

1. Examination of a patient with edemas detects proteinuria, arterial hypertension, hypoproteinemia, and retention hyperlipidemia. What syndrome is it?

- A. Nephrotic
- B. Anemic
- C. Hypertensive
- D. Urate
- E. Urinary

2. In treatment of purulent wounds, a dressing with a certain immobilized enzyme is used. Name this enzyme.

- A. Tripsin
- B. Arginase
- C. Catalase
- D. Alkaline phosphatase
- E. Acid phosphatase

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

- A. *Dryopteris filix-mas*
- B. *Potentilla erecta*
- C. *Convallaria majalis*
- D. *Elymus repens*
- E. *Acorus calamus*

4. In plants, the synthesis of secondary reserve starch takes place in:

- A. Amyloplasts
- B. Chloroplasts
- C. Chromoplasts
- D. Elaioplasts
- E. Proteinoplasts

5. What coordinates are used in the calibration graph for the quantification of copper salts using the photometry method?

- A. Optical density — concentration
- B. Optical density — temperature
- C. Optical density — liquid layer thickness
- D. Light absorption intensity — wavelength
- E. Optical density — wavelength

6. A 2M solution of *HCl* was added into the solution being analyzed, which resulted in formation of a white precipitate that turned black when processed with an ammonia solution. What cation is present in this solution?

- A. Hg_2^{2+}
- B. Ag^+
- C. Pb^{2+}
- D. Ba^{2+}
- E. Mg^{2+}

7. HIV-infection occupational risk groups include people of various professions, with healthcare workers being one such group. What is the most likely route of infection transmission to healthcare workers?

- A. Parenteral transmission
- B. Fecal-oral transmission
- C. Airborne droplet transmission
- D. Transmission via airborne dust particles
- E. Vector-borne transmission

8. Liquid dosage forms containing camphor and chloral hydrate are used in dental practice. What phases are in equilibrium at the eutectic point in such dosage forms?

- A. Melt of the eutectic composition, chloral hydrate crystals, camphor crystals
- B. Melt of the eutectic composition
- C. Crystals of camphor and chloral hydrate
- D. Melt of the eutectic composition and crystalline camphor
- E. Melt of the eutectic composition and crystalline chloral hydrate

9. What medium is necessary for determining the halide ions argentometrically using the Volhard method?

- A. Nitric acid medium
- B. Acetic acid medium
- C. Neutral medium
- D. Weak alkaline medium
- E. Strong alkaline medium

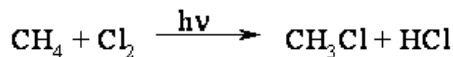
10. A pus sample taken from the urethra had been inoculated on ascitic agar, which resulted in the growth of round transparent colonies. Microscopy of the colonies detects Gram-negative bean-shaped diplococci. What causative agent is it?

- A. Gonococcus
- B. Pneumococcus
- C. Meningococcus
- D. Micrococcus
- E. Streptococcus

11. Children receive DPT vaccine for prevention of pertussis, diphtheria, and tetanus. What type of vaccine contains killed microbial cells of one pathogen and anatoxins of other pathogens?

- A. Combination vaccine
- B. Genetically engineered vaccine
- C. Chemical vaccine
- D. Autovaccine
- E. Anti-idiotypic vaccine

12. What is the mechanism of the methane chlorination reaction that occurs according to the following equation:



?

- A. S_R
- B. S_N
- C. S_E
- D. A_N
- E. A_E

13. After the total resection of the stomach, the patient developed severe B_{12} -deficiency anemia with impaired hematopoiesis and altered erythrocytes appearing in the blood. What forms of erythrocytes indicate this disease in the patient, if they are present in the blood?

- A. Megalocytes
- B. Microcytes
- C. Ovalocytes
- D. Normocytes
- E. Annulocytes (codocytes)

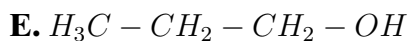
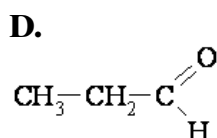
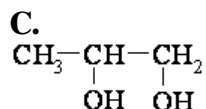
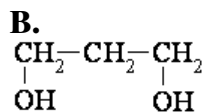
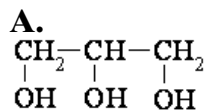
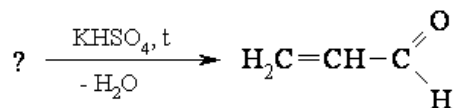
14. What cations have the highest mobility among those listed below?

- A. Hydroxonium cations
- B. Sodium cations
- C. Potassium cations
- D. Lithium cations
- E. Ammonium cations

15. Examination of a sputum sample obtained from a patient with suspected tuberculosis revealed thin, long, slightly curved bacilli in the specimen. The bacilli were stained ruby-red and arranged in chains. What staining method was used in this case?

- A. Ziehl-Neelsen
- B. Loeffler
- C. Gram
- D. Ozheshko
- E. Romanowsky-Giemsa

16. What compound forms acrolein when heated with water-removing reagents according to the scheme given below?



17. What solution has the highest osmotic pressure at the temperature of 298 K?

- A. Aluminum sulfate solution
- B. Urea solution
- C. Glucose solution
- D. Sodium benzoate solution
- E. Sodium sulfate solution

18. Staphylococci grow well on common nutrient media. However, when isolating pure cultures from patients, blood agar and yolk-salt agar are used for inoculation. What is the purpose of using these nutrient media?

- A. To determine the pathogenicity factors
- B. To determine the tinctorial properties
- C. To study the antigenic properties
- D. To determine the mobility of the bacteria
- E. To measure the sensitivity to antibiotics

19. Chromatographic methods can be classified by the mechanism of the separation process. What type of chromatography is gas-liquid chromatography?

- A. Distribution chromatography
- B. Adsorption chromatography
- C. Ion-exchange chromatography
- D. Gel-filtration chromatography
- E. Affinity chromatography

20. What solution is used to standardi-

ze the silver(I) nitrate titrant solution in Mohr's method?

- A. Sodium chloride solution
- B. Sodium carbonate solution
- C. Potassium dichromate solution
- D. Sodium tetraborate solution
- E. Sodium oxalate solution

21. Isoelectric state of protein molecules depends on the:

- A. pH of the medium
- B. Concentration of the solvent
- C. Mass of the solute
- D. Shape of the protein molecule
- E. Solution preparation technique

22. What method is used for the quantification of bismuth in a preparation?

- A. Complexonometry
- B. Iodometry
- C. Mercurimetry
- D. Permanganatometry
- E. Argentometry

23. What method is used for the quantification of ammonia?

- A. Alkalimetry, back titration
- B. Acidimetry, back titration
- C. Alkalimetry, direct titration
- D. Acidimetry, direct titration
- E. Complexonometry

24. In cases of long-term intoxication, a significant decrease in the activity of aminoacyl-tRNA synthetases can be observed. What metabolic process becomes disturbed in such cases?

- A. Biosynthesis of proteins
- B. DNA replication
- C. DNA repair
- D. Genetic recombination
- E. RNA processing

25. A woman, who works at a plant that produces phenylhydrazine, has been hospitalized with complaints of general weakness, dizziness, and drowsiness. Her blood test shows signs of anemia with high levels of reticulocytosis, anisocytosis, and poikilocytosis, as well as isolated normocytes. What type of anemia is observed in the patient?

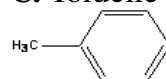
- A. Hemolytic
- B. Iron deficiency
- C. Protein deficiency
- D. Aplastic
- E. Metaplastic

26. To determine the type of botulinum toxin, a reaction of toxin neutralization with antitoxin is performed on laboratory mice. Name this research method.

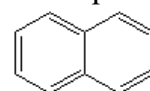
- A. Biological method
- B. Microscopy
- C. Allergy testing
- D. Microbiological method
- E. —

27. What compound is the most resistant to oxidants?

- A. Benzene C_6H_6
- B. Hexanol $C_6H_{13}OH$
- C. Toluene



D. Naphthalene

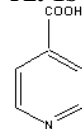


E. Furan



28. Which one of the listed compounds is an amphoteric one?

A. Isonicotinic acid



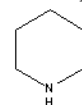
B. Pyridine



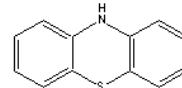
C. Pyrimidine



D. Piperidine



E. Phenothiazine



29. In monocotyledons, metabolism end products are often represented by multiple needle crystals of calcium oxalate arranged in clusters. Name these structures.

- A.** Raphides
- B.** Druses
- C.** Styloids
- D.** Twinned crystals
- E.** Crystalline sand

30. The material obtained from a patient with dysentery was sent to a bacteriological laboratory. What serological reaction must be used to identify the isolated pure culture of bacteria?

- A.** Agglutination
- B.** Precipitation in gel
- C.** Complement fixation
- D.** Neutralization
- E.** Precipitin ring assay

31. Analysis of the plant parts detects fragments of rhizomes. Their microscopy revealed periphloematic vascular bundles on section. What plants do these samples belong to?

- A.** Ferns
- B.** Monocotyledons
- C.** Dicotyledons
- D.** Gymnosperms
- E.** Algae

32. In what taxonomic division is the gametophyte predominant over the sporophyte during the plant's life cycle?

- A.** *Bryophyta*
- B.** *Magnoliophyta*
- C.** *Pnyophyta*
- D.** *Lycopodiophyta*
- E.** *Polypodiophyta*

33. A 30-year-old man has developed an anaphylactic allergic reaction after taking a herbal medicine. Leukocytosis was observed in the patient's blood. What type of leukocytosis is characteristic of such cases?

- A.** Eosinophilia
- B.** Monocytosis
- C.** Lymphocytosis
- D.** Basophilia
- E.** Neutrophilia

34. The pharmacological effect of some antidepressants is associated with detoxification of biogenic amines in the brain. What enzyme inactivates biogenic ami-

nes?

- A.** Monoamine oxidase
- B.** Decarboxylase
- C.** Lactate dehydrogenase
- D.** Deaminase
- E.** Transaminase

35. What rule describes the coagulation of sols under the effect of electrolytes?

- A.** Schulze-Hardy rule
- B.** Gibbs rule
- C.** Duclos–Traube rule
- D.** Van 't Hoff rule
- E.** Arrhenius equation

36. Allopurinol is used to treat gout. What is the mechanism of action of this drug?

- A.** Competitive inhibitor of xanthine oxidase
- B.** Xanthine oxidase activator
- C.** Xanthine oxidase coenzyme
- D.** Inhibitor of purine nucleotide synthesis
- E.** Activator of purine nucleotide catabolism

37. One of the biological functions performed by glycoproteins in the body is a regulatory (hormone) function. What hormone is a glycoprotein based on its chemical nature?

- A.** Thyrotropin
- B.** Cortisol
- C.** Aldosterone
- D.** Insulin
- E.** Glucagon

38. During active muscle work, anaerobic glycolysis is the main source of energy, causing the accumulation of lactate in the muscles, the level of which gradually decreases. During what interorgan cycle does the utilization of lactate take place afterwards?

- A.** Cori cycle
- B.** Krebs cycle
- C.** Pentose phosphate cycle
- D.** Urea cycle
- E.** Knoop-Lynen cycle

39. What drug has a hypoglycemic effect because it stimulates pancreatic β -cells?

- A.** Glibenclamide
- B.** Prednisolone
- C.** Epinephrine
- D.** Nandrolone
- E.** Heparin

40. A 34-year-old woman with bronchi-

tis has persistent dry non-productive cough. Her physician has prescribed her a centrally-acting antitussive drug. Name this drug.

- A. Glaucine
- B. Mucaltin
- C. Bromhexine
- D. Ambroxol
- E. Acetylcysteine

41. What drug is a potent short- and fast-acting loop diuretic?

- A. Furosemide
- B. Clopamide
- C. Diacarb (Acetazolamide)
- D. Spironolactone
- E. Triamterene

42. A patient was prescribed an anti-platelet agent that has an effect on thromboxane formation in platelets. What drug is it?

- A. Acetylsalicylic acid
- B. Menadione
- C. Epinephrine
- D. Calcium chloride
- E. Prednisolone

43. Select from the list an antiprotozoal drug with anti-*Helicobacter pylori* effect.

- A. Metronidazole
- B. Isoniazid
- C. Rifampicin
- D. Aciclovir
- E. Benzylpenicillin sodium salt

44. What causes the dry cough that developed in a patient who has been taking lisinopril for a long time to treat her essential hypertension?

- A. Increased bradykinin levels
- B. Depletion of the noradrenaline reserves
- C. Accumulation of angiotensin II
- D. Inhibition of angiotensin receptors
- E. Decreased renin levels

45. A 45-year-old patient with rheumatoid arthritis was prescribed a glucocorticoid. Select this drug from the list.

- A. Prednisolone
- B. Ibuprofen
- C. Mefenamic acid
- D. Insulin
- E. Metamizole sodium

46. A patient with peptic ulcer disease of the duodenum was taking a histamine H_2 receptor blocker. Which one of the listed

drugs belongs to this group?

- A. Famotidine
- B. Pirenzepine
- C. Omeprazole
- D. Mebeverine
- E. Allochol

47. Long-term taking of sulfonamides has resulted in the patient developing anemia, leukopenia, and thrombocytopenia. What is the mechanism of development of these disorders?

- A. Inhibition of hematopoiesis in the bone marrow
- B. Destruction of blood elements
- C. Intensified use of blood elements
- D. Bone marrow stimulation
- E. These disorders have not been caused by the medicines

48. An outbreak of acute intestinal infection has occurred in a kindergarten. An epidemiological laboratory team has studied the hand lavages of kitchen workers. What microorganisms in the hand lavages can indicate a fecal contamination?

- A. *E. coli*
- B. *S. aureus*
- C. *C. albicans*
- D. *Actinomyces*
- E. *Streptomyces*

49. 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. Globoids
- C. Druses
- D. Crystalline sand
- E. Cystoliths

50. A 71-year-old woman with cholecystitis has developed mechanical jaundice. What type of arrhythmia will develop in this case?

- A. Sinus bradycardia
- B. Sinus tachycardia
- C. Extrasystole
- D. Atrioventricular block
- E. Ciliary arrhythmia

51. A unilocular, single-seeded fruit has a pericarp with an exocarp, a juicy mesocarp, and a lignified endocarp. What plant is it characteristic of?

- A. *Armeniaca vulgaris*
- B. *Quercus robur*
- C. *Leonurus quinquelobatus*
- D. *Coriandrum sativum*
- E. *Potentilla erecta*

52. Ammonia is a highly toxic substance, especially for the nervous system. Ammonia binds with a certain metabolite of the tricarboxylic acid cycle, forming glutamate and glutamine. What metabolite is it?

- A. α -Ketoglutarate
- B. Citrate
- C. Fumarate
- D. Malate
- E. Succinate

53. A part of the energy that is released from a glucose molecule becomes stored in the process of a substrate-level phosphorylation reaction. What macroergic compound forms in the process of glycolysis in phosphorylation reactions?

- A. Phosphoenolpyruvate
- B. UTP
- C. Malate
- D. ThTP
- E. Lactate

54. Metal ions in the blood are transported in a complex with proteins. What blood protein contains copper?

- A. Ceruloplasmin
- B. Fibrinogen
- C. Thrombin
- D. Albumin
- E. Fibrinolysin

55. A laboratory has conducted a soil study to identify the causative agents of an anaerobic infection. Spore-forming is a characteristic feature of these bacteria. What staining technique can be used to detect spores?

- A. Ozheshko stain
- B. Burri-Gins stain
- C. Neisser stain
- D. Romanowsky-Giemsa stain
- E. Morozov stain

56. In titrimetry, the titer of the titrant by the analyte is often used in calculations. What does the titer by the analyte indicate?

- A. The mass of the analyte substance, equivalent to 1 mL of the titrant solution
- B. The mass of the analyte substance, equivalent to 1 g of the titrant solution
- C. The mass of the titrant substance, equivalent to 1 g of the analyte substance
- D. The mass of the titrant substance, equivalent to 1 mL of the analyte substance solution
- E. The mass of the titrant, equivalent to 1 mL of the analyte substance

57. A 2M solution of HCl was added into the studied solution, resulting in formation of a white precipitate that dissolved when heated. What cations are present in the solution?

- A. Pb^{2+}
- B. Hg^{22+}
- C. Ag^+
- D. Ba^{2+}
- E. Mg^{2+}

58. What parameter must be determined during a blood test for erythrocyte sedimentation rate?

- A. Sedimentation stability
- B. Coagulation threshold
- C. Aggregative stability
- D. Kinetic stability
- E. —

59. The leaves of a plant that is being studied have a well-defined main vein located in the center, from which the secondary veins branch off to the sides at equal distances. What type of venation is it?

- A. Pinnate
- B. Palmate
- C. Arcuate
- D. Parallel
- E. Dichotomous

60. Microscopy of a leaf of a heliophyte plant detects several dense layers of elongated chlorophyll-containing cells that are located under the epidermis. These cells are oriented perpendicular to the surface of the leaf. What type of parenchyma is it?

- A. Palisade parenchyma
- B. Spongy parenchyma
- C. Folded parenchyma
- D. Water-storage parenchyma
- E. Storage parenchyma

61. What parameter determines the coagulating power of an electrolyte?

- A.** Charge of the coagulator ion
B. Electrolyte concentration
C. Sol dispersion degree
D. Sol volume
E. Sol density
- 62.** A patient has acute pancreatitis. What is the leading link in the pathogenesis of this disease?
- A.** Early activation of trypsin and elastase
B. Atherosclerosis of pancreatic vessels
C. Arterial hypertension
D. Autoallergy
E. Disturbed trophism of exocrine pancreatocytes
- 63.** To study the sanitary and microbiological quality of water at a laboratory, the minimum volume of water, in which bacteria of the *Escherichia coli* group can be detected, was determined. According to the State Standard of Ukraine, this value must be no less than:
- A.** 300
B. 100
C. 200
D. 400
E. 500
- 64.** A pregnant woman was administered fenoterol to reduce the uterine tone for the correction of her labor activity. What is the mechanism of the uterolytic effect of this drug?
- A.** Stimulation of β_2 -adrenoceptors of the uterus
B. Stimulation of α_1 -adrenoceptors of the uterus
C. Blocking β_2 -adrenoceptors of the uterus
D. Stimulation of β_2 - and α_1 -adrenoceptors of the uterus
E. Direct antispasmodic effect
- 65.** A 65-year-old patient has been diagnosed with prostate adenoma. What adrenoblocker should he be prescribed?
- A.** Doxazosin
B. Atenolol
C. Propranolol
D. Metoprolol
E. Nifedipine
- 66.** A patient with epilepsy was prescribed sodium valproate. What is the mechanism of action of this drug?
- A.** Increasing GABA levels in the brain
B. Stimulation of α -adrenergic receptors
C. Stimulation of opioid receptors
D. Stimulation of butyrylcholinesterase activity
E. Stimulation of β -adrenergic receptors
- 67.** In a plant being studied, epidermis of some of the leaves has a thick cuticle and a layer of wax on the surface, while epidermis of the other leaves has scales or numerous trichomes and only a few stomata. What group does this plant belong to?
- A.** Xerophytes
B. Mesophytes
C. Hydrophytes
D. Hygrophytes
E. Ephemerals
- 68.** Stone cells shaped like dumbbells or tubular bones were detected in begonia leaves. What type of cells do they belong to?
- A.** Osteosclereids
B. Macrosclereids
C. Astrosclereids
D. Trichosclereids
E. Fibrosclereids
- 69.** At the end of his shift, a worker at the steel foundry felt dizziness and fever of 38.5°C . What condition can be observed in this worker?
- A.** Hyperthermia
B. Decompression
C. Fever
D. Hypothermia
E. Hypertension
- 70.** A patient with a hypertensive crisis was administered magnesium sulfate, which resulted in a sharp drop of the patient's blood pressure. What drug can be used in this case to eliminate the side effects of magnesium sulfate?
- A.** Calcium chloride
B. Potassium chloride
C. Trilon B (EDTA disodium salt)
D. Sodium bromide
E. Sodium sulfate
- 71.** What titrimetric method of analysis is used for the quantification of calcium chloride?

- A. Permanganometry, back titration
- B. Cerimetry, direct titration
- C. Permanganometry, direct titration
- D. Nitritometry, direct titration
- E. Acidimetry, back titration

72. What is the taxonomic division of a plant with periphloematic fibrovascular bundles that were detected during the study of the anatomical structure of its rhizome?

- A. Polypodiophyta
- B. Bryobionta
- C. Angiosperms
- D. Gymnosperms
- E. Green algae

73. All bacteria have a number of fundamental characteristics that distinguish them from microscopic fungi and protozoa. What is the main morphological difference of a bacterial cell?

- A. Nucleoid
- B. Differentiated nucleus
- C. Ribosomes
- D. Cell wall
- E. Size

74. What coordinates are used to build monomolecular adsorption isotherms?

- A. Adsorption — concentration
- B. Surface tension — concentration
- C. Inverse adsorption — inverse concentration
- D. Logarithm of adsorption — concentration
- E. Inverse adsorption — concentration

75. Extraction is often used in analysis of medicinal substances. In this method, the degree of extraction of the substance that is being determined depends on the following:

- A. Distribution coefficient
- B. pH of the solution
- C. Temperature
- D. The amount of the substance being extracted
- E. The mass of the substance being extracted

76. Ascorutin is used in treatment of bleeding gums and punctate hemorrhages. What vitamin does it contain?

- A. C
- B. K
- C. D
- D. A
- E. E

77. The breakdown of hemoglobin is accompanied by the formation of bile pigments. What pigment forms as a result of the heme oxidation reaction?

- A. Biliverdin
- B. Chlorophyll
- C. Stercobilinogen
- D. Urobilinogen
- E. Carotene

78. Electrochemical methods of analysis use various electrodes to identify pharmaceutical preparations. What electrode has the potential that depends on the concentration of the ion that is being determined?

- A. Indicator electrode
- B. Reference electrode
- C. Silver chloride electrode
- D. Calomel electrode
- E. Standard electrode

79. Select lyophilic systems among the dispersion systems listed below.

- A. Surfactant solutions
- B. Emulsions
- C. Suspensions
- D. Sols
- E. Solid foams

80. Ammoniacal buffer and 8-oxyquinoline solution were added into the solution containing cations of the fifth analytical group, which resulted in formation of a green-yellow precipitate. This qualitative reaction corresponds with the following cations:

- A. Magnesium cations
- B. Calcium cations
- C. Ammonium cations
- D. Iron(II) cations
- E. Manganese cations

81. An iodine solution was prepared using the method of established titer. What primary standards can be used for the standardization in this case?

- A. Hydrazine sulfate and arsenic(III) oxide
- B. Ammonium oxalate and oxalic acid
- C. Metallic iron and iron(II) sulfate
- D. Potassium dichromate and potassium bromate
- E. Sodium tetraborate and sodium carbonate

82. Nitritometry is used to determine primary aromatic amines. What indicator is used in the process?

- A. Tropaeolin 00
- B. Methyl orange
- C. Phenolphthalein
- D. Potassium chromate
- E. Eosin

83. Leaves of a *Lamiaceae* family plant are ovate, with a crenate margin, darker on the top than on the bottom, and have a characteristic lemon-like smell. What plant has these characteristic features?

- A. *Melissa officinalis*
- B. *Salvia officinalis*
- C. *Leonurus cardiaca*
- D. *Mentha piperita*
- E. *Lamium album*

84. A group of tourists set off for a hiking tour into the mountains. Two hours after the departure, some of them developed tachycardia and shortness of breath, which indicates hypoxia. What type of hypoxia is the cause of these disorders?

- A. Hypoxic hypoxia
- B. Hemic hypoxia
- C. Circulatory hypoxia
- D. Tissue hypoxia
- E. Respiratory hypoxia

85. Antiparkinsonian drugs are classified based on the mechanism of their action in the body. What drug is a dopamine precursor?

- A. Levodopa
- B. Bromocriptine
- C. Selegiline
- D. Midantan (Amantadine)
- E. Trihexyphenidyl

86. 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. Kussmaul breathing
- B. Cheyne-Stokes breathing
- C. Biot breathing
- D. Apneic breathing
- E. Gasping

87. A patient with tuberculosis has developed impaired hearing after a long-term antibiotic treatment. What drug has caused such an ototoxic effect in this case?

- A. Streptomycin
- B. Ampicillin
- C. Ceftriaxone
- D. Benzylpenicillin
- E. Pefloxacin

88. What factor will cause an increase in glomerular filtration in the kidneys?

- A. Reduced oncotic blood pressure
- B. Reduced hydrostatic pressure in the glomerular capillaries
- C. Reduced number of functioning glomeruli
- D. Increased oncotic blood pressure
- E. Increased intra-renal pressure

89. Megaloblasts and a high color index were detected in the patient's blood. The diagnosis of megaloblastic anemia was established. What drug should be prescribed in this case?

- A. Cyanocobalamin
- B. Pyridoxine
- C. Ascorbic acid
- D. Rutin
- E. Tocopherol acetate

90. In a patient with jaundice, increased levels of direct bilirubin and cholemia were detected in the blood. No stercobilinogen was detected in urine. What disorder is observed in this case?

- A. Mechanical jaundice
- B. Hemolytic jaundice
- C. Parenchymal jaundice
- D. Gilbert's syndrome
- E. Crigler-Najjar syndrome

91. Under what condition is the solubilization process possible?

- A. Surfactant is in the form of micelles
- B. Surfactant is in the form of molecules
- C. Surfactant was comminuted before the dissolution
- D. Solute has high solubility in a certain solvent
- E. Surfactant concentration in the solution is arbitrary

92. During what process does the entropy of a system decrease?

- A. Polymerization
- B. Evaporation
- C. Dissociation
- D. Dissolution
- E. Sublimation

93. A 23-year-old patient has laryngeal diphtheria that manifests as classic clinical signs with the development of true croup. What type of inflammation is characteristic of this disease?

- A. Fibrinous
- B. Serous
- C. Purulent
- D. Putrid
- E. Croupous

94. A stool sample obtained from a patient with suspected shigellosis was inoculated on the Ploskirev nutrient medium. What will be the color of the colonies of the dysentery pathogen in this medium?

- A. Colorless
- B. Blue-violet
- C. Red with a metallic sheen
- D. Yellow
- E. Dark brown

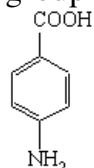
95. A patient developed neuritis of the facial nerve after 5 months of anti-tuberculosis treatment. What drug has caused this side effect?

- A. Isoniazid
- B. Benzylpenicillin sodium
- C. Ceftriaxone
- D. Rifampicin
- E. Sodium para-aminosalicylate

96. What method of titrimetric analysis is used to quantify streptocide (sulfanilamide) with a $KBrO_3$ solution in the presence of KBr ?

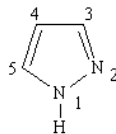
- A. Bromatometry
- B. Iodometry
- C. Permanganometry
- D. Dichromatometry
- E. Vanadatometry

97. What reagent reacts with the amino group of p-aminobenzoic acid?



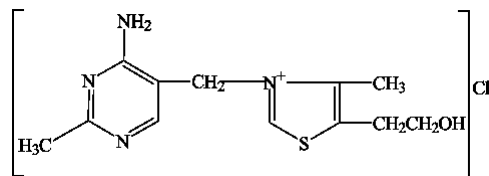
- A. $(CH_3CO)_2O$
- B. $NaOH$
- C. $NaHCO_3$
- D. $SOCl_2$
- E. Br_2

98. At what position in the pyrazole molecule do electrophilic substitution reactions occur?



- A. 4
- B. 5
- C. 3
- D. 2
- E. 1

99. What two heterocyclic rings are present in the structure of vitamin B_1 (thiamine)?



- A. Pyrimidine and thiazole
- B. Pyrimidine and thiophene
- C. Pyridazine and thiazole
- D. Pyrazine and thiophene
- E. Pyridazine and thiophene

100. What heterocycle has acidophobic properties?

- A. Pyrrole
- B. Pteridine
- C. Pyrimidine
- D. Thiophene
- E. Quinoline

101. Amino acids take part in methylation reactions during the synthesis of a number of bioactive substances — adrenaline, melatonin, phosphatidylcholine, creatine. For the synthesis of these compounds, the active form of a certain amino acid is used. Name this amino acid.

- A. Methionine
- B. Phenylalanine
- C. Threonine
- D. Alanine
- E. Valine

102. At the beginning of the bacteriological study, microscopy of the studied material was carried out and Gram-positive cocci were detected in it. The cocci were arranged in the clusters that resembled a bunch of grapes. Next, the material was inoculated on a dense nutrient medium. Why was it done?

- A. To obtain isolated colonies
- B. To obtain the pure culture
- C. To study the cultural properties
- D. To study the biochemical properties
- E. To study the antigenic properties

103. What is the mechanism of Br_2 attaching to propene?

- A. A_E
- B. S_E
- C. S_R
- D. A_N
- E. S_N

104. After parenteral administration of iron preparations, the patient presents with pain behind the sternum and redness of the face and neck. What drug should be administered in this case?

- A. Deferoxamine
- B. Cyanocobalamin
- C. Ascorbic acid
- D. Vitamin A
- E. Folic acid

105. During the morphological analysis of a flower, the presence of a reduced perianth in the form of two membranes — lodicules — was established. Its stamens have long staminal filaments. Its pistil has a feathery stigma. This description is characteristic of the plants that belong to the following family:

- A. *Poaceae*
- B. *Alliaceae*
- C. *Convallariaceae*
- D. *Lamiaceae*
- E. *Pinaceae*

106. The surface activity of diphilic molecules can be described using the Traube-Duclos rule. How will the surface activity of fatty acids change in the area of low concentrations, if the length of the hydrocarbon radical increases by three $-CH_2-$ groups?

- A. It will become 27 times higher
- B. It will become 3 times lower
- C. It will become 27 times lower
- D. It will become 9 times higher
- E. It will remain unchanged

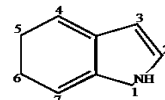
107. A solution contains anions of organic acids. When a solution of iron(III) chloride was added, a pink-yellow precipitate formed. What anions are present in the solution?

- A. Benzoate anions
- B. Oxalate anions
- C. Tetraborate anions
- D. Carbonate anions
- E. Formate anions

108. In the process of systematic analysis of a cation mixture, iron(III) cations can be determined using the fractional method. What reagent should be used for this purpose?

- A. Potassium hexacyanoferrate(II)
- B. Potassium chloride
- C. Sodium dihydrogen phosphate
- D. Hydrochloric acid
- E. Nitric acid

109. At what position in the indole molecule does its nitration reaction occur?



- A. 3
- B. 1
- C. 2
- D. 4
- E. 5

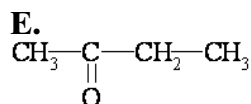
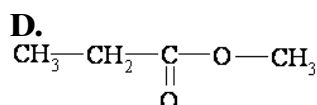
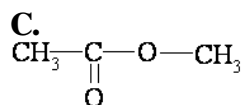
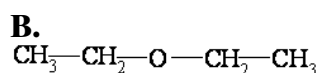
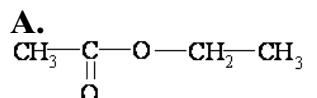
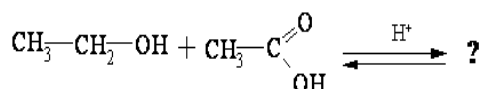
110. At a chemical analytical laboratory, nickel cations are being identified using a reaction with dimethylglyoxime. What will be the color of the precipitate that forms as a result of this reaction?

- A. Red
- B. Blue
- C. Green
- D. Yellow
- E. White

111. The antitumor agent 5-fluorouracil blocks the enzyme that attaches the methyl group to deoxyuridine monophosphate (dUMP). What reaction becomes inhibited, when this medicine is used?

- A. Synthesis of thymidine monophosphate
- B. Synthesis of glucose monophosphate
- C. Synthesis of adenosine monophosphate
- D. Synthesis of guanosine monophosphate
- E. Synthesis of glycerol monophosphate

112. What end product forms as a result of ethanol esterification with acetic acid according to the scheme given below?



113. Conversion of a proenzyme into an active enzyme can occur in different ways. What type of activation is common in the gastrointestinal tract?

- A. Limited proteolysis
- B. Phosphorylation
- C. Decarboxylation
- D. Glycosylation
- E. Transamination

114. The products of condensation of aldehydes with hydroxylamine belong to the following class:

- A. Aldoximes
- B. Ketoximes
- C. Hydrazones
- D. Hemiacetals
- E. Hydrazides

115. Amino acids and their derivatives function as neurotransmitters in brain neurons. What neurotransmitter forms from an aromatic amino acid?

- A. Dopamine
- B. Leucine
- C. Glycine
- D. Methionine
- E. Taurine

116. Examination of the sputum of a patient with suspected pneumonia detects blue-violet lanceolate cocci with a capsule, arranged in pairs. What staining method has been used to detect the capsule?

- A. Burri-Gins stain
- B. Ozheshko stain
- C. Neisser stain
- D. Gram stain
- E. Ziehl-Neelsen stain

117. Aggression enzymes are characteristic of pathogenic microorganisms. Select one such aggression enzyme from the list.

- A. Lecithinase
- B. Transferase
- C. Catalase
- D. Lyase
- E. Lactamase

118. What emulsions can be stabilized by emulsifiers, if the solubility of these emulsifiers is greater in water than in oil?

- A. Direct emulsions
- B. Invert emulsions
- C. Emulsions of the second type
- D. Dilute emulsions
- E. Concentrated emulsions

119. What is used as an external indicator for determining the titration endpoint in nitritometry?

- A. Starch iodide paper
- B. Diphenylamine
- C. Tropaeolin 00
- D. Methyl orange
- E. Ferroin

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

- A. Aci-nitro tautomerism
- B. Amino-imino tautomerism
- C. Tautomerism of azoles
- D. Keto-enol tautomerism
- E. Lactam-lactim tautomerism

121. A patient developed a keloid scar at the site of skin inflammation. This condition is associated with an abnormal course of a certain stage of inflammation. Name this stage.

- A. Proliferation
- B. Exudation
- C. Primary alteration
- D. Secondary alteration
- E. Progression

122. The breakdown of starch in the body is a catalytic process that occurs with the help of amylase. What type of catalysis is it?

- A. Enzymatic catalysis
- B. Heterogeneous catalysis
- C. Autocatalysis
- D. Acid-base catalysis
- E. Redox catalysis

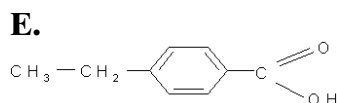
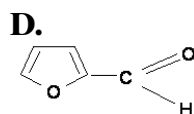
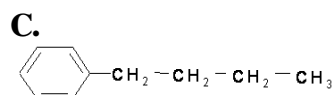
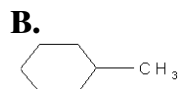
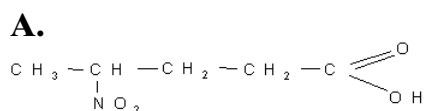
123. In pharmacy, extraction is used to extract bioactive substances from herbal raw materials. What law underlies this process?

- A. Distribution law
- B. Law of mass action
- C. Ostwald's law
- D. Konovalov's law
- E. Poiseulle's law

124. What substance is a mediator of delayed-type hypersensitivity?

- A. Lymphokines
- B. Histamine
- C. Bradykinin
- D. Serotonin
- E. Prostaglandins

125. What compound is an aliphatic one?



126. A pharmaceutical factory has received a batch of a herbal raw material that, based on the external signs, was affected by a viral disease. What modern method of diagnostics should be used for the specific detection of viral nucleic acids in plants?

ved a batch of a herbal raw material that, based on the external signs, was affected by a viral disease. What modern method of diagnostics should be used for the specific detection of viral nucleic acids in plants?

- A. Molecular hybridization
- B. Hemagglutination reaction
- C. Hemagglutination inhibition reaction
- D. Indirect hemagglutination reaction
- E. Enzyme-linked immunosorbent assay

127. What pair of electrodes is used in potentiometric redox titration?

- A. Platinum electrode and silver chloride electrode
- B. Silver electrode and platinum electrode
- C. Copper electrode and zinc electrode
- D. Glass electrode and silver chloride electrode
- E. Silver sulfide electrode and silver chloride electrode

128. Polymerase chain reaction (PCR) is widely used in modern laboratory diagnostics. What can be detected using this reaction?

- A. Nucleic acid of the microorganism
- B. Antigen of the microorganism
- C. Antibodies to the microorganism
- D. Autoimmune disease
- E. Allergy to the pathogen

129. Alkaline hydrolysis of esters (complex ethers) is called:

- A. Saponification
- B. Oxidation
- C. Rearrangement
- D. Condensation
- E. Etherification

130. What method is used for the quantification of medicinal substances with basic properties?

- A. Acidimetry
- B. Complexonometry
- C. Argentometry
- D. Thiocyanatometry
- E. Permanganometry

131. In the patient's blood, increased activity of AST, LDH1, LDH2, and CPK was detected. In what organ is a pathological process possible in this case?

- A. Heart muscle
- B. Skeletal muscles
- C. Kidneys
- D. Liver
- E. Adrenal glands

132. What disaccharide is a reducing one?

- A. Maltose
- B. Ribose
- C. Sucrose
- D. Cellulose
- E. Starch

133. 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 apart from the diuretic effect?

- A. Potassium-sparing
- B. Antispasmodic
- C. Analgesic
- D. Sedative
- E. Irritant

134. Because of its antiplatelet effect, acetylsalicylic acid is used in the treatment of diseases of the cardiovascular system. What mechanism is this effect based on?

- A. Inhibition of thromboxane A₂ biosynthesis
- B. Inhibition of COX-1 enzyme activity
- C. Inhibition of COX-2 enzyme activity
- D. Stimulation of synthesis of E₁ prostaglandins
- E. Reduction of synthesis of E₂ prostaglandins

135. A dithizone solution was added into the studied alkaline solution of cations that belong to the IV analytical group. As a result, a compound formed that was coloring not only the organic but also the aqueous phase in red. What cations are present in the solution, as indicated by this analytical effect?

- A. Zn^{2+}
- B. Fe^{3+}
- C. Cr^{3+}
- D. Bi^{3+}
- E. Al^{3+}

136. A child presents with increased nervous excitability, spontaneous tetany attacks, dry skin, brittle nails and hair, and subcutaneous calcifications in the area of the auricles. What hormone is deficient in this case, causing the described changes?

- A. Parathyroid hormone
- B. Thyroid hormones
- C. Vasopressin
- D. Progesterone
- E. Oxytocin

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

- A. Macrophages
- B. Tissue basophils
- C. Platelets
- D. Lymphocytes
- E. Eosinophils

138. To isolate a pure culture of the disease's pathogen, its specific biological properties were used: growth at low temperatures, type of respiration, pathogenicity for laboratory animals, growth on selective nutrient media, and the ability for "creeping growth" on the surface of the medium. What microbial culture is expected to be isolated in this case?

- A. *Proteus vulgaris*
- B. *Yersinia pestis*
- C. *Pseudomonas aeruginosa*
- D. *Staphylococcus aureus*
- E. *Enterococcus faecalis*

139. A miner, who was trapped under a rock pile, developed crush syndrome and signs of hepatic coma. Hyperammonemia was detected in his blood. What process has caused the increase in the ammonia levels in the patient's blood?

- A. Deamination of amino acids
- B. Glycolysis
- C. Gluconeogenesis
- D. Hydroxylation of amino acids
- E. Bilirubin catabolism

140. A patient at the gastroenterological department presents with disturbed digestion of proteins, which is why the activation of the decay of proteins can be observed in the patient's large intestine. What compound forms in a large amount under these conditions?

- A. Putrescine
- B. Cholesterol
- C. Glucose
- D. Glycerine
- E. Glycogen

141. Analysis of a sedative herbal tea detects yellow-green infructescences (microstrobiles) formed by bract scales with

a tile-like arrangement and small nut-like fruits. What plant can be characterized by such features?

- A. *Humulus lupulus*
- B. *Alnus glutinosa*
- C. *Schizandra chinensis*
- D. *Juniperus communis*
- E. *Ephedra distachya*

142. What plant is a component of the pectoral herbal tea and has characteristic basal long-petiolate, broadly ovate leaves that are white and downy from below and dark green, bare, and glossy from above?

- A. *Tussilago farfara*
- B. *Sambucus nigra*
- C. *Verbascum phlomoides*
- D. *Origanum vulgare*
- E. *Thymus serpyllum*

143. A modern drug that inhibits the HMG-CoA reductase enzyme and reduces cholesterol synthesis was received by a pharmacy chain. Name this drug.

- A. Atorvastatin
- B. Lisinopril
- C. Furosemide
- D. Hydrochlorothiazide
- E. Enalapril

144. A patient with essential hypertension has been prescribed a drug with an anti-anginal, hypotensive, and antiarrhythmic effect. Name this drug.

- A. Metoprolol
- B. Epinephrine
- C. Clonidine
- D. Dopamine hydrochloride
- E. Fenoterol

145. A patient with food poisoning, accompanied by diarrhea and multiple episodes of vomiting, developed dehydration. What type of total blood volume disorder can be observed in this case?

- A. Polycythemic hypovolemia
- B. Oligocythemic hypovolemia
- C. Normocythemic hypovolemia
- D. Polycythemic hypervolemia
- E. Oligocythemic hypervolemia

146. What compound has the highest basic properties?

- A. $CH_3CH_2NH_2$
- B. CH_3CH_2OH
- C. CH_3CH_2SH
- D. CH_3COOH
- E. $CH \equiv CH$

147. With what substance does butane react under the given conditions?

- A. Br_2 , in the presence of light, $20^\circ C$
- B. Br_2 , in the dark, $20^\circ C$
- C. $NaOH$, aqueous solution
- D. HCl
- E. $NaOH$, alcoholic solution

148. What compound among the listed substances does not result in a positive iodoform test?

- A. CH_3-O-CH_3
Dimethyl ether

- B. CH_3-CH_2-OH

Ethanol

- C. $H_3C-C \begin{matrix} \nearrow O \\ \searrow H \end{matrix}$

Ethanal

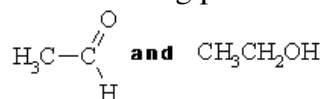
- D. $H_3C-C \begin{matrix} \parallel \\ O \end{matrix} -CH_3$

Acetone

- E. $H_3C-C \begin{matrix} \parallel \\ O \end{matrix} -CH_2-CH_3$

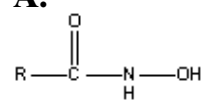
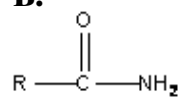
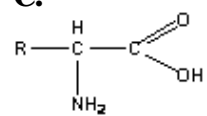
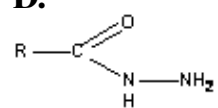
Methyl ethyl ketone

149. What reagent can be used to tell apart the following pair of compounds?



- A. $[Ag(NH_3)_2]OH$
- B. $NaOH$
- C. HCl
- D. $FeCl_3$
- E. $NaNO_2 + HCl$

150. What compound is a hydroxamic acid?

A.**B.****C.****D.****E.**