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. Calculation of the phase transformation temperature under varying pressure is of extreme practical importance to the modern pharmaceutical industry. This temperature can be calculated using the:

A. Clausius-Clapeyron equation
B. Trouton's rule
C. Gibbs phase rule
D. Mendeleev-Clapeyron equation
E. Konovalov rules

3. What is the order of the kinetic equation that describes the process of coagulation according to the Smoluchowski theory of rapid coagulation?

A. Second order
B. Zero order
C. First order
D. Third order
E. Fractional order

4. 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

5. In the formation of lateral roots, the main role belongs to:

A. Pericycle
B. Procambium
C. Cambium
D. Apical meristem
E. Intercalary meristem

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

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

7. A certain infection leads to fetus malformation if a pregnant woman becomes infected. What vaccine must be used for the prevention of this infection?

A. Rubella virus vaccine
B. Influenza virus vaccine
C. Mumps vaccine
D. Poliovirus vaccine
E. Antirabic vaccine

8. Quantitative determination of copper salts by photometry must be conducted according to the calibration graph that is built within the following coordinates:

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

9. 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+}

10. Administration of adrenaline leads to increased levels of glucose in the blood. What process is mainly activated in this case?

A. Glycogen breakdown
B. Glycogen synthesis
C. Synthesis of fatty acids
D. Pentose phosphate pathway
E. Alcoholic fermentation

11. HIV-infection occupational risk groups include people of various professions, healthcare workers included. What is the most likely route of infection transmission to healthcare workers?

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

12. People, who were in the building during a fire, suffer from carbon monoxide poisoning. What type of hypoxia can be observed in this case?

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

13. What indicator is necessary for titration of a potassium iodide solution using a silver nitrate solution (direct titration)?

A. Fluorescein
B. Methyl orange
C. Ammonium iron(III) sulfate
D. Starch solution
E. Tropeolin 00

14. When a root tip was processed with Lugol's solution, the following was revealed in the cells of the root cap:

A. Statolith starch
B. Compound proteins
C. Fatty oils
D. Inulin
E. Glycogen

15. If an alkali is added into the solution being analyzed, the solution produces a gas when heated. This gas changes the color of a moist litmus paper from red to blue, which indicates the presence of the following in the solution:

A. Ammonium ions
B. Carbonate ions
C. Lead ions
D. Bismuth ions
E. Chloride ions

16. A patient has persistent tachycardia, exophthalmos, high excitability, and increased basal metabolic rate. What disorder can lead to the development of this syndrome?

A. Hyperthyroidism
B. Hypoparathyroidism
C. Hypothyroidism
D. Hyperparathyroidism
E. Adrenal hypofunction

17. 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

18. What parameter is measured during conductometric titration of electrolyte solutions?

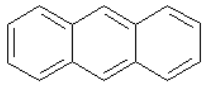
A. Electrical conductivity
B. Electromotive force
C. Viscosity of the solution
D. Acidity of the environment
E. Concentration of the solution

19. What reactions and reagents under certain conditions allow the determination of certain ions in the presence of other ions?

A. Specific
B. Selective
C. Group
D. Characteristic
E. General

20. Which compound of those listed below is a condensed arene?

A.



B.

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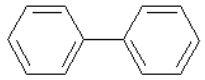

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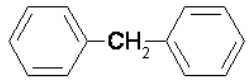
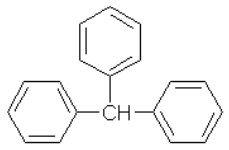


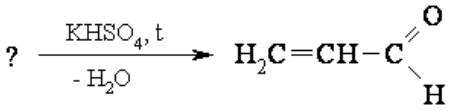
E.



21. What method is used for simultaneous elimination of the effect of foreign substances, concentration, and determination of concentration?

A. Extraction-photometric analysis
B. Differential spectrophotometry
C. Polarimetry
D. Fluorimetry
E. Refractometry

22. What compound forms acrolein when heated with water-removing reagents?



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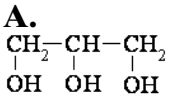
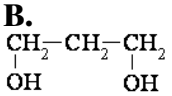
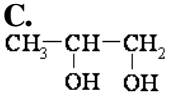


B.


C.


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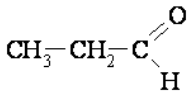


E. $H_3C - CH_2 - CH_2 - OH$

23. A person diagnosed with malaria was admitted into the infectious diseases hospital. What route of infection transmission is characteristic of this disease?

A. Vector-borne transmission
B. Fecal-oral transmission
C. Airborne and droplet transmission
D. Direct transmission
E. Indirect transmission

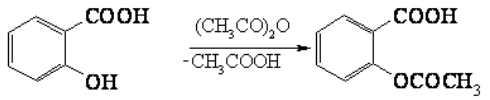
24. A certain meristematic tissue is located in the vascular bundles of the stem between the secondary phloem and the secondary xylem. What type of meristematic tissue is it?

A. Cambium
B. Procambium
C. Phellogen
D. Pericycle
E. Dermatogen

25. What changes occur with physical adsorption of substances, when temperature increases?

A. Physical adsorption decreases
B. Physical adsorption increases
C. Physical adsorption transforms into chemisorption
D. Physical adsorption decreases in heterogeneous systems
E. Physical adsorption increases in homogeneous systems

26. What drug is produced as a result of reaction between salicylic acid and acetic anhydride?



A. Aspirin
B. Salicylamide
C. Phenyl salicylate
D. Benzyl salicylate
E. Sodium salicylate

27. A child that attends a day care center fell ill with measles. What is used to prevent this disease in the contact persons?

A. Measles immunoglobulin
B. Measles vaccine
C. Immunostimulants
D. Antibiotics
E. Sulfanilamides

28. What is the mechanism of action of a catalyst in a chemical reaction?

A. Reduces activation energy
B. Increases activation energy
C. Does not change the activation energy
D. Changes the nature of the reagents
E. Changes the degree of dispersion

29. Insulin is a pancreatic hormone with a hypoglycemic action. Chemically, it can be classified as a:

A. Polypeptide
B. Nucleotide
C. Steroid
D. Carbohydrate
E. Lipid

30. Asepsis, antiseptics, disinfection, and sterilization are widely used in pharmaceutical practice. What is the correct definition of the term "asepsis"?

A. Preventing microbes from contaminating any object
B. Destruction of pathogenic microbes in the environment
C. Complete destruction of all forms of microbes in an object
D. The use of substances that kill microorganisms on the skin and mucosa
E. The use of substances that kill pathogenic microbes in the internal environment of the body

31. Polarography is one of the electrochemical methods of analysis. What parameter is used in polarographic analysis to identify the substance being analyzed?

A. Half-wave potential
B. Magnitude of the electromotive force
C. Height of a polarographic wave
D. Position of a polarographic wave
E. Width of a polarographic wave

32. Nitrogen oxides can oxidize Fe^{2+} to Fe^{3+} in the hemoglobin molecule, creating a hemoglobin derivative that is unable to bind with oxygen. What hemoglobin derivative is it?

A. Methemoglobin
B. Oxyhemoglobin
C. Carbhemoglobin
D. Deoxyhemoglobin
E. Carboxyhemoglobin

33. When measuring the antimicrobial activity of drugs, their minimum concentration that suppresses the growth of microbes must be determined. What is this parameter?

A. The lowest drug concentration that inhibits growth of a bacterial test culture
B. The lowest drug concentration that has a bactericidal effect
C. The lowest drug concentration that causes development of selective strains of test cultures
D. The lowest drug concentration that inhibits enzyme biosynthesis in the macroorganism
E. —

34. What titration method must be used for determination of a volatile substance?

A. Back titration
B. Direct titration
C. Substitution titration
D. Titration with instrumental fixation of the equivalence point
E. Titration of separate sample weights

35. Causative agents of infectious diseases can be carried both by humans and animals. What infections affect animals and from them can be passed onto humans?

A. Zooanthroponoses
B. Sapronoses
C. Anthroponoses
D. Zoonoses
E. Mixed

36. During a regular check-up, a person presents with enlarged thyroid gland, exophthalmos, fever, and elevated heart rate of 110/min. What hormone should be measured in the patient's blood in this case?

A. Thyroxine
B. Testosterone
C. Glucagon
D. Insulin
E. Cortisol

37. At the age of 5 months, a child had measles antibodies in the blood. At the age of 1 year, these antibodies were no longer present in the child's blood. Why were these antibodies present in the child's blood?

A. Acquired natural passive immunity
B. Non-specific resistance
C. Acquired natural active immunity
D. Innate immunity
E. Artificial immunity

38. A Gram stained smear shows large oval violet cells that form pseudomycelium. Name these microorganisms.

A. *Candida* fungi
B. *Mucor* fungi
C. Malaria emphPlasmodium
D. *Actinomycetales*
E. *Penicillium* fungi

39. Some medicinal plants need to be harvested very carefully, because they are poisonous. One such plant is a representative of *Umbelliferae* family. Name this plant.

A. *Cicuta virosa*
B. *Viburnum opulus*
C. *Valeriana officinalis*
D. *Plantago major*
E. *Arctium lappa*

40. Analysis of the plant parts detected fragments of rhizomes. Their microscopy revealed periphloematic vascular bundles on section, the presence of which indicates that these samples belong to:

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

41. What enzyme catalyzes the reaction of activation of amino acids and their attachment to a specific tRNA?

A. Aminoacyl-tRNA synthetase
B. Ribonuclease
C. DNA ligase
D. Nucleotidase
E. Deoxyribonuclease

42. The structure of the bacterial cell that provides microbes with increased resi-

stance to the environmental factors and can remain intact for a long time can be detected by staining a smear according to the Ozheshko technique. What is this structure called?

A. Spore
B. Capsule
C. Flagella
D. Plasmid
E. Pilus

43. Alanine is an important substrate of gluconeogenesis in the liver. What is the reaction, in which alanine forms in skeletal muscles from pyruvate?

A. Transamination
B. Decarboxylation
C. Dehydrogenation
D. Isomerization
E. Phosphorylation

44. An analytical laboratory expert performs direct iodometric determination of ascorbic acid. What indicator must be used in this case?

A. Starch
B. Methyl orange
C. Diphenylamine
D. Phenolphthalein
E. Methyl red

45. Examination of the patient's oral cavity detects roseola rash, pustules, and papules on the mucosa of the soft palate. Microscopy of the smears prepared from the discharge and stained according to Romanowsky-Giemsa revealed pale pink wavy microorganisms. What microorganisms are the likely cause of this pathology?

A. Treponema pallidum
B. Staphylococci
C. Streptococci
D. *Candida* fungi
E. Meningococci

46. What type of ground tissue (by function) is characteristic of above-ground organs of succulents, in particular cacti?

A. Water storage tissue (hydroparenchyma)
B. Aerenchyma (aeriferous parenchyma)
C. Starch storage parenchyma
D. Folded parenchyma
E. Spongy parenchyma

47. What reaction must be conducted by an analytical chemist during the preliminary tests to determine chromium(III) ions?

A. Reaction for formation of a perchromic acid after preliminary oxidation of chromium
B. Reaction with sodium hydroxide
C. Reaction with potassium permanganate
D. Reaction with ammonia
E. Reaction with sodium hydroxide and hydrogen peroxide

48. What potential forms at the interface between two solutions?

A. Diffusion potential
B. Electrode potential
C. Contact potential
D. Electrokinetic potential
E. Surface potential

49. What changes in leukogram are most characteristic of helminthiasis?

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

50. One of the methods of methanol poisoning treatment requires administration of ethanol (*per os* or intravenously) in the amount that would have caused 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 inactivates alcohol dehydrogenase
C. Ethanol blocks alcohol dehydrogenase coenzyme
D. Ethanol breaks down faster than methanol
E. Ethanol inhibits methanol diffusion

51. A patient suffering from neurosis associated with feelings of anxiety and fear was prescribed diazepam. What pharmacological effect of this drug allows using it in treatment of this condition?

A. Anxiolytic
B. Antiarrhythmic
C. Anti-inflammatory
D. Hypotensive
E. Antianginal

52. A patient with essential hypertension was prescribed lisinopril. What is the mechanism of action of this drug?

A. Inhibits angiotensin-converting enzyme
B. Blocks α-adrenergic receptors
C. Blocks β-adrenergic receptors
D. Stimulates β-adrenergic receptors
E. Blocks muscarinic receptors

53. What drug has a hypoglycemic effect because it stimulates pancreatic beta-cells?

A. Glibenclamide
B. Prednisolone
C. Adrenaline hydrochloride (Epinephrine)
D. Retabolil (Nandrolone)
E. Heparin

54. A 34-year-old woman with bronchitis presents with persistent dry non-productive cough. Her physician prescribed her a centrally acting antitussive drug. Name this drug.

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

55. During a surgery with application of tubocurarine as a muscle relaxant, the patient developed a respiratory disturbance. The disturbance was eliminated after the patient was administered proserin (neostigmine). What term can be used to describe the interaction between these two drugs?

A. Antagonism
B. Cumulation
C. Incompatibility
D. Tachyphylaxis
E. Synergism

56. A patient developed a hemorrhage caused by a long-term use of neodicumarin (ethyl biscoumacetate). What neodicumarin antagonist must be used in this case?

A. Vicasol (Menadione)
B. Aminocaproic acid
C. Etamsylate
D. Fibrinogen
E. Ascorbic acid

57. What drug is indicated in case of an overdose of depolarizing muscle relaxants?

A. Prozerin (Neostigmine)
B. Metoprolol
C. Naloxone
D. Magnesium sulfate
E. Unithiol

58. What anticholinesterase agent is used to stimulate intestinal peristalsis in the patients during the postoperative period?

A. Prozerin (Neostigmine)
B. Adrenaline hydrochloride
C. Metoprolol
D. Salbutamol
E. Dithylin (Suxamethonium)

59. A doctor prescribed metoprolol to a patient, which helped to lower the patient's blood pressure. This drug belongs to the following pharmacological group:

A. Beta-blockers
B. Alpha-blockers
C. Muscarinic antagonists
D. Nicotinic antagonists
E. Sympatholytics

60. What is the mechanism of action of the antiviral drug acyclovir?

A. Inhibition of nucleic acid synthesis
B. Blockade of cellular wall synthesis
C. Increase of cellular membrane permeability
D. Antagonism with para-aminobenzoic acid
E. Inhibition of protein synthesis

61. What drug can be used to stop a bronchospasm?

A. Salbutamol
B. Aspirin
C. Atenolol
D. Amoxicillin
E. Omnoponum

62. To quickly stop an attack of angina pectoris, a 55-year-old patient was prescribed an organic nitrate drug. What drug is it?

A. Nitroglycerin
B. Octadine (Guanethidine)
C. Nifedipine
D. Prazosin
E. Labetalol

63. What is the name of the phenomenon when one drug enhances the effect of another?

A. Synergism
B. Antagonism
C. Sensitization
D. Withdrawal
E. Tachyphylaxis

64. An infection caused by phytopathogenic mycoplasmas has spread through a plantation of medicinal plants. What feature characterizes this group of mi-

croorganisms?

A. Have no cellular wall
B. Die in the presence of oxygen
C. Form spores
D. Do not grow on nutrient media
E. Have one flagellum

65. Microbiological study of dried medicinal plants shows that they were contaminated with clostridia. What feature is characteristic of this group of microorganisms?

A. Spore-formers
B. Obligate aerobes
C. Nonpathogenic for humans
D. Gram-negative
E. –

66. Microscopy of plants detects parenchymal cells with thin membranes, a large nucleus, and a large number of ribosomes. What tissue is it?

A. Meristematic tissue
B. Parenchyma
C. Dermal tissue
D. Mechanical tissue
E. Secretory tissue

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

A. Alpha-ketoglutarate
B. Citrate
C. Fumarate
D. Malate
E. Succinate

68. What substance is used as a primary standard in permanganometry, bromatometry, dichromatometry, iodometry, and cerimetry?

A. Arsenic(III) oxide
B. Sodium chloride
C. Potassium hydroxide
D. Sodium carbonate
E. Ammonium acetate

69. Plant fatty acids have an odd number of carbon atoms. What product forms as a result of beta-oxidation of fatty acids with an odd number of carbon atoms?

A. Propionyl-CoA
B. Palmitoyl-CoA
C. Stearoyl-CoA
D. Acetoacetyl-CoA
E. Oxymethylglutaryl-CoA

70. According to the Pharmacopoeia, molecular mass of a high-molecular substance must be determined using:

A. Viscometry
B. Potentiometry
C. Nephelometry
D. Osmometry
E. Cryometry

71. What forms when gelatin dissolves in water at an elevated temperature?

A. Molecular solution
B. Suspension
C. Emulsion
D. Elastic xerogel
E. Brittle xerogel

72. How does the value of the critical micelle concentration in homologous series change with an increase in the molecular mass of the surfactant?

A. Decreases
B. Sharply increases
C. Increases
D. Remains unchanged
E. Reaches its maximum and then decreases

73. A 50-year-old man with a history of alcoholic cirrhosis complains of dyspeptic disorders and bleeding from hemorrhoidal veins. Examination detects ascites and distended superficial veins of the anterior abdominal wall. What pathology is indicated by these signs?

A. Portal hypertension
B. Peptic ulcer disease
C. Enterocolitis
D. Intestinal obstruction
E. Hepatitis

74. The inflorescence of a plant has an elongated main axis and sessile flowers. What type of inflorescence is it?

A. Spike
B. Corymb
C. Round capitulum
D. Umbel
E. Flat capitulum

75. A person suffers from a chronic inflammatory process. In the focus of the inflammation, a certain biochemical process maintains the concentration of NADPH that is necessary for the

phagocytosis mechanism to occur. What process is it?

A. Pentose phosphate pathway
B. Cori cycle
C. Uric acid synthesis
D. Ornithine cycle
E. Glycolysis

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

A. 10 mmol/L
B. 15 mmol/L
C. 20 mmol/L
D. 1 mmol/L
E. 5 mmol/L

77. Sedimentation is characteristic of the following type of systems:

A. Suspensions
B. Solutions of high-molecular compounds
C. Nonelectrolyte solutions
D. Electrolyte solutions
E. Foams

78. The plant organ exhibits radial symmetry, unlimited growth, and positive geotropism. It provides nutrition and fixation in the soil. What organ is it?

A. Root
B. Stem
C. Leaf
D. Rhizome
E. Seed

79. An autoimmune disorder of islet β-cells was detected in a 14-year-old girl with hyperglycemia, glycosuria, and polyuria. What type of diabetes does this girl have?

A. Type 1 diabetes mellitus
B. Type 2 diabetes mellitus
C. Gestational diabetes
D. Diabetes insipidus
E. —

80. A patient with a malignant tumor suffers from significant weight loss and exhaustion, caused by a certain substance that inhibits the hunger center and stimulates catabolism. Name this substance.

A. Cachexin
B. Insulin
C. Glucagon
D. Somatotropin
E. Aldosterone

81. People with albinism tend to be very sensitive to sunlight: tan does not develop and they burn very easily. This phenomenon is caused by problems with synthesis of a certain substance. What substance is it?

A. Melanin
B. Phenylalanine
C. Tyrosine
D. Adrenaline
E. Thyroxine

82. Potentiometric methods of analysis are based on the use of:

A. Dependence of the electromotive force (EMF) of a galvanic cell on the concentration of the analyte
B. Dependence of the volume of the titrant on the concentration of the analyte
C. Dependence of the electric current on the concentration of the analyte
D. Dependence of the mass of the precipitate on the concentration of the analyte
E. Dependence of the volume of the produced gas on the concentration of the analyte

83. Chitinization is a type of change in cell membranes. In what organisms is this phenomenon observed?

A. Fungi
B. Woody plants
C. Gymnosperms
D. Higher spore plants
E. Ferns

84. Nut shells, cherry pits, and wood are hard because of deposition of a certain substance in the cell membrane. What substance is it?

A. Lignin
B. Silica
C. Chitin
D. Suberin
E. Calcium carbonate

85. Colloidal protection is used in the manufacturing of medicinal products. Name the colloidal preparation of silver protected by proteins.

A. Protargol
B. Festal
C. Enzymtal
D. Argentum
E. Collagen

86. 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

87. Phenylephrine (mezaton) was administered to a patient with collapse for blood pressure correction. What is the mechanism of hypertensive action of this drug?

A. Stimulates alpha-adrenoceptors
B. Stimulates beta-adrenoceptors
C. Stimulates muscarinic acetylcholine receptors
D. Stimulates nicotinic acetylcholine receptors
E. Stimulates angiotensin receptors

88. A 33-year-old woman was admitted into a psychiatric hospital with an anxiety disorder of neurotic origin. What drug is indicated in this case?

A. Diazepam
B. Valerian extract
C. Droperidol
D. Naloxone
E. Levodopa

89. What drugs can be classified as angiotensin-converting enzyme (ACE) inhibitors?

A. Captopril, enalapril
B. Nifedipine, diltiazem
C. Raunatin, reserpine
D. Dibazol (bendazol), papaverine
E. Losartan, irbesartan

90. A patient developed an atrioventricular block. What drug is indicated in this case?

A. Atropine
B. Clophelin (Clonidine)
C. Metoprolol
D. Pirenzepine
E. Anaprilin (Propranolol)

91. A 30-year-old woman complains of frequent nosebleeds. Objectively, she has pale skin, dystrophic changes in her nails, and dry hair with split ends. Complete blood count shows the following: erythrocytes — $2.9 \cdot 10^{12}$/L, Hb — 70 g/L, color index — 0.5, serum iron — 5 mcmol/L, leukocytes — $6.0 \cdot 10^{9}$/L, annulocytes, poikilocytosis, microcytosis. What anemia is observed in the patient?

A. Iron deficiency anemia
B. Sickle cell disease
C. B12 and folate deficiency anemia
D. Hemolytic anemia
E. Minkowski-Chauffard syndrome

92. At the end of his shift, a worker of the steel foundry felt dizziness and fever of 38.5^oC. What condition can be observed in this worker?

A. Hyperthermia
B. Decompression
C. Fever
D. Hypothermia
E. Hypertension

93. A woman with essential hypertension developed a dry hacking cough as a result of taking angiotensin-converting enzyme inhibitors. What drugs that inhibit the renin-angiotensin system should be prescribed in this case?

A. Angiotensin II receptor antagonists
B. Beta-blockers
C. Calcium channel blockers
D. Diuretics
E. Sympatholytics

94. A patient has toxic pulmonary edema. What drug must be used for emergency aid in this case?

A. Mannitol
B. Hydrochlorothiazide
C. Spironolactone
D. Diacarb (Acetazolamide)
E. Indapamide

95. A fibrinolysis inhibitor was used to stop postpartum bleeding. Name this drug.

A. Aminocaproic acid
B. Hemostatic sponge
C. Calcium chloride
D. Nettle leaves
E. Thrombin

96. 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

97. 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

98. What groups of antibiotics can be classified as beta-lactam antibiotics?

A. Penicillins, cephalosporins, monobactams, carbapenems
B. Cephalosporins, monobactams, aminoglycosides
C. Penicillins, cephalosporins, macrolides, carbapenems
D. Penicillins, cephalosporins, tetracyclines
E. Cephalosporins, macrolides, aminoglycosides

99. A leaf has 5–7 identical veins that branch many times. What type of leaf venation is it?

A. Palmate reticulate
B. Palmate marginal
C. Parallel
D. Arcuate
E. Pinnate reticulate

100. What hormone changes glucose levels in the blood and is produced in the pancreas?

A. Insulin
B. Somatostatin
C. Growth hormone
D. Testosterone
E. Aldosterone

101. 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

102. In case of excessive consumption of carbohydrates, insulin stimulates the transformation of carbohydrates into lipids in the cells of adipose tissue. What process is involved in this transformation?

A. Synthesis of higher fatty acids
B. Heme synthesis
C. Lipolysis
D. Gluconeogenesis
E. Uric acid synthesis

103. 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. These are the features of the following plant:

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

104. The Wasserman test was positive in a 25-year-old woman. What disease can be diagnosed using this test?

A. Syphilis
B. Tuberculosis
C. Diphtheria
D. Leptospirosis
E. Brucellosis

105. What bacteria indicate the presence of fecal contamination?

A. Escherichia coli
B. Sarcina
C. Klebsiella
D. Serratia
E. Anthracoids

106. 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

107. What is the name of the process when droplets in emulsions spontaneously merge together?

A. Coalescence
B. Flocculation
C. Sedimentation
D. Flotation
E. Coagulation

108. A woman came to an endocrinologist with complaints of increased excitability, tachycardia, finger tremor, sweating, and bulging eyes. What is the most likely cause of her condition?

A. Hyperthyroidism
B. Hypothyroidism
C. Adrenocortical hyperfunction
D. Hyperparathyroidism
E. Adrenocortical hypofunction

109. Some leaf cells have lignified membranes. These cells are called:

A. Sclereids
B. Collenchyma
C. Sieve tubes
D. Trichomes
E. Companion cells

110. Conducting tissue cells are live and connected to the sieve tube elements. It is characteristic of:

A. Companion cells
B. Vessels
C. Tracheids
D. Sclerenchyma
E. Collenchyma

111. Which one of the substances listed below is not a surfactant?

A. Sodium chloride
B. Sodium stearate
C. 1-Pentanol
D. Sodium oleate
E. Sodium palmitate

112. Antibiotic treatment of infectious diseases belongs to the following type of pharmacotherapy:

A. Etiotropic
B. Pathogenetic
C. Substitution
D. Symptomatic
E. Stimulating

113. A patient looks pale and complains of headache, pain in the heart, and attacks of tachycardia and hypertension. Blood biochemistry test detects significantly increased levels of catecholamines. What gland is likely to be dysfunctional in this case, causing this condition in the patient?

A. Adrenal medulla
B. Adrenal cortex
C. Parathyroid glands
D. Neurohypophysis
E. Adenohypophysis

114. After a physical exertion a person developed premature contractions of the cardiac muscle. What type of arrhythmia is it?

A. Extrasystole
B. Sinus tachycardia
C. Sinus bradycardia
D. Ventricular fibrillation
E. Paroxysmal tachycardia

115. Cytochrome oxidase enzyme blockade occurred in a person as a result of cyanide poisoning. What type of hypoxia develops in such cases?

A. Tissue hypoxia
B. Hemic hypoxia
C. Circulatory hypoxia
D. Respiratory hypoxia
E. Stagnant hypoxia

116. What will be the order of the reaction if one of the reagents participating in a bimolecular reaction was taken in a large excess?

A. Pseudomonomolecular order
B. The order can be determined based on the substance taken in excess
C. The order would be the same as the molecularity
D. The order would be greater than the molecularity
E. Third order

117. Ascorbic acid is not synthesized in the human body and must be supplied with food. What is one of the most important functions of ascorbic acid in the human body?

A. Participation in hydroxylation reactions
B. Calcium absorption
C. Removal of cholesterol from the body
D. Participation in phosphorylation reactions
E. Participation in hydrolysis reactions

118. 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

119. What compound is a basis for organic dyes and belongs to isolated polynuclear arenes?

A. Triphenylmethane
B. Benzene
C. Anthracene
D. Phenanthrene
E. Cumene

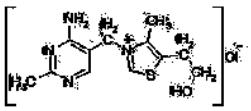
120. What functional groups can be observed in the cyclic forms of ribose and deoxyribose?

A. Hydroxylic
B. Aldehyde
C. Carboxylic
D. Hydroxylic and aldehyde
E. Hydroxylic and carboxylic

121. What product forms as a result of aldehydes and ketones reacting with primary amines?

A. Azomethine
B. Alcohol
C. Nitrile
D. Thiol
E. Diazine

122. 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

123. The C_2H_4 (alkene) $\longrightarrow$ C_2H_6 (alkane) transformation occurs in the following reaction:

A. Hydrogenation
B. Dehydrogenation
C. Dehydration
D. Hydration
E. Dimerization

124. How will the rate of the chemical reaction $2NO(gas) + O_2(gas) = 2NO_2(gas)$ change if the pressure increases by three times?

A. The rate will increase by 27 times
B. The rate will remain unchanged
C. The rate will decrease by 27 times
D. The rate will increase by three times
E. The rate will decrease by three times

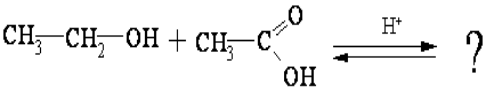
125. In the process of systematic analysis of a cation mixture, iron(III) cations can be determined using the fractional method. What reagent is used for this purpose?

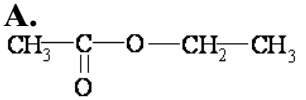
A. Potassium hexacyanoferrate(II)
B. Potassium chloride
C. Sodium dihydrogen phosphate
D. Hydrochloric acid
E. Nitric acid

126. What drug is used in treatment of herpes infection?

A. Acyclovir
B. Rimantadine
C. Sabin's vaccine
D. Gamma globulin
E. Tamiflu (Ozeltamivir)

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



A.


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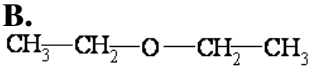

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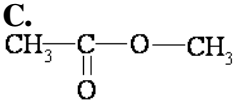

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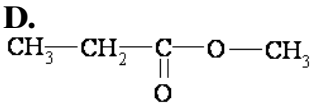

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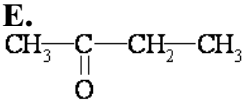
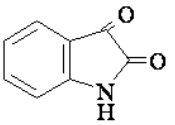


128. Isatin molecule contains a ketone group in its structure:

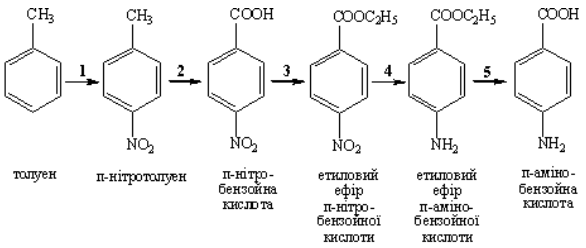


What reagent can be used to prove it?

A. NH_2OH
B. $[Ag(NH_3)_2]OH$
C. $NaOH$
D. $CH_3C(O)Cl$
E. $NaHCO_3$

129. At what stage does the esterification reaction occur in the scheme of

transformations given below?



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

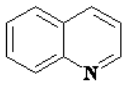
130. A potassium chromate solution was added into the solution being analyzed, which resulted in the formation of a yellow precipitate, soluble in acetic acid. What cations were present in the solution, as indicated by this qualitative reaction?

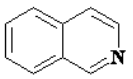
A. Strontium cations
B. Potassium cations
C. Ammonium cations
D. Magnesium cations
E. Sodium cations

131. During protein starvation, decreased protein levels in the blood, growth retardation, edemas, and anemia are observed. What is the key factor in the mechanism of edema development, when there is not enough protein in the diet?

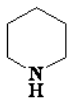
A. Decrease of the albumin synthesis
B. Increase of the albumin synthesis
C. Decrease of the hemoglobin synthesis
D. Increase of the globulin synthesis
E. Increase of the hemoglobin synthesis

132. Select the quinoline formula among the structural formulas given below:

A. 

B. 

C. 

D. 

E. 

133. Which phenomenon is uncharacteristic of aerosols?

A. Dissociation
B. Thermophoresis
C. Photophoresis
D. Thermoprecipitation
E. Coagulation

134. What reagent can be used to distinguish between ethanol (C_2H_5OH) and glycerine?

$$\begin{pmatrix} CH_2-CH-CH_2 \\ | \quad | \quad | \\ OH \quad OH \quad OH \end{pmatrix}?$$

A. $Cu(OH)_2$
B. HBr
C. $FeCl_3$
D. $KMnO_4$
E. Ag_2O

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

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

136. What is the color of the compound that forms as a result of reaction between salicylate ions and Fe^{3+} ions in an acidic environment?

A. Violet
B. Green
C. Blue
D. Black
E. Brown

137. What two working solutions are used in determination of hydrogen sulfide in mineral waters by means of iodometry (back titration)?

A. I_2, $Na_2S_2O_3$
B. $NaOH$, HCl
C. Na_2CO_3, HCl
D. $H_2C_2O_4$, $KMnO_4$
E. $AgNO_3$, H_2SO_4

138. 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. Transferases
B. Oxidoreductases
C. Lyases
D. Ligases
E. Isomerases

139. Aerosols are one of the dosage forms. Name the phenomenon when aerosol particles move in the direction of decreasing temperature.

A. Thermophoresis
B. Electrophoresis
C. Peptization
D. Photophoresis
E. Sedimentation

140. One of the classifications of titrimetric methods of analysis is based on the chemism of the reaction between the substance being analyzed and the titrant. What reaction is the basis for determining the amount of sodium carbonate using hydrochloric acid?

A. Neutralization reaction
B. Redox reaction
C. Sedimentation reaction
D. Complexation reaction
E. Hydrolysis reaction

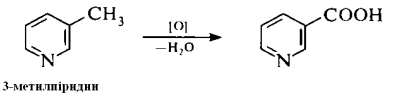
141. To prevent the development of muscular dystrophy, a doctor prescribed potassium orotate to a patient. This compound is an intermediate product of the synthesis of a certain substance. What substance is it?

A. Pyrimidine nucleotides
B. Glucose
C. Bile acids
D. Cholesterol
E. Ketone bodies

142. Long-term use of antibiotics can result in development of dysbiosis. What method can detect intestinal dysbiosis?

A. Bacteriology
B. Serology
C. Allergy testing
D. Gnotobiotic experiments
E. Patient interview

143. What compound will form as a result of 3-methylpyridine oxidation according to the scheme given below?



3-метилпіридин

A. Nicotinic acid
B. Picolinic acid
C. Isonicotinic acid
D. 2-Hydroxypyridine
E. 3-Hydroxypyridine

144. What compound has a primary aromatic amino group in its structure? What reaction can be used to confirm it?

A. $C_6H_5 - NH_2$ (aniline). Reaction of diazotization and azo coupling
B. $(C_6H_5)_2NH$ (diphenylamine). Diazotization reaction
C. $(CH_3)_2NH$ (dimethylamine). Reaction with HCl
D. $(CH_3)_3N$ (trimethylamine). Reaction with HCl
E. $(CH_3)_3C - NH_2$ (tert-butylamine). Reaction of diazotization and azo coupling

145. What product forms as a result of a reaction between aniline and benzaldehyde?

A. N-benzylideneaniline
B. Oxime
C. N,N-dimethylaniline
D. Cyanohydrin
E. Hemiacetal

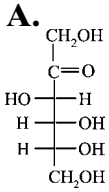
146. What reaction is used to obtain butane $CH_3 - CH_2 - CH_2 - CH_3$ from chloroethane $CH_3 - CH_2 - Cl$?

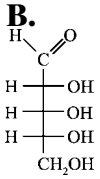
A. Wurtz reaction
B. Kucherov reaction
C. Konovalov reaction
D. Zinin reaction
E. Finkelstein reaction

147. Which compound has the most markedly expressed basic properties?

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

148. Fructose is a monosaccharide that is a glucose isomer. In medicine, it is used in treatment of hepatic disorders, in dietary nutrition, etc. What structural formula corresponds with D-fructose?

A.


B.


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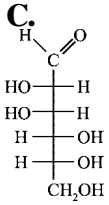

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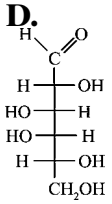

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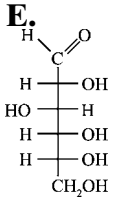
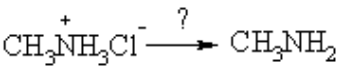
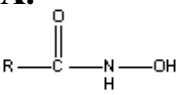


149. What reagent is used to transform methylammonium chloride into methylamine?



A. $NaOH$
B. HCl
C. O_2
D. N_2
E. Br_2

150. What compound is a hydroxamic acid?

A.


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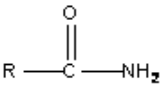

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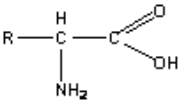

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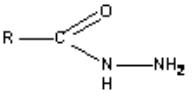

E.