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

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

3. 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. Monocytosis
b. Lymphocytosis
c. Basophilia
d. Neutrophilia
e. Eosinophilia

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

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

5. Which one of the listed heterocyclic compounds exhibits the strongest basic properties?

a. Thiophene
b. Pyrrolidine
c. Pyrrole
d. Furan
e. Pyridine

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

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

7. What is the name of the lower expanded hollow part of the pistil that contains ovules in a flower?

a. Gynoecium
b. Receptacle
c. Ovary
d. Style
e. Stigma

8. 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. Lactic acid
b. Creatine
c. Indican
d. Protein
e. Glucose

9. What medium is used in quantification of halide ions by means of Volhard method (thiocyanometry)?
a. Strongly alkaline
b. Weakly alkaline
c. Neutral
d. Phosphate acid
e. Nitric acid

10. 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. Inhibition of phosphodiesterase
c. Activation of central alpha-adrenergic receptors
d. Calcium channel block
e. Blockade of angiotensin receptors

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

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

13. 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. Chromosome abnormality
c. Blastopathy
d. Fetopathy
e. Molecular genetics disease

14. 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. Achillea millefolium
b. Artemisia absinthium
c. Bidens tripartita
d. Urtica dioica

e. Chelidonium majus

15. 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. Acetylsalicylic acid
d. Adrenaline tartrate
e. -

16. 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. 0
c. 25
d. 150
e. 50

17. 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

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

19. 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. C_6H_12O_6
b. LiCl
c. MgCl_2
d. AlBr_3
e. CaCO_3

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

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

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

23. A plant is completely submerged in water. What ecological group does this plant belong to?

a. Succulents
b. Hygrophytes
c. Hydrophytes
d. Xerophytes
e. Mesophytes

24. Microscopy of a rhizome detects periphloematic vascular bundles. What plant does this rhizome belong to?

a. Elymus repens
b. Potentilla erecta
c. Convallaria majalis
d. Dryopteris filix-mas
e. Acorus calamus

25. 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. Aldosterone
b. Erythropoietin
c. Nitric oxide
d. Vitamin D
e. Renin

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

27. 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. -
b. Verapamil hydrochloride
c. Digoxin
d. Glycerol trinitrate
e. Propranolol hydrochloride

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

29. 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. Addison disease
c. Pituitary dwarfism
d. Diabetes insipidus
e. Cushing disease

30. A 65-year-old man developed third-degree atrioventricular block. What medicine should be prescribed for this patient?

a. Verapamil hydrochloride
b. Digoxin
c. Atropine sulfate
d. Amiodarone hydrochloride
e. Metoprolol

31. What specific reagent is used for identification of Fe^2+ cations?

a. NH_4OH
b. K_3[Fe(CN)_6]
c. K_2Na[Co(NO_2)_6]
d. H_2SO_4
e. NaOH

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

a. Metoprolol
b. Suxamethonium chloride
c. Adrenaline tartrate
d. Neostigmine methylsulfate
e. Salbutamol

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

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

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

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

35. What group reagent can be used to separate group III cations (acid-base classification), when conducting systematic analysis of a mixture?

a. Sulfuric acid
b. Barium chloride
c. Ammonia
d. Hydrochloric acid
e. Alkali and hydrogen peroxide

36. 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. Kidney failure

b. Diabetes insipidus
c. Insulinoma
d. Diabetes mellitus
e. Nephrogenic diabetes insipidus

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

38. What amine causes a positive isonitrile reaction?
a. N,N-Dimethylamine
b. Benzylamine
c. Tetramethylammonium chloride
d. Diethylamine
e. Diphenylamine

39. What inflorescences are most typical of the Brassicaceae family?
a. Raceme, panicle
b. Compound corymb, compound umbel
c. Spadix, spike
d. Corymb, umbel
e. Round or flat capitulum

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

41. Amylolytic enzymes catalyze hydrolysis of polysaccharides and oligosaccharides. They have an effect on the following chemical bond:
a. Glycosidic bond
b. Peptide bond
c. Hydrogen bond
d. Phosphodiester bond
e. Amide bond

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

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

44. What adsorption indicator is used in quantification of iodides by means of the Fajans method?
a. Murexide

b. Methyl orange
c. Phenolphthalein
d. Eosin
e. Diphenylamine

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

46. 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. Heart muscle
b. Skeletal muscles
c. Liver
d. Kidneys
e. Adrenal glands

47. A flower has many stamens, fused together by filaments into several bundles. What type of androecium is it?
a. Polyadelphous
b. Diadelphous
c. Monadelphous
d. Didynamous
e. Tetradynamous

48. 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. Lyase
b. Oxidase
c. Transferase
d. Carbohydrase
e. Hyaluronidase

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

50. What is characteristic of benign tumors?
a. Invasion into the surrounding tissues
b. Infiltrating growth
c. Expansive growth
d. Metastasis
e. Cancer cachexia

51. 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. Yersinia pestis
c. Streptococcus pyogenes
d. Borrelia recurrentis
e. Salmonella typhi

52. What functional groups are present in the cyclic forms of ribose and deoxyribose?

a. Only hydroxylic

b. Hydroxylic and aldehyde

c. Only carboxylic

d. Hydroxylic and carboxylic

e. Only aldehyde

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

a. Spectrophotometry

b. Potentiometry

c. Chromatography

d. Infrared spectroscopy

e. Polarimetry

54. 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. Vinca minor

b. Taraxacum officinale

c. Plantago major

d. Althaea officinalis

e. Chelidonium majus

55. 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. Opalescence

d. Emission

e. Fluorescence

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

a. Verapamil hydrochloride

b. Metoprolol

c. Furosemide

d. Amiodarone hydrochloride

e. Magnesium sulfate

57. 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. Rosaceae

b. Scrophylariaceae

c. Solanaceae

d. Lamiaceae

e. Asteraceae

58. 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. Diphenhydramine hydrochloride

b. Furosemide

c. Adrenaline tartrate

d. Atropine sulfate

e. Propranolol hydrochloride

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

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

61. What is the structural formula for 3-chloropropene?
a. ClCH=CH-CH_3
b. CH_2=CCl-CH_3
c. ClCH_2-CH=CH_2
d. CH_2=CH-CH=CHCl
e. ClCH_2-CH=CH-CH_3

62. 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

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

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

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

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

67. What method of chromatographic analysis can be used for separation, identification, and quantification of methanol and ethanol in a mixture?
a. Planar chromatography
b. Precipitation chromatography
c. Paper chromatography
d. Ion exchange chromatography
e. Gas-liquid chromatography

68. Primary and secondary nitroalkanes are tautomeric compounds. What tautomerism is characteristic of these compounds?
a. Tautomerism of azoles
b. Lactam-lactim tautomerism
c. Keto-enol tautomerism
d. Amino-imino tautomerism
e. Aci-nitro tautomerism

69. A patient diagnosed with arterial hypertension has been prescribed a drug with an antihypertensive, antianginal, and antiarrhythmic effect. Name this drug.
a. Adrenaline tartrate
b. Fenoterol
c. Clonidine
d. Metoprolol
e. Dopamine hydrochloride

70. Urinalysis of a patient with diabetes mellitus detects glucosuria. What is the renal threshold for glucose reabsorption?
a. 1 mmol/L
b. 10 mmol/L
c. 5 mmol/L
d. 15 mmol/L
e. 20 mmol/L

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

72. 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 destruction of hydrate complexes
c. For formation of hydroxo- and oxoanions of these elements at the highest oxidation degrees
d. For more complete precipitation of these cations
e. For formation of hydroxo- and oxoanions of these elements at the lowest oxidation degrees

73. 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. Aniline
c. Toluene
d. Benzene
e. Phenol

74. 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. Interferons
c. Glutelins
d. Histones
e. Globulins

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

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

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

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

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

80. At a pharmaceutical factory, an alkaloid must be extracted from a herbal raw material. What would ensure effective extraction of this substance?
a. Solvents must be miscible with each other
b. Solvents must have similar polarity values
c. The substance must enter into a chemical reaction with the solvent
d. The substance must have different solubility in two different solvents

e. The extraction process must be carried out at a high temperature

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

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

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

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

85. 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. Cystoliths
c. Crystalline sand
d. Globoids
e. Druses

86. Berberis vulgaris has spines that are modifications of:
a. Rachises
b. Stems
c. Stipules
d. Leaves
e. Petioles

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

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

e. Ethanol and ethylene glycol

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

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

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

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

93. What value is used when calculating the osmotic pressure of electrolyte solutions according to the Van 't Hoff's law?
a. Isotonic coefficient
b. Cryoscopic constant
c. Ebullioscopic constant
d. Osmotic coefficient
e. Activity coefficient

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

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

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

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

98. What fluid will cause plasmolysis of human blood cells, if it is mistakenly administered intravenously?
a. 0.9% glucose solution
b. 3.5% NaCl solution
c. 0.9% NaCl solution
d. Distilled water
e. 3.5% glucose solution

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

100. What titrimetric methods can be used for quantification of streptocide (sulfanilamide, a primary aromatic amine) in a drug?
a. Bromatometry, complexonometry
b. Bromatometry, nitritometry
c. Nitritometry, argentometry
d. Permanganometry, bromatometry
e. Complexonometry, nitritometry

101. What is the typical sign of the initial stage of acute renal failure?
a. Polyuria
b. Dysuria
c. Nocturia
d. Anuria
e. Pollakiuria

102. What substance is a unique accumulator, donor, and transformer of energy within the body?
a. Succinyl-CoA
b. Phosphoenolpyruvate
c. Adenosine triphosphate
d. Creatine phosphate
e. Acetyl-CoA

103. Interleukin-1 is one of the secondary pyrogens in a fever. What cells are the main producers of this pyrogen?
a. Lymphocytes
b. Tissue basophils
c. Macrophages
d. Platelets
e. Eosinophils

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

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

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

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

108. What is propene structural formula?
a. CH_3-CH_2-CH_3
b. CH_3-CH_2-CH=CH-CH_3
c. -
d. CH_3-CH=CH-CH_3
e. CH_3-CH=CH_2

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

110. Species pectorales herbal tea contains pieces of bright yellow, sweet-tasting roots. What medicinal plant is it?
a. Plantago major
b. Althaea officinalis
c. Glycyrrhiza glabra
d. Acorus calamus
e. Valeriana officinalis

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

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

112. 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. NH_4^+
b. Pb^{2+}
c. Cl^-
d. Bi^{3+}
e. CO_3^{2-}

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

114. What monomer is the basis for natural rubber?
a. Isoprene
b. Divinyl
c. 1-Butyne
d. Propene
e. Ethene

115. 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. Potassium ions
c. Ammonium ions
d. Sodium ions
e. Barium ions

116. Polarimetry is used for determining optically active substances. What substance can be determined, using this method?
a. Calcium nitrate
b. Glucose
c. Potassium iodide
d. Copper sulfate
e. Sodium chloride

117. 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. alpha-adrenergic receptors
c. Muscarinic acetylcholine receptors
d. Angiotensin receptors
e. Nicotinic acetylcholine receptors

118. 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. Uric acid synthesis

c. Lipolysis
d. Heme synthesis
e. Synthesis of higher fatty acids

119. 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. Arthropod-borne transmission
b. Parenteral transmission
c. Airborne-droplet transmission
d. Alimentary transmission
e. Airborne-dust transmission

120. 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. Parenchyma
c. Secretory tissue
d. Dermal tissue
e. Meristematic tissue

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

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

123. 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. Almagel
b. Pancreatin
c. -
d. Drotaverine hydrochloride
e. Bisacodyl

124. 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

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

e. Pentose phosphate pathway

126. Name the phenomenon when aerosol particles move in the direction of decreasing temperature.
a. Sedimentation
b. Photophoresis
c. Electrophoresis
d. Thermophoresis
e. Peptization

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

128. 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. Acyclovir
c. Albendazole
d. Isoniazid
e. Doxycycline

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

130. 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 slow down the reaction and are ortho- and para-directors
c. They speed up the reaction and are meta-directors
d. They have no effect on the reaction
e. They slow down the reaction and are meta-directors

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

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

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

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

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

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

137. What is benzene formula?
a. C_10H_8
b. C_6H_6
c. C_4H_4
d. C_6H_8
e. C_6H_10

138. 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. Ericaceae
b. Brassicaceae
c. Rosaceae
d. Lamiaceae
e. Fabaceae

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

140. 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. Agranulocytosis
d. Lymphogranulomatosis
e. Chronic lymphocytic leukemia

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

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

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

144. 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. Cushing disease
c. Insulinoma
d. Acromegaly
e. Thyrotoxicosis

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

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

147. A person has been hospitalized with the diagnosis of malaria. What route of infection transmission is characteristic of this disease?
a. Indirect contact transmission
b. Fecal-oral transmission

c. Direct contact transmission
d. Arthropod-borne transmission
e. Airborne and droplet transmission

148. The synthesis of thyroid hormones is carried out from tyrosine in a special protein of the thyroid gland. Name this protein.
a. Interferon
b. Thyroglobulin
c. Histone
d. Albumin
e. Immunoglobulin

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

150. What structures of a flower originate from the stem?
a. Calyx and stamens
b. Pedicel and receptacle
c. Calyx and corolla
d. Stamens and pistils
e. Receptacle and perianth