcus granulosus*

Correct answer:

- *Ascaris lumbricoides*

118. Two days after consumption of smoked pork a patient got face and eyelid edemata, gastrointestinal disturbances, abrupt temperature rise, muscle pain. Blood analysis showed full-blown eosinophilia. What helminth could the patient is infected with?

- Ascarid
- Whipworm
- Trichina
- Pinworm
- Hookworm

Correct answer:

- Trichina

119. In some days after the use of smoked pork, a patient had edemata of the face and eyelids, gastrointestinal frustration, sharp temperature increase, and muscular pain. Sharply expressed eosinophilia was found in blood test. What helminth the person could catch through pork?

- *Trichinella*
- Pinworm
- Ascarid
- Whipworm
- Hookworm

Correct answer:

- *Trichinella*

120. A patient complains of pain in the area of his liver. Duodenal intubation revealed yellowish, oval, narrowed at the poles eggs with an operculum at the end. Size of these eggs is smallest among all helminth eggs. Which of the following is the most likely diagnosis?

- Opisthorchiasis
- Diphyllbothriasis
- Teniasis
- Beef tapeworm infection
- Echinococcosis

Correct answer:

- Opisthorchiasis

121. A 35-year-old man was taken to a hospital. He failed to see with one of his eyes. It was known from anamnesis that he used to eat pork. After radiologic examination and serologic findings, he was diagnosed with cysticercosis. What helminth is an agent of cysticercosis?

- *Taenia saginata*
- *Taenia solium*
- *Trichocephalus trichiurus*
- *Trichinella spiralis*
- *Diphyllobothrium latum*

Correct answer:

- *Taenia solium*

122. A patient came to a doctor complaining of general weakness and indigestion. He brought segments of a tapeworm found on his bedclothes. Which of helminths did the patient have?

- *Hymenolepis nana*
- *Taenia solium*
- *Taenia saginata*
- *Diphyllobothrium latum*
- *Echinococcus granulosus*

Correct answer:

- *Taenia saginata*

123. During regular examination of school-children, it was revealed that a 10-year-old girl had asymmetric oval eggs with a larva in the scrape from her perianal folds. What diagnosis should be made?

- Ascariasis
- Trichocephalosis
- Enterobiosis
- Amebiasis
- Ankylostomiasis

Correct answer:

- Enterobiosis

124. A hunter drank raw water from a pond. Which of helminthiasis may the man get?

- Opisthorchiasis
- Fascioliasis
- Paragonimiasis
- Clonorchiasis
- Taeniasis

Correct answer:

- Fascioliasis

125. A group of men applied to a doctor complaining of rising temperature, headache, swelling of face and eyelids, and myalgia. From the history, it became known that all of them were hunters and they often ate meat of wild animals. What is the most likely diagnosis?

- Trichinosis
- Teniasis
- Filariasis
- Taeniarhynchosis
- Cysticercosis

Correct answer:

- Trichinosis

126. It is known that larvae of some helminths, which are causative agents of transmissible helminthoses, can be revealed in the patient's blood only in a certain time of a day. What microfilariae of helminth were found in the fresh blood smears taken from a patient at night?

- Blinding filaria
- Eye worm
- Dragon worm
- Bancroft's filaria
- *Trichinella*

Correct answer:

- Bancroft's filaria

127. A guide of scientific expedition in India was native who always was with his dog. What invasive disease can be transmitted to the participants of the expedition because of contacts with this dog if it is the source of invasion?

- Dicrocoeliasis
- Teniasis
- Echinococcosis
- Fascioliasis
- Paragonimiasis

Correct answer:

- Echinococcosis

128. Eggs of what helminth need soil for development?

- *Opisthorchis felinus*
- *Trichinella spiralis*
- *Ascaris lumbricoides*
- *Diphyllobothrium latum*
- *Enterobius vermicularis*

Correct answer:

- *Ascaris lumbricoides*

129. A 10-year-old child complains of weakness, nausea, irritability. Helminths of white color and 5–10 mm long were found on the underwear. On microscopy of the scrape from perianal folds, achromic ova of the unsymmetrical form were revealed. Indicate helminth that parasitises in the child.

- *Enterobius vermicularis*
- *Ancylostoma duodenale*
- *Trichinella spiralis*
- *Ascaris lumbricoides*
- *Trichuris trichiura*

Correct answer:

- *Enterobius vermicularis*

130. A patient who arrived from Africa had blood in urine. During microscopy of sediment of urine, oval eggs of yellow color with a spine on one of the poles were found. What helminth do they belong to?

- *Opisthorchis*
- *Clonorchis*
- *Paragonimus*
- *Schistosoma*
- *Fasciola*

Correct answer:

- *Schistosoma*

131. Some residents of one village who has identical symptoms: edemata of eyelids and face, severe muscular pain, high temperature, and headache, consulted a doctor. All sick residents were guests at a wedding where dishes were prepared from pork three weeks ago. A doctor suspected trichinosis. What method will help to confirm the diagnosis?

- Analysis of feces on the presence of eggs of helminths
- Blood test
- Analysis of urine
- Analysis of a phlegm
- Immunological

Correct answer:

- Immunological

132. Why drugs dissolving proglottids or causing vomiting as well as manipulations, which can cause reversed peristalsis (placement of a tube), are not be allowed to prescribe for patients with taeniasis?

- The listed factors accelerate development of sexually mature form of helminth
- These factors serve as the reason for autoreinfection
- Such actions of a doctor lead to sensitization of an organism of the patient
- The listed factors help eggs to get to acid environment, lead to dissolving of their envelopes and release of a germ (oncosphere)
- Such actions of a doctor help to delay of helminth in intestines

Correct answer:

- The listed factors help eggs to get to acid environment, lead to dissolving of their envelopes and release of a germ (oncosphere)

133. A patient consulted an urologist about pain during urination. Analysis of his urine, taken in the daytime, revealed eggs with a characteristic sharp point. It is known from anamnesis that the patient has recently returned from Australia. Some relatives living with her had similar symptoms. What helminth was found in this patient?

- *Opisthorchis felinus*
- *Schistosoma mansoni*
- *Schistosoma japonicum*
- *Schistosoma haematobium*
- *Dicrocoelium lanceatum*

Correct answer:

- *Schistosoma haematobium*

134. What is invasive stage of *Echinococcus granulosus*?

- Larva
- Vegetative form
- Encapsulated metacercaria
- Egg
- Cercaria

Correct answer:

- Egg

135. A group of miners with complaints of weight loss, headache, apathy, darkening in eyes, anemia, disorder of digestion, itch of skin, and dermatitis, consulted a doctor. Oval eggs with thin transparent envelope of 55–75 microns × 34–40 microns in size were revealed in excrements of patients. With what helminth miners could be infected?

- Ascarid
- Assassin worm
- Pinworm
- Trichinella
- Whipworm

Correct answer:

- Assassin worm

136. A patient presents with severe indigestion. Ripe and immovable segments of a tapeworm are found in his feces; the uterus of each segment has 7–12 lateral branches. Which helminth does the patient have?

- *Diphyllobothrium latum*
- *Hymenolepis nana*
- *Taenia solium*
- *Taeniarhynchus saginatus*
- *Echinococcus granulosus*

Correct answer:

- *Taenia solium*

137. Name a parasite, development of fluid-filled cysts of which in a human body can lead to strong headache, hearing disorder, vestibular frustration, paresis, and sight loss:

- dwarf tapeworm
- armed tapeworm
- unarmed tapeworm
- rat tapeworm
- *Echinococcus multilocularis*

Correct answer:

- armed tapeworm

138. A 35-year-old man came to a doctor complaining of epigastric pain. As it appeared, the patient was fond of fishing and often ate raw fish. Eggs of helminths were found in patient's feces. Eggs were dark and oval-shaped with an operculum on one of the poles, 30×15 micrometers in size. Which helminthiasis did the patient have?

- Opisthorchiasis
- Paragonimiasis
- Fascioliasis
- Schistosomiasis
- Ancylostomiasis

Correct answer:

- Opisthorchiasis

139. In life cycle of parasites, the unique phenomenon is a free-living stage of the development. For what helminth this phenomenon is characteristic?

- *Strongyloides stercoralis*
- *Trichocephalus trichiurus*
- *Enterobius vermicularis*
- *Dracunculus medinensis*
- *Taeniarhynchus saginatus*

Correct answer:

- *Strongyloides stercoralis*

140. Cardinal difference of *Echinococcus multilocularis* from a dog tapeworm is the shape of a uterus. What form uterus of *Echinococcus multilocularis* has?

- Spherical
- With diverticula
- Rosette-like
- With lateral branches
- Tubular

Correct answer:

- Spherical

141. Over 10 years, a patient suffers from edemata of the lower extremities with their significant increase. During examination in a hospital, sharp disturbance of lymph outflow was established. What diagnosis was made?

- Ancylostomiasis
- Dracunculosis
- Loiasis
- Wuchereriasis
- Onchocercosis

Correct answer:

- Wuchereriasis

142. During dehelminthization, a big piece of helminth with segmented body was found in a patient. Length of a proglottid exceeds its width. In the center of a proglottid, an ovary with three segments is localized. What is a species of helminth?

- *Taenia solium*
- *Schistosoma mansoni*
- *Hymenolepis nana*
- *Paragonimus*
- *Fasciola hepatica*

Correct answer:

- *Taenia solium*

143. By contact with a dog, a man can catch echinococcosis. What is decisive in diagnosis of echinococcosis in the person?

- Roentgenoscopy
- Analysis of feces on the presence of eggs of helminths
- Immunological reactions
- Biopsy
- Blood test

Correct answer:

- Immunological reactions

144. A tourist who was staying in Eastern Asia had been hospitalized to the therapeutic department with suspected pneumonia. During examination of patient's sputum and feces, eggs of *Paragonimus ringeri* were found. With what food could the patient get the pathogenic organism?

- Undercooked crabs
- Unboiled water
- Undercooked fish
- Undercooked pork
- Dirty fruit and vegetables

Correct answer:

- Undercooked crabs

145. A patient with suspicion on a venereal disease, because he had severe pains during urination and blood in urine, consulted a doctor. From anamnesis, it became clear that the patient worked in India on rice fields. During investigation of urine after centrifugation, eggs of helminths with a spine on a back pole were revealed. What disease is diagnosed for the patient?

- Fascioliasis
- Paragonimiasis
- Bilharziasis
- Opisthorchiasis
- Dicrocoeliasis

Correct answer:

- Bilharziasis

146. When opening a liver of a dead person, mass in the form of roundish bubble with a smooth surface 5 cm in diameter was revealed. A large number of small bubbles with transparent colourless content are localized in its cavity. Liver tissue around the bubble is sclerotized. Which of the following is the most likely diagnosis?

- Opisthorchiasis
- Alveococcosis
- Cysticercosis
- Hydatid echinococcosis
- Schistosomiasis

Correct answer:

- Hydatid echinococcosis

- 147.** Choose typical features of flat worms:
- body cavity is absent, space between organs is filled with parenchyma
 - digestive system consists of three parts with an anus
 - nervous system is presented by ganglia and nerve trunks
 - separate sexes; difference in an external structure between males and females exists
 - eggs of all helminths need water for development

Correct answer:

- body cavity is absent, space between organs is filled with parenchyma

148. Patients from one family were admitted to a hospital. Clinical symptoms of a disease are edemata of eyelids and face, fever, eosinophilia, headache, and muscle pain. The disease began for the 10th day after eating sausage and fat, which were sent by relatives from Khmel-nitsky region of Ukraine. What parasitic disease is most probable?

- Trichocephaliasis
- Taeniasis
- Trichinosis
- Echinococcosis
- Taeniarhynchosis

Correct answer:

- Trichinosis

149. One of tourists who came back from travel across Southeast Asia was hospitalized with suspicion on pneumonia because of he had red-brown phlegm with blood impurity, fever and general serious condition. During stay abroad, the tourist often ate crayfish and crabs. During research of phlegm and feces, golden-brown eggs with the size of 90×60 microns were found. What disease is present in the patient?

- Echinococcosis
- Paragonimiasis
- Taeniasis
- Fascioliasis
- Hymenolepiasis

Correct answer:

- Paragonimiasis

150. A patient presents with dermatitis, disorder of digestive tract; blood impurity is found in liquid excrements. Helminthosis was suspected, but the negative result was received during the first investigation of feces. Only after hospitalization of the patient when investigations were performed in the conditions of a hospital (analysis of fresh feces), rhabditiform larvae were found. What diagnosis can be made?

- Hookworm disease
- Trichocephaliasis
- Ascariasis
- Diphyllbothriasis
- Strongyloidosis

Correct answer:

- Strongyloidosis

151. What intermediate host is present in the life cycle of *Wuchereria bancrofti*?

- Rodent
- Dog
- Mosquito
- Man
- Fish

Correct answer:

- Mosquito

152. During necropsy, over 200 small helminths of 4–13 mm in size, which have two suckers on the forward end of a body, and two rosette-like testes on back part, were found in a liver. What diagnosis will be made by a doctor?

- Fascioliasis
- Paragonimiasis
- Clonorchiasis
- Opisthorchiasis
- Dicrocoeliasis

Correct answer:

- Opisthorchiasis

153. A man has worked in an African country for 3 years. A month after his return to Ukraine he consulted an ophthalmologist and complained about eye ache, eyelid edema, lacrimation, and temporary visual impairment. Underneath the eye conjunctiva, the doctor revealed helminths 30–50 mm long with elongated filiform body. What diagnosis might be suspected?

- Enterobiasis
- Trichocephaliasis
- Filariasis
- Diphyllbothriasis
- Ascariasis

Correct answer:

- Filariasis

154. In the perianal folds of a 5-year-old girl, her mother found some white "worms" that caused itch and anxiety in the child. "Worms" were sent to a laboratory. During examination, a physician revealed white filiform helminths 0.5–1 cm long, with pointed ends; some helminths had twisted ends. What is the most likely diagnosis?

- Ascariasis
- Opisthorchiasis
- Diphyllbothriasis
- Teniasis
- Enterobiasis

Correct answer:

- Enterobiasis

155. A male patient has fever and enanthesis. As a result of examination involving serological tests, he has been diagnosed with *Fasciola hepatica*. It was found that the patient had been infected through raw river water. Which stage of *Fasciola* life cycle is invasive for humans?

- Adolescaria
- Ovum
- Miracidium
- Plerocercoid
- Cysticercus

Correct answer:

- Adolescaria

Note.

During exam in 2011, two such answers were present: "adolescaria" and "metacercaria"; both of them are correct. To avoid confusion, we have replaced the answer "metacercaria" by "plerocercoid".

156. A 15-year-old girl was taken to a hospital with inflammation of vermiform appendage. Blood test revealed signs of anemia. Lemon-shaped helminthic eggs with size of 50×30 micron, that have "plugs" on the poles, were revealed in excrements. What species of helminth parasitizes in the patient?

- Hookworm
- Whipworm
- Dog tapeworm
- Pinworm
- Dwarf tapeworm

Correct answer:

- Whipworm

Note.

Another possible variant of correct answer is *Trichuris*.

157. A miner consulted a physician with complaints of general weakness, abdominal pain, and loss of appetite. Scatologic investigation of fresh feces revealed transparent colorless eggs having 4–8 globular blastomeres. Make a diagnosis.

- Ascariasis
- Trichocephaliasis
- Trichinellosis
- Enterobiasis
- Ancylostomiasis

Correct answer:

- Ancylostomiasis

158. A patient with complaints of disorders of digestion and defecation, nausea, and pains in epigastric region that resemble stomach ulcer consulted a doctor. Based on laboratory diagnostics, trichocephaliasis was established. The patient could catch this disease by using:

- dried fish
- milk products
- badly fried beef
- dirty vegetables and fruits
- badly fried pork

Correct answer:

- dirty vegetables and fruits

159. Fever, rash on skin, itch, and inflammation of lymph nodes are observed in a person who visited Indochina several months ago. What helminthosis can be expected?

- Malayan filariasis
- Loiasis
- Onchocercosis
- Dirofilariasis
- Taeniarhynchosis

Correct answer:

- Malayan filariasis

160. Life expectancy of pinworms is about a month only, but people can be ill with enterobiasis for a long time. It occurs owing to:

- uses of unboiled water
- uses of dirty vegetables
- swallowing of larvae with food
- repeated swallowing of eggs from dirty hands
- active penetration of parasites through skin

Correct answer:

- repeated swallowing of eggs from dirty hands

161. A patient with fever, joint pain, nausea, vomiting, diarrhea, and spleen enlargement got to a hospital. The patient worked in Egypt at irrigating fields. A doctor made the diagnosis schistosomiasis. What is the intermediate host in a cycle of development of schistosomes?

- Fishes
- Molluscs
- Crayfish, crabs
- Pigs
- Ants

Correct answer:

- Molluscs

162. Disorders of digestion and nervous system, affected skin, allergic rash, and cough are observed in a patient. Larvae in excrements are revealed in a laboratory. What disease can be suspected in the patient?

- Ascariasis
- Taeniasis
- Cysticercosis
- Strongyloidosis
- Hymenolepiasis

Correct answer:

- Strongyloidosis

163. In one of Polessia¹ regions, there was an outbreak of helminthiasis manifested by cramps and facial edemata. Developed preventive measures in particular included ban for eating infested pork even after heat processing. What helminthiasis was the case?

- Teniasis
- Echinococcosis
- Trichinosis
- Taeniarhynchosis
- Alveococcosis

¹ Name of the wooded district in the eastern European country (Ukraine, Russia etc.).

Correct answer:

- Trichinosis

164. A patient with complaints of edemata of eyelids and conjunctiva, severe pain in the left eye, consulted a hospital. During surgical intervention, roundworm about 60 mm long was removed from her eye. It was established that recently she was in Africa where she went according to the tour. Name a possible vector of the causative agent of this disease.

- Mosquito *Mansonia*
- Buffalo gnats
- Gadfly of the genus *Chrysops*
- Human flea
- Sand fly

Correct answer:

- Gadfly of the genus *Chrysops*

165. A patient came to a clinic with complaints of pain in breast, dyspnea, weakness, and cough with phlegm with blood impurity. From anamnesis, it is known that it was some months in business trip in the Far East and often ate crayfish, crabs. What is the provisional diagnosis?

- Paragonimiasis
- Diphyllbothriasis
- Opisthorchiasis
- Fascioliasis
- Taeniasis

Correct answer:

- Paragonimiasis

166. During additional examination, small asymmetric eggs 26–30 microns long, having lids and small tubercle on the opposite ends, are revealed in excrements of a patient with mechanical jaundice and bright manifestation of allergic reactions. From anamnesis, it is known that the patient living in the Western Ukraine for 20 years works as the log worker in Western Siberia. What is a diagnosis of the disease?

- Fascioliasis
- Dicrocoeliasis
- Paragonimiasis
- Opisthorchiasis
- Nanophyetiasis

Correct answer:

- Opisthorchiasis

167. A woman who came back from India consulted a hospital with complaints of a strong edema of extremities, genitals, and breast. A doctor at poll of the patient found that the woman lived in a region with a large number of mosquitoes. During examination, recurrent lymphadenitis and increased mediastinum nodes were revealed. What group of helminthoses the above-named symptoms are characteristic for?

- Trematodiasis
- Filariases
- Cestodiasis
- Hookworm diseases
- Schistosomiasis

Correct answer:

- Filariases

168. A patient who arrived from Egypt has complaints of pain in the bottom of an abdomen, which become stronger during urination. It was revealed by poll that he often bathed in the river in hot time of day. Impurities of blood and eggs of a parasite with a spine were found in the urine of the patient. What disease can be expected?

- Opisthorchiasis
- Dicrocoeliasis
- Paragonimiasis
- Fascioliasis
- Schistosomiasis

Correct answer:

- Schistosomiasis

169. During dehelminthization, tapeworm of 3.5 m long was driven from intestines of a patient. Mature proglottids of helminth are not mobile and have up to 12 lateral branches of a uterus. In this case it is necessary to conduct additional investigations of the patient to exclude a disease:

- Cysticercosis
- Echinococcosis
- Taeniarhynchosis
- Diphyllbothriasis
- Taeniasis

Correct answer:

- Cysticercosis

170. On the African continent numerous cases of diseases caused by round worms – filariae – are registered. Vectors of these helminths are:

- mosquitoes
- bugs
- tsetse flies
- sand flies
- fleas

Correct answer:

- mosquitoes

171. After examination by means of serological reactions, the diagnosis "opisthorchiasis" was made to a patient with increased temperature and rash on skin. In what way he could catch the disease?

- Through dirty hands
- By using infected fish
- By using unboiled water from a small river, a pond
- By using infected liver
- With help of flies

Correct answer:

- By using infected fish

172. During examination, the diagnosis "metagonimiasis" is made to a patient. What is prevention of this disease?

- Do not use badly processed fish
- Do not use dirty vegetables
- To wash hands
- Do not use badly processed liver of animals
- Do not use badly processed beef

Correct answer:

- Do not use badly processed fish

173. During examination, nanophyctiasis was revealed in the foreign citizen. In what way he could catch?

- When swimming in the river
- By the use in food of meat
- By the use in food of fish
- Through dirty hands
- By stings of mosquitoes

Correct answer:

- By the use in food of fish

174. What is the sequence of developmental stages of *Trichinella* in the human body from the moment of the beginning of an invasion?

1. Migration of larvae through lymph and blood stream. 2. Moving of encapsulated larvae into intestines. 3. Subsidence of larvae in striated muscles. 4. Transformation of larvae into sexually mature forms (males and females) and fertilization. 5. Formation of a capsule around larvae in muscles. 6. Female gives birth to live larvae.

- 4, 6, 1, 3, 2, 5
- 2, 1, 3, 4, 6, 5
- 1, 2, 3, 4, 5, 6
- 3, 4, 5, 6, 2, 1
- 2, 4, 6, 1, 3, 5

Correct answer:

- 2, 4, 6, 1, 3, 5

175. Koreans got used crustaceans for culinary processing in such manner that is unusual for Europeans, – they subject crayfish, crabs and shrimps only to "cold" processing, filling in them with marinade. What trematodiasis can people catch by eating these dishes?

- Fascioliasis
- Dicrocoeliasis
- Opisthorchiasis
- Paragonimiasis
- Intestinal schistosomiasis

Correct answer:

- Paragonimiasis

176. A foreign female student with complaints of feeling of heaviness in her lower abdomen, and small amount of blood being excreted with urine at the end of each urination, consulted an urologist. During microscopy of urine sediment, eggs about 140×70 micron in size, with terminal spine are revealed. What diagnosis can be made by the infectiologist?

- Schistosomiasis
- Opisthorchiasis
- Dicrocoeliasis
- Paragonimiasis
- Fascioliasis

Correct answer:

- Schistosomiasis

177. It is known that in the case of opisthorchiasis and diphyllbothriasis, the invasive stage is located in fish, and analysis of eggs of helminths is used for laboratory diagnostics. However, in the case of diphyllbothriasis, a symptom that is not characteristic for opisthorchiasis exists. What is this symptom?

- Pneumonia
- Anemia
- Nausea
- Increasing of body temperature
- Muscular pains

Correct answer:

- Anemia

178. What sequence of developmental stages of an ascarid from the moment of an invasion of a person? 1. Female lays eggs in intestines. 2. Swallowing of invasive egg. 3. Migration of larvae through the blood system. 4. Development of a larva in the egg, which is in soil. 5. An exit of larva from the egg and its passing through a gut wall to the bloodstream. 6. Swallowing of larvae and their development in intestines into sexually mature forms. 7. Migration of larvae from blood system into airways and nasopharynx.

- 1, 2, 3, 4, 5, 6, 7
- 2, 5, 3, 7, 6, 1, 4
- 6, 7, 4, 3, 1, 2, 5
- 2, 5, 3, 7, 6, 4, 1
- 2, 5, 6, 1, 3, 7, 4

Correct answer:

- 2, 5, 3, 7, 6, 1, 4

179. Schistosomiasis are serious helminthic diseases that are widespread in Africa, Asia, and Latin America. How does a person catch schistosomiasis?

- By water drink
- By the use in food of fish
- By contact with water in the polluted reservoirs
- By sting of insects
- By the use in food of crustaceans

Correct answer:

- By contact with water in the polluted reservoirs

180. A journalist worked in India for a long time. After a while and after arrival of this country, swelling, which is similar to lace and has the bubble filled with necrotic masses on its end, was formed in his subcutaneous tissue of popliteal area of the right extremity. What helminthosis can be suspected in the patient?

- Dracunculosis
- Trichinosis
- Ascariasis
- Enterobiasis
- Opisthorchiasis

Correct answer:

- Dracunculosis

181. Being in Africa, a person noticed that he has blood in urine. During laboratory investigation of day urine, oval yellow eggs with a spine on one of poles were revealed. What helminth they belong to?

- Ascarid
- Urinary schistosome
- Pinworm
- Trichinella
- Liver fluke

Correct answer:

- Urinary schistosome

182. During autopsy of a died person, a pathologist found larvae in tissues of brain. It was established that they belong to one of helminths listed below. Specify it:

- Unarmed tapeworm
- Liver fluke
- Lung fluke
- Cat liver fluke
- Armed tapeworm

Correct answer:

- Armed tapeworm

183. Infection of a person with some helminthoses can occur through the skin. What of the specified helminths can penetrate into human body through the skin?

- Ascarid
- Pinworm
- Armed tapeworm
- Unarmed tapeworm
- Hookworm

Correct answer:

- Hookworm

184. Opisthorchiasis is a disease caused by cat liver (Siberian) fluke. Opisthorchiasis was revealed in a patient. How the causative agent penetrated to the patient's organism?

- By the use in food of the crude or insufficiently thermally processed meat of cattle
- By the use in food of crude or dried fish
- By drink of unboiled water from open reservoirs
- By the use in food of dirty vegetables
- By contact with a sick cat

Correct answer:

- By the use in food of crude or dried fish

185. Flukes belong to the phylum Flat worms. All flukes are parasitic organisms. Diseases which are caused by them, have the general name:

- Filariases
- Cestodiasis
- Nematodosis
- Trematodiasis
- Protozoan diseases

Correct answer:

- Trematodiasis

186. Penetration of helminths into a human body can occur in different ways. What of the listed helminthoses is caused by larvae of a parasite, which actively penetrate into the human body?

- Dracunculosis
- Urinary schistosomiasis
- Trichocephaliasis
- Enterobiasis
- Dicrocoeliasis

Correct answer:

- Urinary schistosomiasis

187. The vast majority of flukes have difficult life cycle part of which passes in water. At what representative of the class Flukes life cycle is not associated with a reservoir?

- Lung fluke
- Cat liver fluke
- Lancet fluke
- Liver fluke
- Urogenital schistosome

Correct answer:

- Lancet fluke

188. A woman complains of headache, muscle pain during swallowing, chewing and rotation of eyes, weakness, increased temperature, edema of eyelids and face. In 1.5–2 months prior to appearance of these symptoms, the woman used pork that did not pass veterinary and sanitary examination. What helminth causes the specified symptoms in the person?

- Ascarid
- *Trichinella*
- Threadworm
- American hookworm
- Assassin worm

Correct answer:

- *Trichinella*

189. Intestinal obstruction, small appetite, nausea, vomiting, and anemia were revealed in a patient. Based on the laboratory diagnostics, diphylobothriasis is established. Infection happened through the use of:

- Crabs and crayfish
- Eggs
- Beef
- Fishes
- Pork

Correct answer:

- Fishes

190. A teenage girl complains of general weakness, disorders of digestion, and diarrheas. During coprology examination, mature proglottids in which the uterus has 7–12 lateral branches are revealed. Establish the diagnosis.

- Taeniasis
- Taeniarhynchosis
- Diphyllbothriasis
- Echinococcosis
- Hymenolepiasis

Correct answer:

- Tachiasis

191. Coprology examination of patient's feces revealed small operculated eggs. It is known from anamnesis that a woman often consumes fish. Based on laboratory analysis, establish what helminth parasitizes in the woman.

- Cat liver fluke
- Blood fluke
- Lung fluke
- Liver fluke
- Lancet fluke

Correct answer:

- Cat liver fluke

192. A child has complaints of headache, disorder of digestion, general weakness, and fast fatigue. During examination, colourless ellipsoidal eggs with threadlike appendages on poles are revealed in excrements. Such signs of eggs are characteristic for:

- armed tapeworm
- unarmed tapeworm
- dwarf tapeworm
- broad tapeworm
- dog tapeworm

Correct answer:

- dwarf tapeworm

193. A patient with signs of spasmodic intestinal obstruction caused by helminths got to a clinic. Name the representative of a class of roundworms, which even in one copy in human intestines is capable to cause such serious condition of the patient.

- Assassin worm
- Human ascarid
- Whipworm
- Threadworm
- Pinworm

Correct answer:

- Human ascarid

194. In the unregulated market, a woman bought a liver of cattle and did not notice that it is invaded by a liver fluke. She roasted a liver not much and served it up. Whether family members can get fascioliasis?

- Those who swallowed the fertilized eggs will get sick
- All family members will get sick
- Those who ate sexually mature individuals will get sick
- Such probability is absent
- Those who ate larvae of a fluke will get sick

Correct answer:

- Such probability is absent

195. In Ukraine, diseases caused by roundworms filariae often occur. A patient with hypodermic and intraocular migration of adult helminths consulted a doctor. These helminths were removed surgically. In what way she was infected with this parasite?

- Transmissible
- Alimentary
- Contact
- By contamination
- Percutaneous

Correct answer:

- Transmissible

196. During a season of maturing and gathering strawberry, all family became ill with pneumonia, which was followed by thorax pain, cutaneous itch, and temperature increase. Larvae of a parasite were found in phlegm of patients. Specify the causative agent of a disease.

- *Enterobius vermicularis*
- *Dracunculus medinensis*
- *Ascaris lumbricoides*
- *Trichocephalus trichiurus*
- *Fasciola hepatica*

Correct answer:

- *Ascaris lumbricoides*

197. During dehelminthization of a patient, long fragments of helminth having segmented structure were revealed. Mature proglottids of 30 by 12 mm were rectangular; closed uterus was in the form of a stem with 17–35 lateral branches. Define a species of helminth.

- *Alveococcus*
- Unarmed tapeworm
- Dog tapeworm
- Dwarf tapeworm
- Armed tapeworm

Correct answer:

- Unarmed tapeworm

198. Geographical distribution of opisthorchiasis coincides with an area of a fresh-water mollusk which is the intermediate host of this trematode. What is a mollusk?

- *Bithynia*
- *Galba*
- *Zebrina*
- *Melania*
- *Bulinus*

Correct answer:

- *Bithynia*

199. During examination, a foreign citizen was found to have loiasis. In what way he could catch the disease?

- When swimming in the river
- Using fish as food
- Through dirty hands
- By stings of gadflies
- By stings of mosquitoes

Correct answer:

- By stings of gadflies

200. Hookworm disease is a serious illness which is followed by exhaustion, anemia, intestines dysfunction, and dermatitis. What contingent of a population is most subject to infection with this helminthosis?

- Health workers
- Employees of meat-processing plants
- Miners
- Hunters
- Employees of pig farms

Correct answer:

- Miners

201. A patient suffered from elephantiasis more than 10 years; this disease is caused by wuchereriasis. Blood for an analysis was taken from the patient for exact diagnosis in what time of day?

- In the morning
- In the afternoon
- In the evening
- At night
- Time does not matter

Correct answer:

- At night

202. Larva of what helminth migrates with blood flow into the liver, heart, and lungs?

- *Ascaris lumbricoides*
- *Alveococcus multilocularis*
- *Echinococcus granulosus*
- *Taenia solium*
- *Taeniarhynchus saginatus*

Correct answer:

- *Ascaris lumbricoides*

203. A patient with complaints of temperature increase and pain in the right hypochondrium consulted a doctor. The patient is fond of fishing and often uses dried fish. What of listed parasites could cause a disease?

- *Fasciola hepatica*
- *Opisthorchis felinus*
- *Dicrocoelium lanceatum*
- *Paragonimus westermani*
- *Clonorchis sinensis*

Correct answer:

- *Opisthorchis felinus*

204. Manifestations of chronic hepatitis and pancreatitis with periodic exacerbations are observed in a patient who worked some years in China. What parasite could cause a disease?

- *Opisthorchis felinus*
- *Fasciola hepatica*
- *Dicrocoelium lanceatum*
- *Clonorchis sinensis*
- *Paragonimus westermani*

Correct answer:

- *Clonorchis sinensis*

205. During dehelminthization of a patient, helminth up to 2 meters long was excreted with feces. Helminth's body is segmented, white colored; length of proglottids exceeds width. Small head with four suckers and hooks is revealed. Define species of helminth.

- Dog tapeworm
- Dwarf tapeworm
- Beef tapeworm
- Pork tapeworm
- *Echinococcus multilocularis*

Correct answer:

- Pork tapeworm

206. A patient consulted with a complaint of general weakness, headache, nausea, and liquid excrements with impurity of mucus and blood. At microscopy of excrements, barrel-shaped eggs of helminth were revealed. Make the provisional diagnosis.

- Ancylostomiasis
- Trichocephaliasis
- Enterobiasis
- Ascariasis
- Necatoriasis

Correct answer:

- Trichocephaliasis

207. A patient with complaints of headache, pain in muscles during movement, weakness, temperature, and edema of eyelids and face came to a hospital. A doctor connects this state with the use of pork bought from individuals. What provisional diagnosis the doctor can make?

- Fascioliasis
- Opisthorchiasis
- Trichinosis
- Taeniasis
- Taeniarhynchosis

Correct answer:

- Trichinosis

208. A person presents with irritation of skin – itch, rashes, depigmentation, and increased lymph nodes. Filariae are found in the eye. The diagnosis "onchocercosis" is made. What bloodsucking insects could become vectors of filariae of the genus *Onchocerca*?

- Gadflies
- Mosquitoes
- Sand flies
- Biting midges
- Buffalo gnats

Correct answer:

- Buffalo gnats

Note.

Buffalo gnats are black flies (*Simulium*).

209. During microscopy of scrape of anal mucosa of a child, asymmetric colorless eggs were found. Which helminth did those eggs belong to?

- *Ancylostoma duodenale*
- *Ascaris lumbricoides*
- *Enterobius vermicularis*
- *Trichocephalus trichiurus*
- *Hymenolepis nana*

Correct answer:

- *Enterobius vermicularis*

210. A shepherd who has tended sheep together with dogs consulted a doctor about pain in his right subcostal area, nausea, and vomiting. Roentgenoscopy revealed a tumour-like mass. What kind of helminthiasis might be suspected?

- Echinococcosis
- Ascariidiasis
- Taeniasis
- Taeniarhynchosis
- Enterobiasis

Correct answer:

- Echinococcosis

211. A patient was revealed to have intestinal impassability, bad appetite, nausea, and vomiting. Anemia associated with lack of B₁₂ vitamin is established. What parasite of human small intestine causes this pathology?

- Dwarf tapeworm
- Dog tapeworm
- Whipworm
- Broad tapeworm
- *Echinococcus multilocularis*

Correct answer:

- Broad tapeworm

212. A patient within three years was treated without any result about considerable decrease in acidity of gastric juice. He was depressed by emergence of proglottids on linen and bed, which moved and crept out of an anus by oneself. Which of the following is the most likely diagnosis?

- Hymenolepiasis
- Opisthorchiasis
- Taeniarhynchosis
- Taeniasis
- Cysticercosis

Correct answer:

- Taeniarhynchosis

213. A patient has been preliminarily diagnosed with paragonimiasis. This disease is caused by lung flukes. The causative agent entered into the patient's body through:

- eating unwashed vegetables
- eating half-cooked lobsters and crabs
- contact with an infected cat
- eating half-cooked or dried fish
- drinking raw water from open reservoirs

Correct answer:

- eating half-cooked lobsters and crabs

214. Mother with a child consulted a pediatrician; she has found on child's linen small white worms of threadlike form with the pointed ends, about 1 cm long. From the story of mother: the child sleeps uneasily, in a dream gnashes teeth, often scratches anal area. Define a type of helminth:

- pinworm
- ascarid
- whipworm
- armed tapeworm
- assassin worm

Correct answer:

- pinworm

215. A person who has a cat with opisthorchiasis consulted a family doctor. He wants to know how members of his family can catch this disease?

- Through badly fried thoroughly meat
- Through fish
- Through dirty hands
- Through dirty vegetables
- By contact with a cat

Correct answer:

- Through fish

216. A patient with complaints of pain in eyes and partial loss of sight addressed to the ophthalmologic office. Larvae reminding a form of rice grain were revealed under retina. What parasitic disease is revealed in this patient?

- Dicrocoeliasis
- Loiasis
- Taeniarhynchosis
- Hymenolepiasis
- Cysticercosis

Correct answer:

- Cysticercosis

217. A patient consulted a physician about chest pain, cough, and fever. Roentgenography of lungs revealed eosinophilic infiltrates that were found to contain larvae. What kind of helminthiasis are these presentations typical for?

- Trichinosis
- Echinococcosis
- Ascariasis
- Fascioliasis
- Cysticercosis

Correct answer:

- Ascariasis

218. A miner with complaints of rash on a body, loss of appetite, abdominal swelling, pain in a duodenum, frequent defecation, and vertigo consulted a doctor. Analysis of excrements and contents of a duodenum on the presence of eggs were carried out, and eggs covered with transparent envelope and 4–8 germinal cells were found. What disease is possible in the patient?

- Hymenolepiasis
- Enterobiasis
- Trichocephaliasis
- Strongyloidosis
- Ancylostomiasis

Correct answer:

- Ancylostomiasis

219. In the vermiform appendix, white helminth was found, 40 mm long with thin filiform forward end. Excrements contained oval eggs with plugs at the poles. Determine the kind of helminth.

- Ascarid
- Hookworm
- Seatworm
- Threadworm
- Whipworm

Correct answer:

- Whipworm

220. The provisional diagnosis was made to a patient: paragonimiasis. This disease is caused by lung fluke. The causative agent entered into the patient's organism during:

- the use in food of dirty vegetables
- contact with a sick cat
- the use in food of half-baked or sun dried fish
- the use in food of half-baked crayfish and crabs
- drink of unboiled water from open reservoirs

Correct answer:

- the use in food of half-baked crayfish and crabs

221. A man visited Lebanon. Soon after return, he felt pain and heaviness in the perineum and suprapubic region. On examination, he was diagnosed with urogenital schistosomiasis. In what way could he become infected?

- By swimming in contaminated water
- By eating unwashed fruit and vegetables
- By eating insufficiently salted fish
- By eating undercooked meat of cattle
- By eating undercooked meat of crayfish and crabs

Correct answer:

- By swimming in contaminated water

222. A fisherman caught fish from the river, slightly roasted it on a fire and ate, almost half-baked. In some weeks, signs of damage of a liver and a pancreas appeared. Laboratory analysis of excrements showed the presence of small eggs of helminth. What trematodosis did the fisherman possibly catch?

- Dicrocoeliosis
- Opisthorchiasis
- Schistosomiasis
- Fascioliasis
- Paragonimiasis

Correct answer:

- Opisthorchiasis

223. In case of some helminthiasis, an affected person can detect helminth himself because mature segments of the causative agent are able to crawl out of anus. This is typical for the following disease:

- Pork tapeworm infection
- Hymenolepiasis
- Beef tapeworm infection
- Bothriocephaliasis
- Echinococcosis

Correct answer:

- Beef tapeworm infection

224. Short-term pneumonia is revealed in a patient. Migration of larvae of what helminth can lead to this disease?

- Whipworm
- Ascarid
- Pinworm
- Dwarf tapeworm
- *Echinococcus multilocularis*

Correct answer:

- Ascarid

225. Malignant anemia was found in a patient. Therapy by intramuscular inoculation of B₁₂ vitamin gave short unstable effect of improvement of blood composition. The patient is an inveterate fisherman and often uses fish that he caught and dried. What diagnosis can be assumed?

- Enterobiosis
- Diphyllbothriasis
- Paragonimiasis
- Ancylostomiasis
- Trichuriasis

Correct answer:

- Diphyllbothriasis

226. A concerned mother addressed a pediatrician with complaints of her child suffering from frequent stomachaches, loss of appetite, nausea, constipation. Feces analysis detected rounded eggs with double envelopes and oncospheres localized in their centers. The child was diagnosed with hymenolepiasis. Specify the type of infection transmission, considering that invasion intensity was extremely high:

- alimentary
- airborne
- autoinvasion
- contamination
- immediate contagion

Correct answer:

- autoinvasion

Note.

Another variant of incorrect answer:

- sexual

227. A patient with complaints of weakness, nausea, and anemia addressed to a doctor. He specified that used in food fresh-salted caviar 3 months ago. With what helminthosis the person could get sick?

- Dicrocoeliosis
- Diphyllbothriosis
- Trichinosis
- *Taenia saginata* infection
- *Taenia solium* infection

Correct answer:

- Diphyllbothriosis

228. Fragments of helminth were found in feces of a patient after drug treatment. These fragments had a tape-like segmented structure. The width of segments exceeded their length. There was a rosette-shaped uterus in the centre of the segment. Which helminth did the patient have?

- *Alveococcus multilocularis*
- *Taenia solium*
- *Diphyllobothrium latum*
- *Taeniarrhynchus saginatus*
- *Hymenolepis nana*

Correct answer:

- *Diphyllobothrium latum*

229. During dehelmintization, a 3.5-meter-long tapeworm was excreted from the patient's intestine. There are 4 suckers and hooks on the scolex of this helminth. Mature segments of tapeworm are immobile and have up to 12 lateral uterine branches. What is a disease?

- Opisthorchiasis
- Echinococcosis
- Beef tapeworm infection
- Pork tapeworm infection
- Diphyllbothriosis

Correct answer:

- Pork tapeworm infection

Note.

Pork tapeworm infection is the same as teniasis solium.

230. A shepherd, who tended to the flock of sheep with his dogs, gradually developed pain in the chest and bloody expectorations. X-ray revealed spheric helminth larvae in the patient's lungs. Specify helminth that could be the causative agent of this disease:

- *Hymenolepis nana*
- *Diphyllobothrium latum*
- *Fasciola hepatica*
- *Taenia solium*
- *Echinococcus*

Correct answer:

- *Echinococcus*

231. Eggs of liver fluke are found in patient's excrements; however, a doctor did not hurry to make a diagnosis and suggested to repeat the analysis after exclusion of beef liver from the patient's diet. What led the doctor to make such decision?

- Possible phenomenon of transit eggs
- Absence of symptoms of invasion
- Uncertainty in analysis accuracy
- Insufficient qualification of a laboratory assistant
- Mistrust of the method of investigation

Correct answer:

- Possible phenomenon of transit eggs

Note.

During exam in 2017, the term "transient eggs" was used; also, the phrase "Lack of trust towards the investigation method" was present (we changed it to "Mistrust of the method of investigation").

232. A patient with the provisional diagnosis 'diphyllobothriosis' came to a hospital. Usage of which products could cause this disease?

- Beef
- Milk and eggs
- Fish
- Vegetables and fruits
- Pork

Correct answer:

Fish

233. A man came to hospital in a severe condition: facial edemas, myalgia, high temperature, and respiratory distress. Case history revealed that the patient's family consumes untested pork regularly. What helminth can be the cause of such symptoms?

- *Trichinella spiralis*
- *Strongyloides stercoralis*
- *Diphyllobothrium latum*
- *Taeniarhynchus saginatus*
- *Ancylostoma duodenale*

Correct answer:

- *Trichinella spiralis*

234. Cases of infection with *Alveococcus* became frequent among dwellers of the taiga village who are engaged in berries harvesting. What is the source of invasion in this case?

- Rodents
- Sick people
- Birds
- Foxes
- Fish

Correct answer:

- Foxes

ARTHROPODS

I. What is a characteristic of arthropods?

- Secretory system consists of protonephridia
- Chitinous cover is an exoskeleton
- Blood system is absent
- Respiratory system is absent
- They have nonsegmented cylindrical body

Correct answer:

- Chitinous cover is an exoskeleton

2. A sick man with high temperature and a lot of tiny wounds on the body has been admitted to a hospital. Lice have been found in folds of his clothing. What disease can be suspected?

- Scabies
- Malaria
- Plague
- Tularemia
- Epidemic typhus

Correct answer:

- Epidemic typhus

3. A geologist who is in the center of spring-summer encephalitis has found on his body a small being from the phylum Arthropoda. What can be dangerous as an encephalitis vector?

- Imago of *Ixodes* tick
- Clothes louse
- Bed bug
- Black cockroach
- Imago of a tick of the family Gamasoidea

Correct answer:

- Imago of *Ixodes* tick

4. Two cows died from anthrax in a settlement, and in a week one 14-year-old child got sick. What is the most probable way he invaded?

- Through contact with a dog which protected herd
- Through the food contaminated by typhoid and screwworm flies
- Through a sting of a dog flea
- Through stings of lice
- Through a sting of *Stomoxys* fly

Correct answer:

- Through a sting of *Stomoxys* fly

5. Blood-sucking jumping insects that are small (2–3 mm) and flattened laterally are revealed indoors. Their worm-shaped larvae develop in floor cracks. Causative agents of what human disease can be most likely revealed in the digestive system of these insects?

- Helminthoses
- Sleeping sickness
- Plague
- Chagas' disease
- Relapsing fever

Correct answer:

- Plague

6. A patient came to a doctor complaining of itching between fingers and on the abdomen, which intensified at night. After examination of his skin, rash and thin grey stripes were found. What pathogenic organism could produce such symptoms?

- *Ixodes ricinus*
- *Sarcoptes scabiei*
- *Ornithodoros papillipes*
- *Dermacentor pictus*
- *Ixodes persulcatus*

Correct answer:

- *Sarcoptes scabiei*

7. On the head of a worker of a livestock farm, big wound with necrotic tissue is present. During management of the wound, worm-shaped larvae of 1 mm in size were removed. What disease can be diagnosed?

- Myiasis
- Demodicosis
- Phthiriasis
- Scabies
- Typhus

Correct answer:

- Myiasis

8. A patient complains of strong itch. Scratches and small wounds are present on his body. In business trip, he did not change linen, whitish insects having three pairs of extremities with claws are found in seams of linen; their body is flattened from a back. Define a species of a parasite:

- itch mite
- bed bug
- clothes louse
- human flea
- *Wohlfahrtia*

Correct answer:

- clothes louse

9. In Africa, damages of an eyeball which are caused by roundworms of the genus *Onchocerca* are registered among seasonal workers. Against representatives of what genus of flies it is necessary to take measures for elimination?

- *Anopheles*
- *Phlebotomus*
- *Pediculus*
- *Pulex*
- *Simulium*

Correct answer:

- *Simulium*

10. Infection of human with epidemic typhus occurs:

- during a sting of a tick through saliva
- during a sting of lice through saliva
- during a sting of a bed bug through saliva
- during rubbing in of lice excrements into the sting place
- during a sting of a mosquito through saliva

Correct answer:

- during rubbing in of louses excrements into the sting place

11. A woman consulted a doctor with complaints of suppuration on hairy part of the head, intolerable eyeball pains. From anamnesis, it became clear that the woman worked in the field where flies with dark spots on an abdomen flew; some of them crept in a nose and ears during her dream. Larvae of what fly could cause this disease?

- *Wohlfahrtia*
- Stable fly
- Gadfly
- Tsetse fly
- Flesh fly

Correct answer:

- *Wohlfahrtia*

12. In blood of a person on whom pubic louses parasitize, spirochetes – causative agents of relapsing fever were found. An expert claims that this species of louses has no relation to infection of the person with relapsing fever, because:

- causative agents of this disease are transmitted by clothes louse only
- causative agents of this disease are transmitted by clothes or head louses
- causative agents of this disease are transmitted by head louse only
- causative agents of this disease are distributed by mechanical vectors only
- it is a disease of "dirty hands"

Correct answer:

- causative agents of this disease are transmitted by clothes louse only

Note.

Sometimes one can read that head louse transmits relapsing fever and epidemic typhus, but this opinion is not correct.

13. A patient complains of skin itch, especially between fingers, in inguinal creases, and on the lower abdomen. Examination of these regions revealed there some small vesicles. Laboratory diagnostics allowed to establish that this condition had been caused by a representative of Arthropoda. Specify the disease caused by this arthropod:

- Scabies
- Demodicosis
- Pediculosis
- Myiasis
- Dermatotropic leishmaniasis

Correct answer:

- Scabies

Note.

During exam in 2006, incorrect word "miasis" was used.

14. What medical importance kissing bug *Triatoma* has?

- Plague vector
- Typhus vector
- Vector of American trypanosomosis
- Vector of relapsing fever
- Saliva is poisonous, stings are painful, and this bug is not a vector of diseases

Correct answer:

- Vector of American trypanosomosis

15. Children from kindergarten went to the country in summer. There were many bird's nests over windows of sleeping rooms. After some days children started complaining of an itch. During examination, big bright red spots were found on children bodies, and blood drops on underclothes. What insects bit children?

- Bugs
- Mosquitoes
- Cockroaches
- Sand flies
- Spiders

Correct answer:

- Bugs

16. In some regions of the world, the cases of malaria became more frequent. What insect is a carrier of the agent of malaria?

- *Culex* mosquito
- *Phlebotomus* sandfly
- *Simulium* black fly
- *Anopheles* mosquito
- *Aedes* mosquito

Correct answer:

- *Anopheles* mosquito

17. During microscopy of material from centers of lesion of a patient suffering from eels and inflammatory changes of face skin, live arthropods of spherical form with 4 pairs of truncated extremities are found. The cause of such state can be:

- scabies
- allergy
- myiasis
- dermatitis
- pediculosis

Correct answer:

- scabies

18. What arthropods are poisonous for human?

- *Stomoxys calcitrans*
- *Dermacentor pictus*
- Black widow
- Solpugids
- *Ixodes ricinus*

Correct answer:

- Black widow

19. After examination, a patient was diagnosed with tick-borne relapsing fever. How was he infected?

- By means of a soft tick's bite
- By means of an itch mite's bite
- By means of a hard tick's bite
- By means of a housefly mite's bite
- By means of a dog tick's bite

Correct answer:

- By means of a soft tick's bite

20. Grey insects measuring 1–1.2 mm with a short wide body covered with setae were observed on the pubis of some boys during medical checkup. What insects were these?

- *Sarcoptes scabiei*
- *Pulex irritans*
- *Pediculus humanus capitis*
- *Cimex lectularius*
- *Phthirus pubis*

Correct answer:

- *Phthirus pubis*

21. Typhoid fly has great epidemiological value in distribution of intestinal diseases (typhoid, cholera, dysentery). It is explained by fact that:

- places of egg laying by flies are decaying substrata, human excrements, humus
- female fly lays until 160 eggs
- mouth of typhoid fly is the licking and sucking
- flies that left pupae, pass through a garbage layer with thickness up to 30 cm
- larva is thermophilic, it migrates there, where temperature is 40–46°C

Correct answer:

- places of egg laying by flies are decaying substrata, human excrements, humus

22. A patient with scratches on the head came to a hospital. During examination insects of gray color, 3 mm long, with a body flattened in the dorsoventral direction and three pairs of extremities are found. Which of the following is the most likely diagnosis?

- Scabies
- Invasion of skin by bugs
- Pediculosis
- Demodicosis
- Allergy

Correct answer:

- Pediculosis

23. During tree felling, workers destroyed nests of rodents when rooted out stubs. Ticks crept out from that places and attacked several workers during their rest. Shortly those workers got sick. Causative agents of what diseases can be transmitted by these ticks?

- Plague
- Endemic typhus
- Anthrax
- Epidemic relapsing fever
- Scabies

Correct answer:

- Endemic typhus

24. A patient, who was in business trip in Brazil for long time, got to a hospital. In preparations of blood and cerebrospinal fluid, trypanosomes were revealed. What arthropod could infect him with this parasite?

- Buffalo gnats
- Tsetse fly
- Mosquito
- Kissing bug
- Flea

Correct answer:

- Kissing bug

25. In the Crimea, papataci fever is distributed (temperature 40° , pains in muscle, joints, and eyes; headache, change in blood cells count are observed for 2–5 days). What insects carry a disease?

- Buffalo gnats
- Gadflies
- Mosquitoes
- Sand flies
- Typhoid and screwworm flies

Correct answer:

- Sand flies

26. After examination, a patient was diagnosed with Russian spring-summer encephalitis. How was the patient infected?

- By means of itch mite's bite
- By means of malaria mosquito's bite
- By means of soft tick's bite
- By means of sand fly's bite
- By means of hard tick's bite

Correct answer:

- By means of hard tick's bite

27. What insects are capable to distribute cutaneous and visceral leishmaniases?

- Sand flies of the genus *Phlebotomus*
- *Anopheles* mosquitoes
- buffalo gnats of the genus *Simulium*
- Biting midges of the family Ceratopogonidae
- Gadflies of the family Tabanidae

Correct answer:

- Sand flies of the genus *Phlebotomus*

28. A 40-year-old man who lives in a pisewalled house came to a laboratory. He found dark-grey arthropods with a long oval body and a somewhat pointed front end in the wall chink. The mouth apparatus of the arthropod were placed in the pit of abdomen surface. The arthropod had 4 pairs of ambulatory legs, sexual opening was placed at the level of the first pair of legs. What arthropod is it?

- *Ixodes ricinus*
- *Ixodes persulcatus*
- *Ornithodoros papillipes*
- *Sarcoptes scabiei*
- *Dermacentor nuttali*

Correct answer:

- *Ornithodoros papillipes*

29. Grey arthropods measuring 3 mm in length with three pairs of legs were found on a patient's head. Arthropods had deep incisures on each side of the body. What arthropods did the patient have?

- *Cimex lectularius*
- *Sarcoptes scabiei*
- *Pediculus humanus capitis*
- *Pulex irritans*
- *Demodex folliculorum*

Correct answer:

- *Pediculus humanus capitis*

30. In laboratories of research institute owing to insufficient disinfection of research materials of human ectoparasites, there were live certain stages of their development. What stages of the listed arthropods are epidemiologically dangerous?

- Nits of clothes louse
- Eggs of itch mite
- Eggs of dog tick
- Nits of pubic louse
- Larvae of rat flea

Correct answer:

- Eggs of dog tick

31. A patient who came to reception complains of itch between fingers. A doctor made a diagnosis – scabies. What arthropod can serve as the cause of this disease?

- Dog tick
- Taiga tick
- *Dermacentor*
- Itch mite
- *Ornithodoros*

Correct answer:

- Itch mite

32. A doctor revealed tissues injury on patient's scalp with localized suppurations and diagnosed his disease as myiasis. This infestation is caused by larvae of the following insect:

- malarial mosquito
- kissing bug
- *Wohlfahrtia* fly
- sand fly
- stable fly (*Stomoxys calcitrans*)

Correct answer:

- *Wohlfahrtia* fly

Note.

During the exam in 2010 and in the site <http://testcentr.org.ua/> (2013), the fourth answer was "mosquito", but in appropriate Russian question, answer was "sand fly" (*Phlebotomus*). Answers "mosquito" and "malaria mosquito" are very similar (bad variants). During the exam in 2004, such answers were present: house fly, tsetse fly, stable fly, *Wohlfahrtia magnifica*, and triatomic bug.

33. During examination, spots of blue color with a steel shade and traces of scratches were revealed in inguinal area of the patient's body. Arthropods of 1–1.5 mm in size were removed from hair of a pubic zone. Their body is short and flattened in the dorsoventral direction, with three pairs of extremities. Define a species of a parasite:

- pubic louse
- itch mite
- clothes louse
- head louse
- flea

Correct answer:

- pubic louse

34. A child complained of itching in occipital and temporal parts of the head. After examination of his head, surface ulcers on head skin and white nits on hairs were found. What arthropod was parasitizing on the child's head?

- *Wohlfahrtia* fly
- Body louse
- Human flea
- Head louse
- Crab louse

Correct answer:

- Head louse

Note.

Another variant of incorrect answer:

- Screwworm fly

35. There are many arthropods that are mechanical and specific vectors of causative agents of diseases as well as causative agents of diseases. An arthropod causing human disease is:

- dog tick
- taiga tick
- *Dermacentor*
- *Ornithodoros*
- itch mite

Correct answer:

- itch mite

36. What of the listed ticks is capable to transmit causative agents of tularemia?

- Taiga tick
- *Ornithodoros*
- Itch mite
- Dog tick
- Follicle mite

Correct answer:

- Dog tick

37. Spirochetes and rickettsia are accumulated in different parts of a louse's body. How a person is infected with relapsing fever?

- By crush of lice and rubbing in their hemolymph in the place of bite
- During sting of lice with their saliva
- By rubbing in of excrements in places of scratches
- By penetration of causative agents into blood through mucous membranes of a nose
- By penetration of causative agents into blood through a conjunctiva of eyes

Correct answer:

- By crush of louses and rubbing in their hemolymph in the place of bite

38. A patient came to a dermatologist complaining of ulcers which appeared on his face and neck skin surface. After laboratory examination of ulcers, mobile wormlike parasites were found. Specify a causative agent that caused this disease.

- Follicle mite
- Itch mite
- Human flea
- Bedbug
- Larva of *Wohlfahrtia* fly

Correct answer:

- Follicle mite

39. A crimson papule has appeared on the face of a student who came back from Turkmenistan, and this papule has turned into an ulcer in 10 days. Cutaneous leishmaniasis is revealed in the patient. What representative of arthropods is a carrier of the causative agent of this disease?

- *Wohlfahrtia*
- Sand fly
- Tsetse fly
- Malaria mosquito
- Human flea

Correct answer:

- Sand fly

40. A housefly got to a hospital office. What causative agents of diseases it can mechanically transmit?

- Cholera, dysentery, typhoid fever
- Relapsing fever
- Typhus
- Encephalitis
- Leishmaniasis

Correct answer:

- Cholera, dysentery, typhoid fever

41. Rodents are reservoirs of causative agents of leishmaniasis – diseases that are natural and transmissible. If a person got to leishmaniasis natural focus, he needs to avoid stings of:

- fleas
- sand flies
- ticks
- mosquitoes
- blood-sucking flies

Correct answer:

- sand flies

42. A homeless person with wounds on the head is hospitalized in city polyclinic. During management of wound, larvae of insects were revealed. Choose an insect which larvae parasitize on a body of people:

- mosquito
- flea
- louse
- *Wohlfahrtia*
- sand fly

Correct answer:

- *Wohlfahrtia*

43. In laboratories of rickettsial diseases, volunteers as source of food for lice are used for studying biology of the causative agent of typhus. Feeding of lice that are infected with the causative agent of typhus occurs through a special grid; lice are placed into cells of this grid. Putting a grid to a femur of a donor, lice are given the chance to suck his blood; however, infection of a person with typhus thus does not happen. It is explained by:

- resistance of a donor
- lack of an invasive stage of the causative agent
- lack of the mechanism of infection – rubbing in of excrements in injured skin
- lack of enough causative agent
- different antigenic structure of the causative agent and donor

Correct answer:

- lack of the mechanism of infection – rubbing in of excrements in injured skin

44. Littered, uncleaned cellars and attics often serve as habitats of homeless cats. After visit of such room, a girl felt many stings and intolerable itch in feet. What arthropods used this girl as the source of food?

- Fleas
- Louses
- Ticks
- Mosquitoes
- Bugs

Correct answer:

- Fleas

45. During routine inspection of schoolchildren, a doctor has found white bright eggs that are densely glued to head hair of several pupils of one class. What representative is the causative agent of this disease?

- Head louse
- Human flea
- Pubic louse
- Bed bug
- Typhoid fly

Correct answer:

- Head louse

46. A patient has acne and inflammatory alterations on facial skin. Microscopic examination of scrapings from affected areas has revealed living porrect vermiform arthropods 0.2–0.5 mm large with four pairs of short extremities in the front part of their bodies. What is the laboratory diagnosis?

- Pediculosis
- Myiasis
- Scabies
- Demodicosis
- Phthiriasis

Correct answer:

- Demodicosis

47. What arthropods suck blood?

- Ticks of the family Ixodidae
- *Sarcoptes scabiei*
- Scorpions
- House flies
- Spiders

Correct answer:

- Ticks of the family Ixodidae

48. A patient with suspicion on epidemic typhus was admitted to a hospital. Some arachnids and insects have been found in his flat. Which of them may be a carrier of the pathogen of epidemic typhus?

- Lice
- Spiders
- Houseflies
- Bedbugs
- Cockroaches

Correct answer:

- Lice

49. During examination of a patient who lived in Central Asia, the diagnosis – tick-borne relapsing fever was made. The causative agent of this disease could get to the patient's organism through a sting of:

- dog tick
- *Ornithodoros*
- *Dermacentor*
- taiga tick
- malaria mosquito

Correct answer:

- *Ornithodoros*

50. While on holiday in the countryside, a boy found a spider with following morphological characteristics: a body length of 2 cm, round black abdomen with two rows of red dots on its dorsal side; four pairs of segmented extremities covered with tiny black hairs. Identify this arthropod:

- Solpugid
- Karakurte (*Latrodectus*)
- Scorpion
- Mite
- Tarantula

Correct answer:

- Karakurte (*Latrodectus*)

51. A patient consults a doctor about abdominalgia, vomiting, and disturbance of defecation. The doctor made the diagnosis of intestinal myiasis which arises when larvae of typhoid fly and little housefly get to intestines. How an infection with intestinal myiasis occurs?

- Due to non-observance of rules of food storage
- By the use of unboiled water
- By the use of insufficiently fried fish
- When using fresh-salted caviar
- Due to non-observance of rules of personal hygiene

Correct answer:

- Due to non-observance of rules of food storage

52. Parasitologist M. I. Latyshev for the first time carried out successful attempt of experimental solution of a question concerning vectors of causative agents of infectious diseases in Central Asia. He voluntarily fed on himself several *Ornithodoros* ticks which were gathered in the house where patients with infectious diseases were present. What disease the courageous researcher caught?

- Tick-borne typhus
- Japanese encephalitis
- Tick-borne relapsing fever
- Russian spring-summer encephalitis
- Anthrax

Correct answer:

- Tick-borne relapsing fever

53. A young man has following symptoms: purulent acne on the face; wrinkled, hyperemic skin; eyebrows and eyelashes are falling out. A doctor has made a diagnosis of demodicosis (demodectic mange). What is prevention of this disease?

- Protection from mite bites
- Usage of repellents
- Maintaining personal hygiene
- Processing of rooms with insecticides
- Careful check of donor's blood during hemotransfusion

Correct answer:

- Maintaining personal hygiene

54. In the region where natural disaster (tsunami) took place, a threat of outbreak of plague appeared. What arthropods this epidemic is associated with?

- Head louse
- Typhoid fly
- Clothes louse
- Sand fly
- Human flea

Correct answer:

- Human flea

55. A man who returned from spring research expedition has weakness, nausea, sleep disorder, increasing of body temperature, symptoms of paralysis of muscles of neck and shoulder girdle. During laboratory diagnostics, the diagnosis – Russian spring-summer encephalitis is made. What way of infection of the patient?

- Transmissible
- Percutaneous
- Peroral
- Sexual
- Contact and household

Correct answer:

- Transmissible

56. There are causative agents of invasive diseases among ticks. What of diseases listed below is caused by the representative of ticks?

- Taiga encephalitis
- Tularemia
- Tick-borne typhus
- Scabies
- Brucellosis

Correct answer:

- Scabies

57. Among representatives of the family Muscidae there are mechanical and biological vectors of causative agents of diseases. A biological vector of the causative agent of invasive disease is:

- tsetse fly
- blue flesh fly
- stable fly
- house fly
- *Wohlfahrtia*

Correct answer:

- stable fly

58. Some of insects can parasitize either at imaginal or at larval stage of development. What of insects parasitizes at larval stage?

- Malaria mosquito
- Sand fly
- Tsetse fly
- Stable fly
- *Wohlfahrtia*

Correct answer:

- *Wohlfahrtia*

59. A patient presents with open facial wound with undermined edges; tissue necrosis with gradually developing partial gangrene that nearly reaches the bone tissue is observed. Due to detailed examination, live larvae are revealed in the wound. The patient is diagnosed with tissue myiasis. What dipteran larvae caused this disease?

- *Glossina palpalis*
- *Musca domestica*
- *Wohlfahrtia magnifica*
- *Phlebotomus papatasi*
- *Stomoxys calcitrans*

Correct answer:

- *Wohlfahrtia magnifica*

60. During expedition to Central Asia, students found an invertebrate animal 7 cm long. The body is divided into a cephalothorax with 4 pairs of walking legs and segmented abdomen. In the last tail segment, poisonous gland is present that opens at the end of a sting. The animal is a night predator and poisonous for human. This animal belongs to such group:

- spiders (Aranei)
- ticks (Acarina)
- solpugids (Solifugae)
- scorpions (Scorpiones)
- fleas (Siphonaptera)

Correct answer:

- scorpions (Scorpiones)

61. A pensioner, who did not happen in taiga but often worked for himself at dacha, consulted a hospital in Vladivostok. He denied the sting of a tick and he was not vaccinated. He considered himself as a patient since when he had headaches, high temperature, and phenomena of left-side hemiparesis. He appealed for the help for the 10th day of the disease. During examination of a body of the patient, a doctor noticed erythema in armpits about 5 cm in the diameter with a sting trace. Which of the following is the most likely diagnosis?

- Demodicosis
- Tick-borne encephalitis
- Scabies
- Malaria
- Trypanosomosis

Correct answer:

- Tick-borne encephalitis

62. In armpits of a patient, small (1–1.5 mm), dorsoventrally flattened, wingless, blood-sucking insects are found. Their larvae develop in armpits too. What disease is caused by these insects?

- Sleeping sickness
- Chagas' disease
- Plague
- Phthiriasis
- Relapsing fever

Correct answer:

- Phthiriasis

63. Mother of a boy who had recently returned from a summer camp found some small whitish insects up to 3 mm long on the child's clothing. Specify the parasite.

- *Phthirus pubis*
- *Pulex irritans*
- *Pediculus humanus humanus*
- *Cimex lectularius*
- *Blattella germanica*

Correct answer:

- *Pediculus humanus humanus*

64. A patient with complaints of disorder of digestion, weakness, vomiting, pains in intestines consulted a gastroenterologist. During analysis of gastric contents larvae of botflies are revealed, during analysis of a mucous membrane of a stomach its inflammation is revealed. What disease is most probable for this patient?

- Cutaneous myiasis
- Intestinal myiasis
- Phthiriasis
- Wuchereriasis
- Trypanosomosis

Correct answer:

- Intestinal myiasis

65. On medical examination, insects of 2–3 mm in size of gray color with deep cuts on each side of a body were revealed on the head of some patients. What are these ectoparasites?

- Ticks
- Head louses
- Fleas
- Bed bugs
- Clothes louses

Correct answer:

- Head louses

66. In fur farms and zoos, fleas quite often bite workers who are looking after animals. Causative agents of what disease can they transmit?

- Cholera
- Relapsing fever
- Plague
- Dysentery
- Typhus

Correct answer:

- Plague

67. Among insects that can be in housing constantly or temporarily, specific and mechanical carriers of causative agents of diseases exist. What arthropod among listed below is a mechanical carrier of the causative agent of diseases?

- Human flea
- Head louse
- Bed bug
- German cockroach
- Clothes louse

Correct answer:

- German cockroach

68. Medical examination of some youths revealed in their axillary regions grey insects 1.0–1.5 mm large, with short broad body covered with hairs. What insects were revealed?

- Flea
- Head louse
- Bed bug
- Pubic louse
- Itch mite

Correct answer:

- Pubic louse

Note.

Another variant of incorrect answer:

- Clothes louse

69. According to the data of WHO, about 250 millions of an Earth population fall ill with malaria. This disease is mostly spread in tropical and subtropical regions. Range of its spread falls into the areal of the following mosquitoes:

- *Anopheles*
- *Mansonia*
- *Aedes*
- *Culex*
- *Culiseta*

Correct answer:

- *Anopheles*

70. After thorough examination, a patient who had returned from Central Asia to Ukraine was diagnosed with spring-summer encephalitis. Its pathogen might have entered the body through the bite of the following arthropod:

- dog louse
- mosquito
- itch mite
- *Ornithodoros papillipes*
- taiga tick

Correct answer:

- taiga tick

Note.

During exam for students studying stomatology (in 2013), the answer "dog louse" was indicated as correct one, but this is a mistake! Dog louse *Linognathus piliferus* does **not** transmit encephalitis.

71. Workers consulted a hospital on the fact that they found parasites of gray color, about 3 mm long on their bodies. They caused unpleasant irritation of skin, there were itch, pain, papules of blue color, and hemorrhages in places of stings. At certain workers temperature rose. What disease is most probable?

- Itch
- Pediculosis
- Sarcoptidosis
- Cutaneous myiasis
- Phthiriasis

Correct answer:

- Pediculosis

72. A man lives in the area of dermal leishmaniasis distribution. He hasn't been inoculated against this disease because of his having contraindication against it. What insects' bites should this man avoid?

- Mosquitoes
- Fleas
- Gadflies
- Sand flies
- Stable flies

Correct answer:

- Sand flies

73. In the South and Central America, a certain species of trypanosomes, which is a causative agent of Chagas disease, is distributed. What animal is a specific vector of the causative agent of this disease?

- Tsetse fly
- Cockroach
- Mosquito
- Sand fly
- Triatomine bug

Correct answer:

- Triatomine bug

74. A woman with complaints of skin itching and puffiness of eyelids addressed to an ophthalmologist. During examination, a worm-like arthropod with size of 0.4 mm is revealed. Continuous scutum covers the forefront of a body; the body has cross stripes. Legs are short, tarsi have two claws. What diagnosis a doctor can make?

- Pediculosis
- Demodicosis
- Phthiriasis
- Facultative myiasis
- Itch

Correct answer:

- Demodicosis

75. A woman with a child, having a gangrenous wound on the head, addressed to a hospital. During investigation, a doctor found white worm-shaped maggots in a wound. What insect could deposit them?

- Sand fly
- Mosquito
- Stable fly
- *Wohlfahrtia*
- Flea

Correct answer:

- *Wohlfahrtia*

MIXED QUESTIONS ON PARASITOLOGY

1. During examination of a patient, a doctor found small ulcers with rough edges on the patient's skin. The patient had just returned from an Asian country where there were a lot of mosquitoes. What disease can be suspected?

- Trypanosomiasis
- Toxoplasmosis
- Malaria
- Cutaneous leishmaniasis
- Scabies

Correct answer:

- Cutaneous leishmaniasis

2. A patient has complaints of pains in the bottom of an abdomen, which enhance during urination. Impurity of blood and egg of parasites are found in urine. Of what disease it is necessary to think?

- Clonorchiasis
- Trypanosomosis
- Trichinosis
- Schistosomiasis
- Trichomoniasis

Correct answer:

- Schistosomiasis

3. A married couple applied to the genetic consultation in order to consult about their child with multiple abnormalities (microcephaly, idiocy etc.). Examination of family members did not reveal hereditary pathology, and the karyotype of parents and the child was normal. The woman did not use mutagens and teratogens during pregnancy. A doctor has found that the family keeps a cat in the apartment. What can be a probable cause of malformation of the newborn?

- Woman had dysentery during pregnancy
- Woman had taeniasis during pregnancy
- Woman had an ascariasis during pregnancy
- Woman had toxoplasmosis during pregnancy
- Woman had an enterobiasis during pregnancy

Correct answer:

- Woman had toxoplasmosis during pregnancy

4. Patients with edemata of eyelids and faces, fever, and muscle pain are hospitalized to a hospital. It became clear that the disease began after the use in food of half-cooked pork which did not pass veterinary sanitary inspection. Which of the following is the most likely diagnosis?

- Taeniasis
- Toxoplasmosis
- Taeniarhynchosis
- Echinococcosis
- Trichinosis

Correct answer:

- Trichinosis

5. A patient with suspicion to liver abscess arrived to surgical office. It was established that the patient was in business trip in Cuba for a long time, frequently had sharp gastrointestinal diseases. What disease can be assumed at the patient, what methods of research need to be used for diagnostics?

- Ascariasis; to analyze excrements (Kato method) on the presence of eggs (big size, 50–80 microns, mammillated surface)
- Echinococcosis; to carry out roentgenoscopy, X-ray analysis, ultrasonography
- Alveococcosis; to carry out roentgenoscopy, X-ray analysis, ultrasonography
- Giardiasis; to analyze smears of excrements microscopically
- Amebiosis; to analyze excrements microscopically

Correct answer:

- Amebiosis; to analyze excrements microscopically

6. A woman, who was infected with toxoplasmosis during pregnancy, has born a child with multiple congenital defects. This is a result of:

- teratogenesis
- chemical mutagenesis
- biological mutagenesis
- recombination
- cancerogenesis

Correct answer:

- teratogenesis

7. A 40-year-old patient who has lost sight on the left eye earlier, consulted an oculist about deterioration of sight on the right eye. What parasitic disease can be suspected?

- Cysticercosis
- Toxoplasmosis
- Echinococcosis
- Trichinosis
- Leishmaniasis

Correct answer:

- Toxoplasmosis

8. All hollow organs of a patient are dilated, the traces reminding stings with indurations are present on the body surface. The patient was more than two months in the territory of the South American country where he caught armadillos for a zoo. Define a disease:

- malaria
- echinococcosis
- nervous form of Chagas' disease (trypanosomosis)
- infection with an American hookworm
- allergic reaction to stings of mosquitoes

Correct answer:

- nervous form of Chagas' disease (trypanosomosis)

9. A patient, who arrived 10 months ago from the Asian country where he worked at building of water accumulative constructions, was hospitalized in clinic with edema of the right lower extremity. In some days a bubble appeared on a surface of skin, asthmatic attacks, nausea, vomiting, vertigo, and then unconsciousness were developed. What reason of these symptoms?

- Chemical burn
- Ascariasis
- Asthma
- Sting of a scorpion
- Dracunculosis

Correct answer:

- Dracunculosis

10. A local who never left his favourite dog was a guide of scientific expedition across India. By the contact with this dog as an invasion source, what invasive diseases can members of expedition be infected with?

- Taeniasis, balantidiasis
- Lambliosis, trypanosomosis
- Echinococcosis
- Dicrocoeliasis, amebiosis
- Trichomoniasis, fascioliasis

Correct answer:

- Echinococcosis

11. A patient consulted a doctor concerning increasing signs of lesion of the central nervous system. The patient was in business trip in the Central Africa for a long time. What disease can be assumed?

- Diphyllbothriasis
- Trypanosomosis
- Ascariasis
- Leishmaniasis
- Trichocephaliasis

Correct answer:

- Trypanosomosis

12. Choose the disease that is caused by pinworms:

- enterobiasis
- strongyloidosis
- dracunculosis
- sleeping sickness
- typhoid

Correct answer:

- enterobiasis

13. A shepherd with head wounds consulted the village medical assistant's point. During examination of wounds, deep damage of soft tissues with local places of gangrenous changes and larvae of flies were revealed. Choose the name of the disease:

- pediculosis
- skin leishmaniasis
- itch
- tissue myiasis
- phthiriasis

Correct answer:

- tissue myiasis

14. Mosquitos' bites caused the appearance of ulcers on the human's skin; ulcers were observed under a microscope. The ulcer's contents analysis revealed nonflagellated protozoans. What disease is this?

- Cutaneous leishmaniasis
- Visceral leishmaniasis
- Malaria
- Scabies
- Myiasis

Correct answer:

- Cutaneous leishmaniasis

15. Toxoplasmosis is diagnosed for a pregnant woman. It is known that it can lead to development of malformation in a foetus. With what it can be associated?

- With possible development of a generative mutation
- With possible development of autoimmune reactions
- With inflammatory processes in tissues of a fetus
- With teratogenic influence
- With possible development of somatic mutations

Correct answer:

- With teratogenic influence

16. A patient presents with frequent liquid stool with impurity of blood, pain in rectum. What parasitic disease needs to be suspected?

- Cysticercosis
- Loiasis
- Lambliosis
- Malaria
- Amebiosis

Correct answer:

- Amebiosis

17. What species belongs to Arachnoidea?

- *Culex*
- *Ixodes persulcatus*
- Typhoid fly
- *Trichinella spiralis*
- Bed bug

Correct answer:

- *Ixodes persulcatus*

18. A patient to whom the diagnosis "malaria" was made after examination, addressed to a polyclinic. However, according to the patient, last 5 years he did not visit the countries in which this disease is distributed. Name a possible way of infection:

- fecal and oral
- owing to a sting of the infected sand fly
- owing to a sting of tsetse fly
- contact and household
- owing to blood transfusion

Correct answer:

- owing to blood transfusion

19. A man is in the center of dermatotropic leishmaniasis. Immunization against this disease was not carried out because he had existence of contraindications. Stings of what insects the person needs to avoid?

- Sand flies
- Fleas
- Botflies
- Mosquitoes
- Blood-sucking flies

Correct answer:

- Sand flies

20. Medicinal leech, which eats blood of fishes, frogs, and mammals and can feed on blood of the human, is found in Ukraine. Blood clotting is prevented by the substance containing in a secret of glands, which channels open in a throat of a leech. How this substance is called?

- Guanine
- Blood clotting factor
- Hemoglobin
- Glycogen
- Hirudin

Correct answer:

- Hirudin

21. A patient has roundish ulcers on his face, inflammation and enlargement of lymph nodes. During laboratory examination of discharge from face ulcers, unicellular organisms without flagella were revealed. What diagnosis it indicates?

- Toxoplasmosis
- Scabies
- Dermatotropic leishmaniasis
- Trypanosomiasis
- Myiasis

Correct answer:

- Dermatotropic leishmaniasis

22. A mother with a 12-year-old child consulted gastroenterologist with complaints of the loss of appetite at the child, meteorism. During endoscopic examination, dyskinesia of bile ducts is diagnosed, and cells of a pear-shaped form with two nuclei and many flagella are revealed in duodenal contents. What disease is most probable for the child?

- Balantidiasis
- Lambliosis
- Ascariasis
- Trichomoniasis
- Enterobiasis

Correct answer:

- Lambliosis

23. As an example of specific human parasites, one can name *Plasmodium falciparum*, human pinworm and some others. The source of parasite invasion is always a human. Such specific human parasites cause the diseases that are called:

- Anthroponoses
- Zoonoses
- Anthropozoonoses
- Infections
- Multifactorial diseases

Correct answer:

- Anthroponoses

24. A patient has complaints of acute abdominal pain of cramp-like character, frequent urges to defecate, and liquid bloody stool with mucus. Laboratory examination of smears of excrements revealed organisms of a changeable shape, which contain erythrocytes. What disease is possible?

- Intestinal trichomoniasis
- Amebiosis
- Lambliasis
- Schistosomiasis
- Balantidiasis

Correct answer:

- Amebiosis

25. Malignant anemia was found in a patient. Therapy by intramuscular inoculation of B₁₂ vitamin gave short unstable effect of improvement of blood composition. The patient is the inveterate fisherman and often uses fish that he caught and dried. What diagnosis can be assumed?

- Pernicious anemia (Addison's anemia)
- Thalassemia
- Elliptocytosis
- Ancylostomiasis
- Diphyllbothriasis

Correct answer:

- Diphyllbothriasis

ЕЛЕКТРОННЕ НАВЧАЛЬНЕ ВИДАННЯ

ТЕСТОВІ ЗАВДАННЯ
З МЕДИЧНОЇ БІОЛОГІЇ

підготовка до складання тестів "Крок-1"
1-го етапу єдиного державного
кваліфікаційного іспиту (ЄДКІ)
(англійською мовою)

*для самостійної роботи студентів
спеціальностей 222 "Медицина",
221 "Стоматологія" і 228 "Педіатрія"
денної форми навчання*

Укладач Олег Ювеналійович Смірнов, канд. біол. наук,
старший науковий співробітник, доцент

Комп'ютерне верстання О. Ю. Смірнова