1. What is the name of the five-membered heterocycle that contains nitrogen heteroatoms of the pyrrole and pyridine type?

a. Triazole
b. Pyrazole
c. Piperidine
d. Pyrazolidine
e. Thiazole

2. Berberis vulgaris has spines that are modifications of:

a. Leaves
b. Stems
c. Rachises
d. Stipules
e. Petioles

3. 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. Gluconeogenesis
b. Heme synthesis
c. Lipolysis
d. Synthesis of higher fatty acids
e. Uric acid synthesis

4. What amine causes a positive isonitrile reaction?

a. Diphenylamine
b. Benzylamine
c. Tetramethylammonium chloride
d. Diethylamine
e. N,N-Dimethylamine

5. 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. Hypothyroidism
b. Diabetes insipidus
c. Pituitary dwarfism
d. Cushing disease
e. Addison disease

6. 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. Gasping
b. Cheyne-Stokes breathing
c. Kussmaul breathing
d. Biot breathing
e. Apneic breathing

7. A patient has pulmonary edema. What drug must be prescribed in this case to reduce the volume of circulating blood?

a. Metoprolol
b. Furosemide
c. Magnesium sulfate
d. Amiodarone hydrochloride
e. Verapamil hydrochloride

8. 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. Salmonella typhi
b. Yersinia pestis
c. Bacillus subtilis
d. Borrelia recurrentis
e. Streptococcus pyogenes

9. 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. Elliptic
b. Narrowly ovate
c. Lanceolate
d. Linear
e. Ovate

10. 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. Glycerol trinitrate
b. -
c. Propranolol hydrochloride
d. Digoxin
e. Verapamil hydrochloride

11. 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. Erythropoietin
c. Renin
d. Vitamin D
e. Aldosterone

12. What group reagent can be used to separate group III cations (acid-base classification), when conducting systematic analysis of a mixture?
a. Ammonia
b. Alkali and hydrogen peroxide
c. Sulfuric acid
d. Hydrochloric acid
e. Barium chloride

13. How does the value of the critical micelle concentration in homologous series change when the molecular mass of the surfactant increases?
a. Increases
b. Decreases
c. Sharply increases
d. Remains unchanged
e. Reaches its maximum and then decreases

14. What reaction can be used to identify multiple bonds in organic compounds?
a. Friedel-Crafts alkylation
b. Wagner reaction
c. Hofmann rearrangement
d. Claisen condensation
e. Kucherov reaction

15. What anticholinesterase agent can be used to stimulate intestinal peristalsis in the patients during the postoperative period?
a. Adrenaline tartrate
b. Suxamethonium chloride
c. Salbutamol

d. Metoprolol

e. Neostigmine methylsulfate

16. The synthesis of thyroid hormones is carried out from tyrosine in a special protein of the thyroid gland. Name this protein.

a. Thyroglobulin

b. Histone

c. Interferon

d. Albumin

e. Immunoglobulin

17. Name the phenomenon when aerosol particles move in the direction of decreasing temperature.

a. Peptization

b. Electrophoresis

c. Thermophoresis

d. Sedimentation

e. Photophoresis

18. Interleukin-1 is one of the secondary pyrogens in a fever. What cells are the main producers of this pyrogen?

a. Tissue basophils

b. Platelets

c. Eosinophils

d. Macrophages

e. Lymphocytes

19. What is benzene formula?

a. C_6H_8

b. C_6H_10

c. C_4H_4

d. C_10H_8

e. C_6H_6

20. 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. -

c. Almagel

d. Pancreatin

e. Bisacodyl

21. 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. Lamiaceae

b. Ericaceae

c. Brassicaceae

d. Rosaceae

e. Fabaceae

22. A flower has many stamens, fused together by filaments into several bundles. What type of androecium is it?

a. Tetradynamous

b. Didynamous

c. Diadelphous

d. Polyadelphous

e. Monadelphous

23. What structures of a flower originate from the stem?

a. Pedicel and receptacle
b. Receptacle and perianth
c. Stamens and pistils
d. Calyx and stamens
e. Calyx and corolla

24. 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. Carbonate anions
b. Phosphate anions
c. Sulfate anions
d. Chloride anions
e. Nitrate anions

25. 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. Blockade of calcium channels in vascular smooth muscle
d. Inhibition of angiotensin-converting enzyme
e. Stimulation of alpha_2-adrenergic receptors

26. 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. Pb^2+
b. Bi^3+
c. CO_3^2-
d. Cl^-
e. NH_4^+

27. After examination, a child was diagnosed with scarlet fever. What microorganism is the causative agent of this disease?
a. Klebsiella
b. Meningococcus
c. Staphylococcus
d. Actinomycete
e. Streptococcus

28. 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. Respiratory hypoxia
b. Tissue hypoxia
c. Hemic hypoxia
d. Circulatory hypoxia
e. Hypoxic hypoxia

29. What laboratory glassware is used for dissolving an exactly measured out sample when preparing a primary standard solution?
a. Test tube
b. Beaker
c. Cylinder
d. Measuring flask
e. Measuring glass

30. A 65-year-old man developed third-degree atrioventricular block. What medicine should be prescribed for this patient?
a. Atropine sulfate
b. Amiodarone hydrochloride

c. Metoprolol
d. Digoxin
e. Verapamil hydrochloride

31. What side effect is characteristic of lisinopril?
a. Red urine
b. Dry cough
c. Bronchospasm
d. Orthostatic hypertension
e. Hyperglycemia

32. What is the mechanism of action of antiviral drug acyclovir?
a. Inhibition of nucleic acid synthesis
b. Blockade of cell wall synthesis
c. Increasing the cell membrane permeability
d. Inhibition of protein synthesis
e. Antagonism with para-aminobenzoic acid

33. Microscopy of a rhizome detects periphloematic vascular bundles. What plant does this rhizome belong to?
a. Elymus repens
b. Dryopteris filix-mas
c. Acorus calamus
d. Convallaria majalis
e. Potentilla erecta

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

35. 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. Rosaceae
c. Lamiaceae
d. Asteraceae
e. Scrophylariaceae

36. What enzyme is used to synthesize genes from matrix RNA on DNA in RNA-containing viruses?
a. Exonuclease
b. Helicase
c. Endonuclease
d. Reverse transcriptase
e. DNA ligase

37. 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. Barium ions
b. Lithium ions
c. Potassium ions
d. Ammonium ions
e. Sodium ions

38. Urinalysis of a patient with diabetes mellitus detects glucosuria. What is the renal threshold for glucose reabsorption?

a. 5 mmol/L
b. 20 mmol/L
c. 10 mmol/L
d. 15 mmol/L
e. 1 mmol/L

39. 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. Creatine
c. Protein
d. Glucose
e. Lactic acid

40. 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. alpha-adrenergic receptors
b. Nicotinic acetylcholine receptors
c. beta-adrenergic receptors
d. Muscarinic acetylcholine receptors
e. Angiotensin receptors

41. What substance is a unique accumulator, donor, and transformer of energy within the body?

a. Phosphoenolpyruvate
b. Succinyl-CoA
c. Acetyl-CoA
d. Creatine phosphate
e. Adenosine triphosphate

42. What titrimetric methods can be used for quantification of streptocide (sulfanilamide, a primary aromatic amine) in a drug?

a. Complexonometry, nitritometry
b. Nitritometry, argentometry
c. Bromatometry, complexonometry
d. Permanganometry, bromatometry
e. Bromatometry, nitritometry

43. 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. Copper
b. Iron
c. Hemosiderin
d. Vitamin B_12
e. Folic acid

44. In the cells of eukaryotic organisms, the DNA is bound to proteins. What proteins are bound to the DNA molecule and stabilize it?

a. Globulins
b. Glutelins
c. Histones
d. Interferons
e. Albumins

45. 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. Intensifying breakdown and absorption in the stomach
b. Increasing lipophilicity to improve absorption
c. Strengthening plasma protein binding
d. Preventing binding to the target receptor
e. Increasing water solubility for renal excretion

46. What compound contains a primary aromatic amino group?
a. (CH_3)_3N (trimethylamine)
b. (CH_3)_3C-NH_2 (tert-butylamine)
c. (C_6H_5)_3N (triphenylamine)
d. (CH_3)_2NH (dimethylamine)
e. C_6H_5-NH_2 (aniline)

47. 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. Scattering
b. Chemiluminescence
c. Fluorescence
d. Opalescence
e. Emission

48. 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. Clay dispersions
b. Tannin solutions
c. Surfactant solutions
d. Foams
e. Solutions of high-molecular compounds

49. What indicator is used in argentometric determination of chloride ions in Mohr's method?
a. Fluorescein
b. Potassium chromate
c. Methyl red
d. Eosin
e. Diphenylcarbazone

50. 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. Transferase
c. Oxidase
d. Hyaluronidase
e. Lyase

51. 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. Umbel
b. Flat capitulum
c. Corymb
d. Botryoid
e. Spike

52. A patient diagnosed with arterial hypertension has been prescribed a drug with an antihypertensive, antianginal, and antiarrhythmic effect. Name this drug.
a. Fenoterol
b. Metoprolol

c. Clonidine
d. Adrenaline tartrate
e. Dopamine hydrochloride

53. A patient was prescribed an antiplatelet agent that has an effect on thromboxane A_2 formation in platelets. What drug is it?
a. Prednisolone
b. Menadione
c. Adrenaline tartrate
d. -
e. Acetylsalicylic acid

54. A 65-year-old man has been diagnosed with benign prostatic hyperplasia. What adrenoblocker should he be prescribed?
a. Doxazosin mesylate
b. Adrenaline tartrate
c. Propranolol hydrochloride
d. Metoprolol
e. -

55. 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. Oxidoreductases
b. Isomerases
c. Lyases
d. Ligases
e. Transferases

56. What principle is used when calculating the phase transition temperature at different pressure?
a. Clausius-Clapeyron equation
b. Trouton rule
c. Konovalov rules
d. Mendeleev-Clapeyron equation
e. Gibbs phase rule

57. What titrants are used in quantification of iodides by means of back titration, using the Volhard method?
a. Silver nitrate, ammonium thiocyanate
b. Mercury(I) nitrate, ammonium thiocyanate
c. Silver nitrate, sodium chloride
d. Mercury(II) nitrate, ammonium thiocyanate
e. Mercury(I) nitrate, potassium thiocyanate

58. Administration of adrenaline increases glucose levels in the blood. What process is mainly activated in this case?
a. Glycogenolysis
b. Pentose phosphate pathway
c. Lipogenesis
d. Glycogenesis
e. Gluconeogenesis

59. What is the effect of electron-accepting substituents (type II substituents) on the course of electrophilic substitution (SE) reactions in arenes?
a. They have no effect on the reaction
b. They speed up the reaction and are ortho- and para-directors
c. They speed up the reaction and are meta-directors
d. They slow down the reaction and are ortho- and para-directors
e. They slow down the reaction and are meta-directors

60. 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. Pasteurization
b. Autoclaving
c. Tyndallization
d. Flame sterilization
e. Moist heat sterilization

61. 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. Thyroxine
b. Aldosterone
c. Glucocorticoids
d. Catecholamines
e. Vasopressin

62. What monomer is the basis for natural rubber?

a. Divinyl
b. Isoprene
c. Propene
d. Ethene
e. 1-Butyne

63. 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. Laticifers
b. Emergences
c. Hydathodes
d. Osmophores
e. Idioblasts

64. 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. Glaucine hydrochloride
b. Ambroxol hydrochloride
c. Bromhexine hydrochloride
d. Acetylcysteine
e. Mucaltin

65. 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. Pericarditis
b. Pulmonary embolism
c. Myocardial infarction
d. Myocarditis
e. Angina pectoris

66. 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

67. 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

68. A Gram-stained smear shows large oval violet cells that form pseudomycelium. Name these microorganisms.
a. Plasmodium malariae
b. Penicillium fungi
c. Actinomycetales
d. Candida fungi
e. Mucor fungi

69. 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. E) coli
b. Neisseria
c. S. aureus
d. Proteus vulgaris
e. Salmonella typhimurium

70. 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. Serotonin and opioid receptors
b. alpha- and beta-adrenergic receptors
c. Benzodiazepine and GABA receptors
d. Muscarinic and nicotinic acetylcholine receptors
e. H_1- and H_2-histamine receptors

71. Microscopy of plants detects parenchymal cells with thin membranes, a large nucleus, and a large number of ribosomes. What tissue is it?
a. Secretory tissue
b. Parenchyma
c. Meristematic tissue
d. Dermal tissue
e. Mechanical tissue

72. What specific reagent is used for identification of Fe^2+ cations?
a. H_2SO_4
b. NaOH
c. NH_4OH
d. K_3[Fe(CN)_6]
e. K_2Na[Co(NO_2)_6]

73. 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

74. Amylolytic enzymes catalyze hydrolysis of polysaccharides and oligosaccharides. They have an effect on the following chemical bond:

a. Glycosidic bond
b. Phosphodiester bond
c. Hydrogen bond
d. Amide bond
e. Peptide bond

75. What feature of a leaf is characteristic of Poaceae?

a. Leaf sheath
b. Stipules
c. Ochrea
d. Leaf blade
e. Petiole

76. 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. Blastopathy
b. Fetopathy
c. Gametopathy
d. Chromosome abnormality
e. Molecular genetics disease

77. What indicator is used in titrimetric determination of substances by means of mercurimetry (complexometry)?

a. Diphenylcarbazide
b. Methyl orange
c. Phenolphthalein
d. Starch
e. Potassium chromate

78. 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. Airborne and droplet transmission
c. Fecal-oral transmission
d. Indirect contact transmission
e. Arthropod-borne transmission

79. What fluid will cause plasmolysis of human blood cells, if it is mistakenly administered intravenously?

a. 0.9% glucose solution
b. 3.5% glucose solution
c. Distilled water
d. 0.9% NaCl solution
e. 3.5% NaCl solution

80. What is the typical sign of the initial stage of acute renal failure?

a. Pollakiuria
b. Dysuria
c. Anuria
d. Nocturia
e. Polyuria

81. 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. Metronidazole

b. Acyclovir
c. Clarithromycin
d. Albendazole
e. Fluconazole

82. What compound is a base for organic dyes and belongs to isolated polynuclear arenes?
a. Benzene
b. Phenanthrene
c. Anthracene
d. Cumene
e. Triphenylmethane

83. What heterocycle has acidophobic properties?
a. Thiophene
b. Quinoline
c. Pyrrole
d. Pyrimidine
e. Pteridine

84. What titrimetric method of analysis can be used for quantification of magnesium chlorides in a mixture that contains both potassium and magnesium chlorides?
a. Complexonometry
b. Argentometry
c. Nitritometry
d. Permanganatometry
e. Mercurometry

85. A plant is completely submerged in water. What ecological group does this plant belong to?
a. Succulents
b. Mesophytes
c. Xerophytes
d. Hygrophytes
e. Hydrophytes

86. 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. Liver
c. Kidneys
d. Skeletal muscles
e. Heart muscle

87. 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. Folic acid
b. -
c. Ascorbic acid
d. Retinol acetate
e. Ergocalciferol

88. What H_2-histamine blocker can be used to treat peptic ulcer disease of the stomach with increased secretory function?
a. Levocetirizine
b. Famotidine
c. Omeprazole
d. Atropine sulfate
e. Drotaverine hydrochloride

89. What value is used when calculating the osmotic pressure of electrolyte solutions according to the

Van 't Hoff's law?
a. Osmotic coefficient
b. Activity coefficient
c. Isotonic coefficient
d. Ebullioscopic constant
e. Cryoscopic constant

90. What end product forms as a result of beta-oxidation of fatty acids with an odd number of carbon atoms?
a. Palmitoyl-CoA
b. Acetyl-CoA
c. Propionyl-CoA
d. Stearoyl-CoA
e. Acetoacetyl-CoA

91. 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. Bromoderivative of D-glucose
b. D-glucose osazone
c. D-Gluconic acid
d. D-Glucuronic acid
e. D-Glucaric acid

92. 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. Anisochromia
b. Reticulocytosis
c. Poikilocytosis
d. Anisocytosis
e. Hypochromia

93. What reagent can be used for identification of lead cations according to the State Pharmacopoeia of Ukraine?
a. Formaldehyde solution
b. Sodium hydroxide
c. Potassium iodide
d. Urea
e. Sodium sulfite

94. What group of broncholytics is used for treatment of patients with bronchial asthma?
a. Nicotinic agonists
b. beta_2-adrenergic agonists
c. Muscarinic agonists
d. beta-adrenergic blockers
e. Anticholinesterase drugs

95. What law underlies the method of spectrophotometry in the ultraviolet region of the spectrum?
a. Rayleigh law
b. Ohm law
c. Beer-Bouguer-Lambert law
d. Stokes-Lommel law
e. Faraday law

96. 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. Benzene
b. Toluene

c. Phenol
d. Aniline
e. Naphthalene

97. Spore formation helps microbes survive in the environment. What microorganisms are spore formers?
a. Bacteroides
b. Staphylococcus
c. Clostridium
d. Peptostreptococcus
e. Peptococcus

98. 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. Aluminum cations
b. Copper cations
c. Cobalt cations
d. Calcium cations
e. Nickel cations

99. What type of pharmaceutical interaction is it, when absorption of tetracycline drugs becomes reduced if they are taken simultaneously with antacids?
a. Pharmacokinetic incompatibility
b. Pharmaceutical incompatibility
c. Functional antagonism
d. Pharmacodynamic incompatibility
e. Synergism

100. 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. Styloids
b. Druses
c. Crystalline sand
d. Cystoliths
e. Globoids

101. What type of chromatography includes the gas-liquid chromatography?
a. Ion exchange chromatography
b. Affinity chromatography
c. Gel chromatography
d. Adsorption chromatography
e. Distribution chromatography

102. 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. Solvents must be miscible with each other
c. The substance must enter into a chemical reaction with the solvent
d. Solvents must have similar polarity values
e. The substance must have different solubility in two different solvents

103. During practice, a student was tasked with classifying plants, dividing them into monocotyledons and dicotyledons. What family of plants belongs to the monocotyledons?
a. Rosaceae
b. Fabaceae
c. Lamiaceae
d. Poaceae
e. Brassicaceae

104. A patient was prescribed losartan potassium for treatment of arterial hypertension. What is the mechanism of action of this drug?

a. Activation of central alpha-adrenergic receptors
b. Inhibition of phosphodiesterase
c. Inhibition of angiotensin-converting enzyme
d. Blockade of angiotensin receptors
e. Calcium channel block

105. 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. RNA polymerase
b. Topoisomerase
c. Peptidyl transferase
d. Aminoacyl-tRNA synthetase
e. Reverse transcriptase

106. 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 destruction of hydrate complexes
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 formation of peroxide compounds of these cations

107. What medium is used in quantification of halide ions by means of Volhard method (thiocyanometry)?

a. Neutral
b. Weakly alkaline
c. Nitric acid
d. Phosphate acid
e. Strongly alkaline

108. D-galactose reacts with an ammonia solution of silver oxide. What functional group makes this reaction possible?

a. Aldehyde group
b. Hydroxyl group
c. Ester group
d. Carboxyl group
e. Ether group

109. Polarimetry is used for determining optically active substances. What substance can be determined, using this method?

a. Copper sulfate
b. Potassium iodide
c. Sodium chloride
d. Calcium nitrate
e. Glucose

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

a. Amylase
b. Catalase
c. Lactate dehydrogenase
d. Arginase
e. Xanthine oxidase

111. 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. Weakening of the absorption process
b. Inhibition of biotransformation
c. Accumulation of the substance in the body
d. Increased sensitivity of receptors
e. Acceleration of biotransformation

112. 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. Minor changes in enzyme activity due to enzyme thermostability
b. Increased enzyme activity due to increased molecular motion
c. Impaired structure of metal ions in the active site
d. Protein denaturation and complete loss of enzyme activity
e. Temporary decrease in enzyme activity that later resumes after cooling

113. 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. Althaea officinalis
b. Taraxacum officinale
c. Plantago major
d. Chelidonium majus
e. Vinca minor

114. What bioactive peptide is a major intracellular antioxidant and performs coenzyme functions?
a. Oxytocin
b. Bradykinin
c. Glutathione
d. Hemoglobin
e. Liberine

115. 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 breaks down faster than methanol
c. Ethanol competes with methanol for the active site of alcohol dehydrogenase
d. Ethanol inhibits methanol diffusion
e. Ethanol blocks alcohol dehydrogenase coenzyme

116. 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. Sarcina
b. Tetracocci
c. Lactobacilli
d. Pseudomonas aeruginosa
e. Micrococci

117. What electrode can be used as an indicator electrode in titration of bases?
a. Glass electrode
b. Calomel electrode
c. Quinhydrone electrode
d. Silver chloride electrode
e. Platinum electrode

118. 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. Anatoxin

b. Immunoglobulin
c. Adjuvant
d. Killed vaccine
e. Antitoxic serum

119. 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. Fluconazole
b. Doxycycline
c. Albendazole
d. Acyclovir
e. Isoniazid

120. What method of instrumental analysis can be used for quantification of hydrochloric and boric acids in a mixture?

a. Spectrophotometry
b. Chromatography
c. Polarimetry
d. Infrared spectroscopy
e. Potentiometry

121. What is characteristic of benign tumors?

a. Metastasis
b. Cancer cachexia
c. Expansive growth
d. Invasion into the surrounding tissues
e. Infiltrating growth

122. Species pectorales herbal tea contains pieces of bright yellow, sweet-tasting roots. What medicinal plant is it?

a. Plantago major
b. Althaea officinalis
c. Acorus calamus
d. Glycyrrhiza glabra
e. Valeriana officinalis

123. 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. Chronic myeloid leukemia
b. Multiple myeloma
c. Chronic lymphocytic leukemia
d. Lymphogranulomatosis
e. Agranulocytosis

124. What is the structural formula for 3-chloropropene?

a. CH_2=CCl-CH_3
b. ClCH_2-CH=CH-CH_3
c. ClCH_2-CH=CH_2
d. CH_2=CH-CH=CHCl
e. ClCH=CH-CH_3

125. Primary and secondary nitroalkanes are tautomeric compounds. What tautomerism is characteristic of these compounds?

a. Aci-nitro tautomerism

b. Tautomerism of azoles
c. Lactam-lactim tautomerism
d. Keto-enol tautomerism
e. Amino-imino tautomerism

126. 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. Potassium-sparing
b. Antispasmodic
c. Sedative
d. Analgesic
e. Irritant

127. The fructose molecule belongs to ketoses. What phenomenon causes fructose to take part in the "silver mirror" reaction?
a. Dehydration
b. Condensation
c. Epimerization
d. Conformation
e. Mutarotation

128. What method of microspecimen staining can be used to detect Mycobacterium tuberculosis?
a. Romanowsky-Giemsa stain
b. Gram stain
c. Neisser stain
d. Ziehl-Nielsen stain
e. Burri-Gins stain

129. 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. Decreased oxygen consumption and inhibition of ATP synthesis
b. Increased use of ATP for cAMP synthesis
c. Decreased ATP synthesis and energy release in the form of heat
d. Increased oxygen consumption and activation of ATP synthesis
e. Increased acetyl-CoA levels and stimulation of tricarboxylic acid cycle

130. What drug inhibits hydroxymethylglutaryl-CoA reductase enzyme and reduces cholesterol synthesis?
a. Amlodipine besylate
b. Hydrochlorothiazide
c. Atorvastatin
d. Furosemide
e. Lisinopril

131. 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 ribosomal protein synthesis
b. Disruption of cell wall synthesis
c. Inhibition of cytoplasmic membrane functions
d. Inhibition of DNA topoisomerases
e. Disruption of nucleic acid synthesis

132. What is the name of the lower expanded hollow part of the pistil that contains ovules in a flower?
a. Style
b. Receptacle
c. Gynoecium
d. Stigma

e. Ovary

133. Which one of the listed heterocyclic compounds exhibits the strongest basic properties?
a. Furan
b. Pyridine
c. Pyrrolidine
d. Thiophene
e. Pyrrole

134. 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. Biot's breathing
d. Inspiratory dyspnea
e. Kussmaul breathing

135. 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. Actinomycetes
b. Protozoa
c. Bacteria
d. Fungi
e. Viruses

136. 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. Sodium
b. Barium
c. Potassium
d. Aluminum
e. Calcium

137. What functional groups are present in the cyclic forms of ribose and deoxyribose?
a. Hydroxylic and carboxylic
b. Only aldehyde
c. Only hydroxylic
d. Hydroxylic and aldehyde
e. Only carboxylic

138. Select from the list a quantitative characteristic of Brownian motion.
a. Average particle displacement over time
b. Coefficient of proportionality
c. Coefficient of friction
d. Resistance of the medium
e. Diffusion coefficient

139. 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. Bidens tripartita
b. Chelidonium majus
c. Achillea millefolium
d. Urtica dioica
e. Artemisia absinthium

140. What antiprotozoal drug has anti-Helicobacter pylori effect?
a. Rifampicin
b. Isoniazid
c. -
d. Metronidazole
e. Albendazole

141. Phellogen forms from pericycle or ground tissue that develops meristematic activity. What type of tissue is phellogen?
a. Mechanical
b. Secretory
c. Meristematic
d. Vascular
e. Dermal

142. 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. 100
b. 50
c. 0
d. 150
e. 25

143. 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. LiCl
b. $MgCl_2$
c. $AlBr_3$
d. $CaCO_3$
e. $C_6H_{12}O_6$

144. What pair of compounds can be distinguished from each other using the silver mirror reaction?
a. n-Butane and isobutane
b. Propanal and propanone
c. 1,3-Butadiene and 1,2-butadiene
d. Ethanol and ethylene glycol
e. Propane and propene

145. What product forms as a result of aldehydes and ketones reacting with primary amines?
a. Azomethine
b. Nitrile
c. Diazine
d. Alcohol
e. Thiol

146. 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. Planar chromatography
c. Ion exchange chromatography
d. Precipitation chromatography
e. Paper chromatography

147. What adsorption indicator is used in quantification of iodides by means of the Fajans method?
a. Murexide
b. Diphenylamine
c. Methyl orange
d. Eosin

e. Phenolphthalein

148. What inflorescences are most typical of the Brassicaceae family?

a. Raceme, panicle

b. Compound corymb, compound umbel

c. Round or flat capitulum

d. Corymb, umbel

e. Spadix, spike

149. 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. Acromegaly

b. Thyrotoxicosis

c. Pheochromocytoma

d. Cushing disease

e. Insulinoma

150. 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. Furosemide

c. Diphenhydramine hydrochloride

d. Adrenaline tartrate

e. Propranolol hydrochloride