1. What end product forms as a result of beta-oxidation of fatty acids with an odd number of carbon atoms?
a. Propionyl-CoA
b. Acetyl-CoA
c. Acetoacetyl-CoA
d. Palmitoyl-CoA
e. Stearoyl-CoA
2. What cations are present in a solution if, after adding dimethylglyoxime (Chugaev reagent) and ammonia buffer solution to it, a bright crimson intracomplex compound forms as a result?
a. Copper cations
b. Nickel cations
c. Cobalt cations
d. Aluminum cations
e. Calcium cations
3. What structures of a flower originate from the stem?
a. Receptacle and perianth
b. Calyx and stamens
c. Stamens and pistils
d. Calyx and corolla
e. Pedicel and receptacle
4. Hepatitis B patients and hepatitis B carriers cannot be potential donors, because there is a risk of transmitting the infection to the recipient along with blood and blood products. What transmission route is characteristic of this infection?
a. Airborne-droplet transmission
b. Airborne-dust transmission
c. Alimentary transmission
d. Parenteral transmission
e. Arthropod-borne transmission
5. A patient diagnosed with stomatitis was prescribed a fat-soluble vitamin preparation that takes part in redox processes and accelerates mucosal epithelization. What drug is it?
a. -
b. Folic acid
c. Ascorbic acid
d. Retinol acetate
e. Ergocalciferol
6. A plant has essential oil glands, its fruit is an achene, its inflorescence is a flat capitulum. What plant family can be characterized by such features?
a. Solanaceae
b. Asteraceae
c. Scrophylariaceae
d. Lamiaceae
e. Rosaceae
7. A 15-year-old girl complains of general weakness, dizziness, and frequent fainting spells. She does not eat enough. Recently, she has been noticing a distortion of taste, a desire to eat chalk and raw minced meat. Her menstruations have been occurring since the age of 13 and are profuse and irregular. What substance causes sideropenic syndrome if its levels in the human body are low?
a. Folic acid
b. Hemosiderin
c. Copper
d. Iron
e. Vitamin B_12
8. What specific reagent is used for identification of Fe^2+ cations?
a. H_2SO_4
b. K_2Na[Co(NO_2)_6]
c. NH_4OH

d. NaOH
e. K_3[Fe(CN)_6]
9. What type of chromatography includes the gas-liquid chromatography?
a. Adsorption chromatography
b. Gel chromatography
c. Affinity chromatography
d. Ion exchange chromatography
e. Distribution chromatography
10. What titrimetric methods can be used for quantification of streptocide (sulfanilamide, a primary aromatic amine) in a drug?
a. Permanganometry, bromatometry
b. Nitritometry, argentometry
c. Bromatometry, complexonometry
d. Complexonometry, nitritometry
e. Bromatometry, nitritometry
11. What is the mechanism of action of antiviral drug acyclovir?
a. Blockade of cell wall synthesis
b. Inhibition of protein synthesis
c. Increasing the cell membrane permeability
d. Antagonism with para-aminobenzoic acid
e. Inhibition of nucleic acid synthesis
12. What product forms as a result of aldehydes and ketones reacting with primary amines?
a. Azomethine
b. Alcohol
c. Diazine
d. Thiol
e. Nitrile
13. The synthesis of thyroid hormones is carried out from tyrosine in a special protein of the thyroid gland. Name this protein.
a. Albumin
b. Thyroglobulin
c. Immunoglobulin
d. Histone
e. Interferon
14. Name the phenomenon when aerosol particles move in the direction of decreasing temperature.
a. Electrophoresis
b. Sedimentation
c. Photophoresis
d. Thermophoresis
e. Peptization
15. When studying the chemical properties of an organic compound, it was established that it exhibits basic properties and easily undergoes halogenation and diazotization reactions. What compound meets these criteria?
a. Naphthalene
b. Toluene
c. Benzene
d. Phenol
e. Aniline
16. What laboratory glassware is used for dissolving an exactly measured out sample when preparing a primary standard solution?
a. Measuring glass
b. Measuring flask
c. Cylinder
d. Test tube
e. Beaker

17. Microscopy of plants detects parenchymal cells with thin membranes, a large nucleus, and a large number of ribosomes. What tissue is it?
a. Mechanical tissue
b. Dermal tissue
c. Secretory tissue
d. Meristematic tissue
e. Parenchyma
18. When a pharmaceutical company was manufacturing an enzyme drug, a violation of the technological process occurred: the drug was heated to 85^oC. What changes will be observed in its enzyme activity?
a. Impaired structure of metal ions in the active site
b. Temporary decrease in enzyme activity that later resumes after cooling
c. Increased enzyme activity due to increased molecular motion
d. Minor changes in enzyme activity due to enzyme thermostability
e. Protein denaturation and complete loss of enzyme activity
19. People, who were in the building during a fire, suffer from carbon monoxide poisoning. What type of hypoxia can be observed in this case?
a. Hemic hypoxia
b. Respiratory hypoxia
c. Hypoxic hypoxia
d. Circulatory hypoxia
e. Tissue hypoxia
20. What is the typical sign of the initial stage of acute renal failure?
a. Anuria
b. Pollakiuria
c. Nocturia
d. Polyuria
e. Dysuria
21. What side effect is characteristic of lisinopril?
a. Bronchospasm
b. Dry cough
c. Orthostatic hypertension
d. Red urine
e. Hyperglycemia
22. Spore formation helps microbes survive in the environment. What microorganisms are spore formers?
a. Peptostreptococcus
b. Staphylococcus
c. Bacteroides
d. Clostridium
e. Peptococcus
23. A patient diagnosed with arterial hypertension was prescribed lisinopril. What is the mechanism of action of this drug?
a. Blockade of beta-adrenergic receptors
b. Stimulation of beta-adrenergic receptors
c. Inhibition of angiotensin-converting enzyme
d. Stimulation of alpha_2-adrenergic receptors
e. Blockade of calcium channels in vascular smooth muscle
24. What method of instrumental analysis can be used for quantification of hydrochloric and boric acids in a mixture?
a. Polarimetry
b. Potentiometry
c. Spectrophotometry
d. Chromatography
e. Infrared spectroscopy

25. What pair of compounds can be distinguished from each other using the silver mirror reaction?
a. Propane and propene
b. n-Butane and isobutane
c. 1,3-Butadiene and 1,2-butadiene
d. Ethanol and ethylene glycol
e. Propanal and propanone
26. Administration of adrenaline increases glucose levels in the blood. What process is mainly activated in this case?
a. Pentose phosphate pathway
b. Glycogenolysis
c. Gluconeogenesis
d. Glycogenesis
e. Lipogenesis
27. A patient has been hospitalized with the diagnosis of diabetic hyperglycemic coma. The patient's breathing is slow, deep, and noisy. The inhalation phase is longer than the exhalation phase. What type of breathing has developed in the patient?
a. Cheyne-Stokes breathing
b. Gasping
c. Biot breathing
d. Apneic breathing
e. Kussmaul breathing
28. A bodybuilder athlete came to a pharmacy complaining of hyperthermia. To improve his athletic performance, he used the banned doping compound 2,4-dinitrophenol that uncouples oxidative phosphorylation. What effect of this compound on mitochondria can explain these symptoms?
a. Increased use of ATP for cAMP synthesis
b. Decreased ATP synthesis and energy release in the form of heat
c. Increased oxygen consumption and activation of ATP synthesis
d. Decreased oxygen consumption and inhibition of ATP synthesis
e. Increased acetyl-CoA levels and stimulation of tricarboxylic acid cycle
29. What substance is a unique accumulator, donor, and transformer of energy within the body?
a. Creatine phosphate
b. Adenosine triphosphate
c. Phosphoenolpyruvate
d. Succinyl-CoA
e. Acetyl-CoA
30. A 34-year-old woman with bronchitis has persistent, dry, non-productive cough. Her physician prescribed her a centrally acting antitussive drug. Select this drug from the list.
a. Mucaltin
b. Glaucine hydrochloride
c. Acetylcysteine
d. Ambroxol hydrochloride
e. Bromhexine hydrochloride
31. When carbohydrate intake is excessive, insulin stimulates conversion of carbohydrates into lipids in the cells of adipose tissue. What biochemical process enables this conversion?
a. Synthesis of higher fatty acids
b. Heme synthesis
c. Lipolysis
d. Gluconeogenesis
e. Uric acid synthesis
32. When harvesting inflorescences, it was determined that their main axis was well developed and the flowers were almost at the same level, despite being attached to peduncles of varying length. What type of inflorescence is it?
a. Flat capitulum
b. Corymb
c. Spike

d. Umbel
e. Botryoid
33. A patient diagnosed with arterial hypertension has been prescribed a drug with an antihypertensive, antianginal, and antiarrhythmic effect. Name this drug.
a. Metoprolol
b. Clonidine
c. Adrenaline tartrate
d. Dopamine hydrochloride
e. Fenoterol
34. What is the name of the single elongated crystals with pointed ends that can be detected during the microscopy of the herbal raw material harvested from a monocotyledonous plant?
a. Crystalline sand
b. Druses
c. Cystoliths
d. Styloids
e. Globoids
35. What fluid will cause plasmolysis of human blood cells, if it is mistakenly administered intravenously?
a. 0.9% glucose solution
b. Distilled water
c. 3.5% NaCl solution
d. 3.5% glucose solution
e. 0.9% NaCl solution
36. After examination, a child was diagnosed with scarlet fever. What microorganism is the causative agent of this disease?
a. Staphylococcus
b. Klebsiella
c. Actinomycete
d. Streptococcus
e. Meningococcus
37. D-galactose reacts with an ammonia solution of silver oxide. What functional group makes this reaction possible?
a. Ether group
b. Hydroxyl group
c. Ester group
d. Carboxyl group
e. Aldehyde group
38. Select from the list a quantitative characteristic of Brownian motion.
a. Coefficient of proportionality
b. Coefficient of friction
c. Resistance of the medium
d. Average particle displacement over time
e. Diffusion coefficient
39. On day 20 after a massive hemorrhage, the patient with an injury to the subclavian artery underwent a blood test. What blood test findings indicate an increase in erythropoiesis?
a. Anisocytosis
b. Anisochromia
c. Hypochromia
d. Poikilocytosis
e. Reticulocytosis
40. What compound contains a primary aromatic amino group?
a. (C_6H_5)_3N (triphenylamine)
b. C_6H_5-NH_2 (aniline)
c. (CH_3)_3C-NH_2 (tert-butylamine)
d. (CH_3)_3N (trimethylamine)

e. (CH_3)_2NH (dimethylamine)
41. For tetanus prevention a certain toxin is used. This toxin is being inactivated with formaldehyde (0.4%) under the temperature of 39^oC over the course of 4 weeks. Name the resulting preparation.
a. Immunoglobulin
b. Antitoxic serum
c. Anatoxin
d. Adjuvant
e. Killed vaccine
42. What is the structural formula for 3-chloropropene?
a. ClCH_2-CH=CH_2
b. ClCH_2-CH=CH-CH_3
c. CH_2=CCl-CH_3
d. ClCH=CH-CH_3
e. CH_2=CH-CH=CHCl
43. A patient was prescribed losartan potassium for treatment of arterial hypertension. What is the mechanism of action of this drug?
a. Inhibition of angiotensin-converting enzyme
b. Activation of central alpha-adrenergic receptors
c. Inhibition of phosphodiesterase
d. Blockade of angiotensin receptors
e. Calcium channel block
44. What compound is a base for organic dyes and belongs to isolated polynuclear arenes?
a. Anthracene
b. Triphenylmethane
c. Benzene
d. Phenanthrene
e. Cumene
45. What functional groups are present in the cyclic forms of ribose and deoxyribose?
a. Only hydroxylic
b. Only aldehyde
c. Hydroxylic and aldehyde
d. Only carboxylic
e. Hydroxylic and carboxylic
46. What medium is used in quantification of halide ions by means of Volhard method (thiocyanometry)?
a. Phosphate acid
b. Weakly alkaline
c. Nitric acid
d. Strongly alkaline
e. Neutral
47. Primary and secondary nitroalkanes are tautomeric compounds. What tautomerism is characteristic of these compounds?
a. Lactam-lactim tautomerism
b. Amino-imino tautomerism
c. Keto-enol tautomerism
d. Aci-nitro tautomerism
e. Tautomerism of azoles
48. What heterocycle has acidophobic properties?
a. Quinoline
b. Pteridine
c. Pyrimidine
d. Thiophene
e. Pyrrole
49. A plant is completely submerged in water. What ecological group does this plant belong to?
a. Mesophytes

b. Hydrophytes
c. Succulents
d. Hygrophytes
e. Xerophytes
50. What value is used when calculating the osmotic pressure of electrolyte solutions according to the Van 't Hoff's law?
a. Cryoscopic constant
b. Activity coefficient
c. Ebullioscopic constant
d. Isotonic coefficient
e. Osmotic coefficient
51. A man diagnosed with epilepsy has been taking phenobarbital for a long time. Over time, he has noticed a decrease in the therapeutic effect of the drug - he has developed tolerance to this drug. What is the mechanism of developing tolerance to phenobarbital?
a. Acceleration of biotransformation
b. Inhibition of biotransformation
c. Increased sensitivity of receptors
d. Weakening of the absorption process
e. Accumulation of the substance in the body
52. At a pharmaceutical factory, an alkaloid must be extracted from a herbal raw material. What would ensure effective extraction of this substance?
a. The extraction process must be carried out at a high temperature
b. The substance must have different solubility in two different solvents
c. Solvents must be miscible with each other
d. Solvents must have similar polarity values
e. The substance must enter into a chemical reaction with the solvent
53. Microscopy of a rhizome detects periphloematic vascular bundles. What plant does this rhizome belong to?
a. Elymus repens
b. Acorus calamus
c. Dryopteris filix-mas
d. Potentilla erecta
e. Convallaria majalis
54. Which one of the listed heterocyclic compounds exhibits the strongest basic properties?
a. Pyrrole
b. Pyrrolidine
c. Thiophene
d. Pyridine
e. Furan
55. Bacteriology of secretions from the patient's wound, stained using the Gram technique, revealed purple spherical microorganisms, arranged like a grape cluster. What microorganisms are the most likely cause of this disease?
a. Proteus vulgaris
b. Neisseria
c. E) coli
d. Salmonella typhimurium
e. S. aureus
56. What indicator is used in titrimetric determination of substances by means of mercurimetry (complexometry)?
a. Phenolphthalein
b. Methyl orange
c. Potassium chromate
d. Starch
e. Diphenylcarbazide
57. In the cells of eukaryotic organisms, the DNA is bound to proteins. What proteins are bound to the

DNA molecule and stabilize it?
a. Albumins
b. Glutelins
c. Globulins
d. Interferons
e. Histones
58. Species pectorales herbal tea contains pieces of bright yellow, sweet-tasting roots. What medicinal plant is it?
a. Plantago major
b. Glycyrrhiza glabra
c. Althaea officinalis
d. Acorus calamus
e. Valeriana officinalis
59. A sample of medicinal raw material was inoculated on the Sabouraud medium in order to detect phytopathogenic microorganisms in it. What microorganisms are detected this way?
a. Fungi
b. Viruses
c. Actinomycetes
d. Protozoa
e. Bacteria
60. A pharmacy has decided to use the biological method to test the quality of instrument sterilization in an autoclave. What microorganisms should be used for this purpose?
a. Bacillus subtilis
b. Borrelia recurrentis
c. Yersinia pestis
d. Streptococcus pyogenes
e. Salmonella typhi
61. A pharmaceutical company is developing a new antitumor drug that targets an enzyme that takes part in DNA replication. What enzyme is targeted by this drug?
a. Topoisomerase
b. Peptidyl transferase
c. Reverse transcriptase
d. RNA polymerase
e. Aminoacyl-tRNA synthetase
62. A woman with candidiasis was prescribed an antifungal drug that disrupts the synthesis of ergosterol, but can cause dyspeptic disorders (diarrhea, nausea), hepatotoxicity, and headache as its side effects. What drug is it?
a. Albendazole
b. Metronidazole
c. Clarithromycin
d. Fluconazole
e. Acyclovir
63. Morphological analysis shows that the length of a leaf blade exceeds 1.5-2 times its width and the widest part is located closer to the base. What shape of the leaf blade is it?
a. Linear
b. Narrowly ovate
c. Lanceolate
d. Elliptic
e. Ovate
64. A patient complains of headache episodes with nausea and vomiting. During examination, patient's blood pressure - 180/100 mm Hg, blood glucose levels - 14.8 mmol/L. Magnetic resonance tomography detects pituitary adenoma. What pathology has caused the development of hyperglycemia in this patient?
a. Addison disease
b. Diabetes insipidus

c. Cushing disease
d. Pituitary dwarfism
e. Hypothyroidism
65. What group reagent can be used to separate group III cations (acid-base classification), when conducting systematic analysis of a mixture?
a. Ammonia
b. Hydrochloric acid
c. Barium chloride
d. Alkali and hydrogen peroxide
e. Sulfuric acid
66. In systematic analysis of group IV cations, hydrogen peroxide must be added along with the group reagent. Why must this substance be added?
a. For formation of peroxide compounds of these cations
b. For formation of hydroxo- and oxoanions of these elements at the lowest oxidation degrees
c. For more complete precipitation of these cations
d. For formation of hydroxo- and oxoanions of these elements at the highest oxidation degrees
e. For destruction of hydrate complexes
67. What law underlies the method of spectrophotometry in the ultraviolet region of the spectrum?
a. Beer-Bouguer-Lambert law
b. Ohm law
c. Stokes-Lommel law
d. Rayleigh law
e. Faraday law
68. Microbiological testing of vaginal suppositories shows that they do not meet the requirements of the Pharmacopoeia. What microflora was detected in the suppositories, causing this conclusion?
a. Micrococci
b. Pseudomonas aeruginosa
c. Tetracocci
d. Lactobacilli
e. Sarcina
69. A 45-year-old man has been hospitalized with intense pain in the right hypochondrium. He was diagnosed with cholelithiasis accompanied by biliary colic. What drug should be prescribed in this case to eliminate the pain syndrome?
a. Drotaverine hydrochloride
b. Pancreatin
c. Almagel
d. -
e. Bisacodyl
70. A doctor has prescribed benzylpenicillin for the treatment of a surgical patient with numerous abscesses of staphylococcal etiology. What is the mechanism of action of this antibiotic?
a. Disruption of nucleic acid synthesis
b. Inhibition of cytoplasmic membrane functions
c. Inhibition of DNA topoisomerases
d. Disruption of cell wall synthesis
e. Disruption of ribosomal protein synthesis
71. Protein-containing liquids, where proteins must remain undenatured, undergo sterilization at the temperature of 56-58^oC in several 60-minute-long sessions over the course of 5 days. What method of sterilization is it?
a. Autoclaving
b. Pasteurization
c. Moist heat sterilization
d. Tyndallization
e. Flame sterilization
72. What method of microspecimen staining can be used to detect Mycobacterium tuberculosis?
a. Burri-Gins stain

b. Romanowsky-Giemsa stain
c. Ziehl-Nielsen stain
d. Neisser stain
e. Gram stain
73. A 50-year-old patient has been hospitalized into the intensive care unit with complaints of weakness, shortness of breath, and constricting pain behind the sternum. Examination reveals that the pateint's condition is moderately severe, heart rate - 80/min, blood pressure - 130/85 mm Hg. ECG shows deep Q waves and ST segment elevation. Acutely increased activity of AST, CPK-MB, and troponins is observed in the blood. What pathological condition can be characterized by the described symptoms and laboratory test results?
a. Pulmonary embolism
b. Myocarditis
c. Angina pectoris
d. Pericarditis
e. Myocardial infarction
74. Urinalysis of a patient with diabetes mellitus detects glucosuria. What is the renal threshold for glucose reabsorption?
a. 15 mmol/L
b. 10 mmol/L
c. 5 mmol/L
d. 20 mmol/L
e. 1 mmol/L
75. What drug inhibits hydroxymethylglutaryl-CoA reductase enzyme and reduces cholesterol synthesis?
a. Atorvastatin
b. Lisinopril
c. Amlodipine besylate
d. Furosemide
e. Hydrochlorothiazide
76. A 45-year-old woman developed an acute inflammatory disease of the upper respiratory tract and eyes during the season of flowering. She presents with hyperemia, edema, and mucous discharge. What type of leukocytosis would be most characteristic in this case?
a. Lymphocytosis
b. Monocytosis
c. Neutrophilia
d. Basophilia
e. Eosinophilia
77. What H_2-histamine blocker can be used to treat peptic ulcer disease of the stomach with increased secretory function?
a. Drotaverine hydrochloride
b. Atropine sulfate
c. Omeprazole
d. Famotidine
e. Levocetirizine
78. What titrimetric method of analysis can be used for quantification of magnesium chlorides in a mixture that contains both potassium and magnesium chlorides?
a. Permanganatometry
b. Mercurometry
c. Complexonometry
d. Nitritometry
e. Argentometry
79. A patient presents with intestinal obstruction and a decrease in the bactericidal effect of gastric juice, which contributes to the growth of putrefactive microflora. In this case, increased excretion of a certain substance can be observed in urine. Name this substance.
a. Indican

b. Glucose
c. Lactic acid
d. Protein
e. Creatine
80. An alkali was added into the solution being analyzed. When heated, the solution produced a gas. This gas changes the color of a moist litmus paper from red to blue, which indicates the presence of the following ions in the solution:
a. Bi^{3+}
b. Pb^{2+}
c. NH_4^+
d. Cl^-
e. CO_3^{2-}
81. Ledum palustre leaves are leathery, with a flat elongated leaf blade, curved downward edges, and brown hairs on the underside. What family does this plant belong to?
a. Fabaceae
b. Lamiaceae
c. Rosaceae
d. Brassicaceae
e. Ericaceae
82. The manufacturer has stated that the half-life of ibuprofen is 2 hours. A patient has been prescribed 400 mg of the drug. How much ibuprofen (mg) will remain in the patient's body 6 hours after taking this dose of the drug?
a. 0
b. 150
c. 25
d. 50
e. 100
83. A doctor prescribed zopiclone to a patient complaining of insomnia. This drug has a hypnotic effect, because it interacts with certain receptors. Name these receptors.
a. Benzodiazepine and GABA receptors
b. Muscarinic and nicotinic acetylcholine receptors
c. alpha- and beta-adrenergic receptors
d. H_1- and H_2-histamine receptors
e. Serotonin and opioid receptors
84. Which one of the listed solutions will have the highest Van't Hoff isotonic coefficient, if their molar concentration and temperature are the same?
a. $MgCl_2$
b. LiCl
c. $AlBr_3$
d. $CaCO_3$
e. $C_6H_{12}O_6$
85. A patient has been hospitalized with signs of ascites. The doctor prescribed the patient spironolactone to enhance the diuretic effect of hydrochlorothiazide. What effect does this drug have besides its diuretic effect?
a. Antispasmodic
b. Potassium-sparing
c. Analgesic
d. Sedative
e. Irritant
86. What amine causes a positive isonitrile reaction?
a. Diethylamine
b. N,N-Dimethylamine
c. Diphenylamine
d. Benzylamine
e. Tetramethylammonium chloride

87. The fructose molecule belongs to ketoses. What phenomenon causes fructose to take part in the "silver mirror" reaction?
a. Mutarotation
b. Condensation
c. Dehydration
d. Conformation
e. Epimerization
88. Microscopy of the leaf epidermis reveals stinging hairs with a tall multicellular base, into which the base of an ampoule-shaped living cell with a small head filled with formic acid is immersed. What plant can be characterized by such emergences?
a. Artemisia absinthium
b. Chelidonium majus
c. Urtica dioica
d. Achillea millefolium
e. Bidens tripartita
89. What group of broncholytics is used for treatment of patients with bronchial asthma?
a. Nicotinic agonists
b. Anticholinesterase drugs
c. beta_2-adrenergic agonists
d. Muscarinic agonists
e. beta-adrenergic blockers
90. What electrode can be used as an indicator electrode in titration of bases?
a. Quinhydrone electrode
b. Calomel electrode
c. Platinum electrode
d. Glass electrode
e. Silver chloride electrode
91. In the process of studying a new lipophilic compound, it was established that after glucuronidation it rapidly excretes with urine. What is the significance of glucuronidation in drug metabolism?
a. Strengthening plasma protein binding
b. Intensifying breakdown and absorption in the stomach
c. Increasing lipophilicity to improve absorption
d. Preventing binding to the target receptor
e. Increasing water solubility for renal excretion
92. After a long course of antibiotic therapy, the patient developed a complication characterized by the formation of white coating on the oral mucosa. Microscopy of swabs from the affected areas reveals oval budding microorganisms. Inoculation of the obtained material on the Sabouraud medium results in growth of smooth white colonies. What drug should be used for the etiotropic treatment of this disease?
a. Acyclovir
b. Albendazole
c. Isoniazid
d. Fluconazole
e. Doxycycline
93. In the patient's blood, increased activity of AST, LDH1, LDH2, and CPK was detected. What organ is the most likely site of a pathological process in this case?
a. Adrenal glands
b. Kidneys
c. Liver
d. Heart muscle
e. Skeletal muscles
94. A 14-year-old boy, who has been suffering from bronchial asthma since childhood, after significant physical exertion developed shortness of breath and impaired respiratory rate and depth, characterized by difficult and prolonged exhalation. What pathological type of breathing has developed in this case?

a. Gasping
b. Expiratory dyspnea
c. Kussmaul breathing
d. Inspiratory dyspnea
e. Biot's breathing
95. A patient has been admitted to the hematology department of a hospital. He has history of frequent cases of acute respiratory viral infections and tonsillitis. Examination reveals enlarged lymph nodes. Blood test results: anemia, lymphocytosis, a small number of lymphoblasts, and Gumprecht shadows in the blood smear. What pathology has most likely occurred in this patient?
a. Lymphogranulomatosis
b. Chronic myeloid leukemia
c. Agranulocytosis
d. Multiple myeloma
e. Chronic lymphocytic leukemia
96. A 65-year-old man developed third-degree atrioventricular block. What medicine should be prescribed for this patient?
a. Metoprolol
b. Digoxin
c. Atropine sulfate
d. Amiodarone hydrochloride
e. Verapamil hydrochloride
97. What enzyme is used to synthesize genes from matrix RNA on DNA in RNA-containing viruses?
a. Endonuclease
b. Helicase
c. Reverse transcriptase
d. Exonuclease
e. DNA ligase
98. What is the name of the lower expanded hollow part of the pistil that contains ovules in a flower?
a. Stigma
b. Ovary
c. Gynoecium
d. Receptacle
e. Style
99. In human body, stable glucose levels are maintained by balanced levels of insulin and counterinsular hormones. What endocrine pathology causes development of persistent hypoglycemia?
a. Pheochromocytoma
b. Insulinoma
c. Cushing disease
d. Acromegaly
e. Thyrotoxicosis
100. A newborn has been diagnosed with Down syndrome, accompanied by mental retardation, short stature, short fingers and toes, and Mongoloid slant of the eyes. Karyotyping detects trisomy 21. What type of hereditary pathology is Down syndrome?
a. Gametopathy
b. Molecular genetics disease
c. Chromosome abnormality
d. Blastopathy
e. Fetopathy
101. What reaction can be used to identify multiple bonds in organic compounds?
a. Wagner reaction
b. Hofmann rearrangement
c. Claisen condensation
d. Friedel-Crafts alkylation
e. Kucherov reaction

102. How does the value of the critical micelle concentration in homologous series change when the molecular mass of the surfactant increases?
a. Sharply increases
b. Decreases
c. Reaches its maximum and then decreases
d. Increases
e. Remains unchanged
103. A 65-year-old man has been diagnosed with benign prostatic hyperplasia. What adrenoblocker should he be prescribed?
a. -
b. Propranolol hydrochloride
c. Doxazosin mesylate
d. Metoprolol
e. Adrenaline tartrate
104. What is benzene formula?
a. C_4H_4
b. C_6H_6
c. C_6H_8
d. C_10H_8
e. C_6H_10
105. What is propene structural formula?
a. CH_3-CH_2-CH=CH-CH_3
b. CH_3-CH=CH-CH_3
c. -
d. CH_3-CH_2-CH_3
e. CH_3-CH=CH_2
106. What monomer is the basis for natural rubber?
a. Isoprene
b. 1-Butyne
c. Propene
d. Ethene
e. Divinyl
107. A patient was prescribed an antiplatelet agent that has an effect on thromboxane A_2 formation in platelets. What drug is it?
a. Acetylsalicylic acid
b. Menadione
c. Prednisolone
d. -
e. Adrenaline tartrate
108. A flower has many stamens, fused together by filaments into several bundles. What type of androecium is it?
a. Monadelphous
b. Didynamous
c. Tetradynamous
d. Polyadelphous
e. Diadelphous
109. Analyzis of a medicinal plant shows that its leaves are collected into a basal rosette, the leaves themselves are broadly ovate or elliptic with arcuate venation, while the flowers are small, unremarkable, and assembled into an inflorescence - a dense spike. What plant can be characterized by such features?
a. Chelidonium majus
b. Vinca minor
c. Althaea officinalis
d. Taraxacum officinale
e. Plantago major

110. What structures enable the release of weak solutions of mineral (or, less often, organic) substances in the form of droplets and are arranged in groups on the serrations of the leaf margin?
a. Idioblasts
b. Emergences
c. Osmophores
d. Hydathodes
e. Laticifers
111. What reagent can be used for identification of lead cations according to the State Pharmacopoeia of Ukraine?
a. Sodium hydroxide
b. Urea
c. Formaldehyde solution
d. Sodium sulfite
e. Potassium iodide
112. What titrants are used in quantification of iodides by means of back titration, using the Volhard method?
a. Mercury(I) nitrate, potassium thiocyanate
b. Mercury(I) nitrate, ammonium thiocyanate
c. Mercury(II) nitrate, ammonium thiocyanate
d. Silver nitrate, sodium chloride
e. Silver nitrate, ammonium thiocyanate
113. Amylolytic enzymes catalyze hydrolysis of polysaccharides and oligosaccharides. They have an effect on the following chemical bond:
a. Amide bond
b. Hydrogen bond
c. Glycosidic bond
d. Peptide bond
e. Phosphodiester bond
114. What bioactive peptide is a major intracellular antioxidant and performs coenzyme functions?
a. Bradykinin
b. Hemoglobin
c. Glutathione
d. Oxytocin
e. Liberine
115. What principle is used when calculating the phase transition temperature at different pressure?
a. Clausius-Clapeyron equation
b. Mendeleev-Clapeyron equation
c. Trouton rule
d. Konovalov rules
e. Gibbs phase rule
116. Disperse systems can be divided into lyophilic and lyophobic ones, based on the intensity of interaction between the particles of the dispersed phase and the dispersion medium. What disperse system is lyophobic?
a. Tannin solutions
b. Solutions of high-molecular compounds
c. Foams
d. Clay dispersions
e. Surfactant solutions
117. Berberis vulgaris has spines that are modifications of:
a. Leaves
b. Rachises
c. Petioles
d. Stems
e. Stipules
118. Monosaccharides can be easily oxidized, but depending on the nature of the oxidant and the

conditions under which oxidation occurs, different products will form. What compound forms when D-glucose is oxidized using bromine water?
a. D-Glucaric acid
b. Bromoderivative of D-glucose
c. D-glucose osazone
d. D-Gluconic acid
e. D-Glucuronic acid
119. What is the name of the five-membered heterocycle that contains nitrogen heteroatoms of the pyrrole and pyridine type?
a. Pyrazolidine
b. Pyrazole
c. Triazole
d. Piperidine
e. Thiazole
120. What feature of a leaf is characteristic of Poaceae?
a. Petiole
b. Leaf blade
c. Stipules
d. Ochrea
e. Leaf sheath
121. What adsorption indicator is used in quantification of iodides by means of the Fajans method?
a. Eosin
b. Murexide
c. Phenolphthalein
d. Diphenylamine
e. Methyl orange
122. Pathogenic microorganisms can be characterized by the presence of enzymes of aggression that determine their virulence. Select an enzyme of aggression from the list below.
a. Carbohydrase
b. Hyaluronidase
c. Oxidase
d. Lyase
e. Transferase
123. What inflorescences are most typical of the Brassicaceae family?
a. Raceme, panicle
b. Round or flat capitulum
c. Corymb, umbel
d. Spadix, spike
e. Compound corymb, compound umbel
124. A patient with arterial hypotension accompanied by collapse was administered phenylephrine hydrochloride to increase the blood pressure. What receptors are stimulated by this drug?
a. beta-adrenergic receptors
b. Muscarinic acetylcholine receptors
c. Nicotinic acetylcholine receptors
d. alpha-adrenergic receptors
e. Angiotensin receptors
125. Phellogen forms from pericycle or ground tissue that develops meristematic activity. What type of tissue is phellogen?
a. Meristematic
b. Secretory
c. Mechanical
d. Vascular
e. Dermal
126. During practice, a student was tasked with classifying plants, dividing them into monocotyledons and dicotyledons. What family of plants belongs to the monocotyledons?

a. Poaceae
b. Brassicaceae
c. Lamiaceae
d. Fabaceae
e. Rosaceae
127. A 55-year-old patient was prescribed an organic nitrate drug for rapid relief of angina pectoris attacks. Select this drug from the list.
a. Digoxin
b. Glycerol trinitrate
c. Verapamil hydrochloride
d. Propranolol hydrochloride
e. -
128. What antiprotozoal drug has anti-Helicobacter pylori effect?
a. Metronidazole
b. -
c. Rifampicin
d. Isoniazid
e. Albendazole
129. After evaporation of the solution that is being analyzed, the remaining dry residue turns the colorless flame of the burner purple. What ions are present in the solution, as indicated by this reaction?
a. Lithium ions
b. Ammonium ions
c. Potassium ions
d. Barium ions
e. Sodium ions
130. A patient has pulmonary edema. What drug must be prescribed in this case to reduce the volume of circulating blood?
a. Furosemide
b. Metoprolol
c. Magnesium sulfate
d. Amiodarone hydrochloride
e. Verapamil hydrochloride
131. After being stung by bees, the patient developed Quincke's edema. What drug should the patient be urgently administered for the treatment of this condition?
a. Atropine sulfate
b. Adrenaline tartrate
c. Propranolol hydrochloride
d. Furosemide
e. Diphenhydramine hydrochloride
132. A solution contains aluminum, potassium, and sodium cations. Into this solution a small amount of ammonium hydroxide and alizarin solution was added, resulting in production of a bright red precipitate (varnish). What ion has been detected as the result of this reaction?
a. Calcium
b. Aluminum
c. Potassium
d. Sodium
e. Barium
133. What method of chromatographic analysis can be used for separation, identification, and quantification of methanol and ethanol in a mixture?
a. Gas-liquid chromatography
b. Paper chromatography
c. Ion exchange chromatography
d. Planar chromatography
e. Precipitation chromatography

134. A person has been hospitalized with the diagnosis of malaria. What route of infection transmission is characteristic of this disease?
a. Direct contact transmission
b. Indirect contact transmission
c. Arthropod-borne transmission
d. Airborne and droplet transmission
e. Fecal-oral transmission
135. Phosphorylation reactions in the cell are catalyzed by enzymes that have the trivial name of "kinases". What class of enzymes do they belong to?
a. Lyases
b. Isomerases
c. Ligases
d. Transferases
e. Oxidoreductases
136. A Gram-stained smear shows large oval violet cells that form pseudomycelium. Name these microorganisms.
a. Plasmodium malariae
b. Mucor fungi
c. Penicillium fungi
d. Candida fungi
e. Actinomycetales
137. After adding a barium chloride solution to the solution being analyzed, a white precipitate, insoluble in acids and alkalis, formed. What anions are present in the analyzed solution?
a. Chloride anions
b. Nitrate anions
c. Phosphate anions
d. Carbonate anions
e. Sulfate anions
138. Polarimetry is used for determining optically active substances. What substance can be determined, using this method?
a. Potassium iodide
b. Calcium nitrate
c. Copper sulfate
d. Glucose
e. Sodium chloride
139. A 54-year-old man with 4-year-long history of chronic glomerulonephritis and 2-year-long history of persistent arterial hypertension made an appointment with a doctor. What substance synthesized in the kidneys plays an important role in the development of arterial hypertension in this patient?
a. Nitric oxide
b. Renin
c. Vitamin D
d. Erythropoietin
e. Aldosterone
140. What is characteristic of benign tumors?
a. Cancer cachexia
b. Expansive growth
c. Invasion into the surrounding tissues
d. Infiltrating growth
e. Metastasis
141. Interleukin-1 is one of the secondary pyrogens in a fever. What cells are the main producers of this pyrogen?
a. Eosinophils
b. Macrophages
c. Lymphocytes
d. Platelets

e. Tissue basophils

142. Disperse systems can be distinguished from true solutions by the bluish glow of colloidal solutions against a dark background when illuminated from the side. Name this phenomenon.

a. Chemiluminescence

b. Opalescence

c. Fluorescence

d. Scattering

e. Emission

143. In cases of methanol poisoning, one of the treatment methods requires administering ethanol (orally or intravenously) in doses large enough to cause intoxication in a healthy person. Why is this treatment method effective?

a. Ethanol inactivates alcohol dehydrogenase

b. Ethanol blocks alcohol dehydrogenase coenzyme

c. Ethanol inhibits methanol diffusion

d. Ethanol competes with methanol for the active site of alcohol dehydrogenase

e. Ethanol breaks down faster than methanol

144. Allopurinol is used to reduce the formation of uric acid in the treatment of gout. What enzyme is inhibited by this medicine?

a. Arginase

b. Lactate dehydrogenase

c. Amylase

d. Xanthine oxidase

e. Catalase

145. What anticholinesterase agent can be used to stimulate intestinal peristalsis in the patients during the postoperative period?

a. Metoprolol

b. Suxamethonium chloride

c. Salbutamol

d. Adrenaline tartrate

e. Neostigmine methylsulfate

146. What indicator is used in argentometric determination of chloride ions in Mohr's method?

a. Potassium chromate

b. Diphenylcarbazone

c. Fluorescein

d. Eosin

e. Methyl red

147. A 35-year-old patient complains of intense thirst, headache, and irritability. The 24-hour fluid intake is 9 liters. The 24-hour diuresis is increased. The patient was diagnosed with diabetes insipidus. This pathology is associated with impaired production of a certain hormone. Name this hormone.

a. Vasopressin

b. Aldosterone

c. Catecholamines

d. Thyroxine

e. Glucocorticoids

148. What is the effect of electron-accepting substituents (type II substituents) on the course of electrophilic substitution (SE) reactions in arenes?

a. They speed up the reaction and are ortho- and para-directors

b. They speed up the reaction and are meta-directors

c. They slow down the reaction and are meta-directors

d. They slow down the reaction and are ortho- and para-directors

e. They have no effect on the reaction

149. A 48-year-old patient complains of thirst, frequent urination, dryness of skin and mucosa, and trophic ulcers that appeared on his legs. Examination detects blood glucose levels of 16 mmol/L and glucose in urine. What disease has occurred in the patient?

a. Diabetes mellitus

b. Nephrogenic diabetes insipidus
c. Diabetes insipidus
d. Insulinoma
e. Kidney failure

150. What type of pharmaceutical interaction is it, when absorption of tetracycline drugs becomes reduced if they are taken simultaneously with antacids?

a. Synergism
b. Pharmaceutical incompatibility
c. Pharmacokinetic incompatibility
d. Pharmacodynamic incompatibility
e. Functional antagonism