

# Sample test questions

## INTEGRATED TEST EXAM “Krok 1” *Pharmacy*



1. A patient, who has been taking phenazepam for a month, came to the pharmacy. He insists that he needs to buy two more packages of this drug, because without it he feels unwell. The side-effect of this drug that can be observed in this patient is based on the development of:

- A. Tolerance
- B. Idiosyncrasy
- C. Cumulation
- D. After-effect
- E. Addiction

2. 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. Incompatibility
- B. Antagonism
- C. Tachyphylaxis
- D. Synergism
- E. Cumulation

3. Phenolphthalein indicator is often used in titrimetric analysis. What titration method uses this indicator?

- A. Precipitation titration
- B. Permanganatometry
- C. Acid-base titration
- D. Redox titration
- E. Complexometric titration

4. An injured person exhibits the following signs at the site of trauma: skin redness, throbbing small arteries, elevated local temperature, increased tissue turgor. What local blood circulation disorder are these presentations typical of?

- A. Thrombosis
- B. Arterial hyperemia
- C. Venous hyperemia
- D. Embolism
- E. Ischemia

5. What ion is present in the solution if its reaction with diphenylamine in the presence of concentrated sulfuric acid results in blue coloring of the solution?

- A. Phosphate
- B. Sulfide
- C. Acetate
- D. Nitrate
- E. Sulfate

6. Phenol reaction with aqueous solution of bromine produces the following:

- A. 2,5-Dibromophenol
- B. 2,4,6-Tribromophenol
- C. 2,4,5-Tribromophenol
- D. 3,5-Dibromophenol
- E. m-Bromophenol

7. It is known that in most species of the gymnosperms the leaves are in the form of needles. However, a certain gymnosperm species has leathery leaves with long petioles, undivided fan-shaped lamina, dichotomous venation, and one or several sinuses along the upper edge. These leaves belong to:

- A. *Juniperus communis*
- B. *Ginkgo biloba*
- C. *Picea abies*
- D. *Cedrus libani*
- E. *Abies sibirica*

8. A woman complains of palpitations, muscle weakness, and increased appetite. Objectively, she presents with thyroid gland enlargement. Hypersecretion of what hormone is likely in this case?

- A. Glucagon
- B. Calcitonin
- C. Cortisol
- D. Thyroxine
- E. Aldosterone

9. Name the line on the phase diagram, above which the solid phase cannot exist:

- A. Liquidus
- B. Median
- C. Solidus
- D. Eutectic
- E. Conode

10. Humans are immune to the plague that affects cattle and dogs. What type of immunity is it?

- A. Natural active
- B. Natural passive
- C. Innate hereditary
- D. Artificial passive
- E. Artificial active

11. An elderly patient developed

postoperative intestinal atony. What anticholinesterase drug is indicated in this case?

- A. Pilocarpine hydrochloride
- B. Dithylin (Suxamethonium)
- C. Proserin (Neostigmine)
- D. Atropine sulfate
- E. Metoprolol

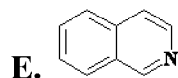
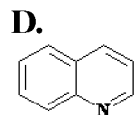
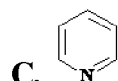
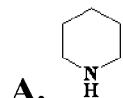
12. To determine the type of botulinum toxin, a reaction of toxin neutralization with antitoxin is performed on laboratory mice. Name this research method:

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

13. An intensive care unit received an unconscious patient diagnosed with diabetic ketoacidotic coma. What type of pathological respiration is characteristic of this condition?

- A. Biot respiration
- B. Kussmaul respiration
- C. Cheyne-Stokes respiration
- D. Gasping respiration
- E. Apneustic respiration

14. Select the quinoline formula from the compounds given below:



15. Cork formation occurs in cell membranes because they accumulate:

- A. Cutin
- B. Cellulose
- C. Suberin
- D. Mineral salts
- E. Lignin

16. During the blooming season a 45-year-old woman developed acute inflammatory disease of her upper airways and eyes with hyperemia, edema, and mucous discharge. What type of leukocytosis is the most characteristic in this case?

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

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

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

18. A factory that produces bacterial preparations makes several types of vaccines. What vaccine is used for mandatory immunization?

- A. Measles vaccine
- B. Plague vaccine
- C. Typhoid vaccine
- D. Antirabic vaccine
- E. Influenza vaccine

19. The doctor prescribed the parturient woman a hormonal drug for labor stimulation, because her labor activity was too weak. Name this drug:

- A. Glibenclamide
- B. Oxytocin
- C. Prednisolone
- D. Insulin
- E. L-thyroxine

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

- A. Histones
- B. Globulins
- C. Albumins
- D. Glutelins
- E. Interferons

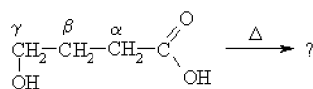
21. *Plantago major* inflorescence grows at the apex, its rachis is long, with sessile flowers. Name this type of inflorescence:

- A. Spike
- B. Thyrsse
- C. Spadix
- D. Capitulum
- E. Panicle

22. Acetylene reaction with water produces the following:

- A. Oxalic acid
- B. Acetaldehyde
- C. Ethylene glycol
- D. Ethyl alcohol
- E. Benzyl alcohol

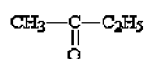
23.  $\gamma$ -butyrolactone is produced, when  $\gamma$ -hydroxybutyric acid is being heated. Select  $\gamma$ -butyrolactone from the listed compounds:



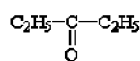
A.



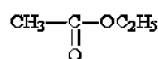
B.



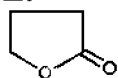
C.



D.



E.



24. A patient, who lives in the area with specific geochemical conditions, was diagnosed with endemic goiter. What microelement deficiency results in development of this pathology?

- A. F
- B. I
- C. Cl
- D. Br
- E. Na

25. Vitamin derivatives function as coenzymes. Thiamine pyrophosphate is the coenzyme form of:

- A. Vitamin  $B_5$
- B. Vitamin  $B_6$
- C. Vitamin  $B_2$
- D. Vitamin  $B_1$
- E. Vitamin  $B_3$

26. A drug solution sterilized by means of boiling was tested for sterility. Inoculation in Kitt-Tarozzi medium revealed clostridia. Clostridia survived the boiling because they are:

- A. Spore-formers
- B. Acid-fast
- C. Prototrophic
- D. Thermophilic
- E. Anaerobic

27. Air contamination with pathological microorganisms can be anticipated by the presence of indicator bacteria. Specify the bacteria that indicate immediate epidemiologic danger:

- A. Sarcinae
- B. Mold fungi
- C. Micrococci
- D. Hemolytic streptococci
- E. Yeast fungi

28. Specify the method of quantitative analysis that is based on formation of complex compounds from halogenide ions and salts  $Hg^{2+}$ :

- A. Argentometry
- B. Alkalimetry
- C. Mercurimetry
- D. Acidimetry
- E. Complexometric titration

29. A 20-year-old woman with diabetes mellitus was delivered to the hospital in the state of unconsciousness. On examination her blood plasma glucose levels were 1.8 mmol/L. She was diagnosed with hypoglycemic coma. What is the likely cause of the patient's condition?

- A. Disturbed sleep schedule
- B. Untimely administration of insulin
- C. Administration of sulfonylurea preparations
- D. Insulin overdose
- E. Biguanide administration

30. Surfactants and high-molecular compounds are added into concentrated emulsions to stabilize them. These substances are:

- A. Solvents
- B. Catalysts
- C. Activators
- D. Absorbents
- E. Emulsifiers

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

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

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

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

33. What type of fruit has a juicy pericarp, is many-seeded, indehiscent, and forms from coenocarpous gynoecium?

- A. Coenobium
- B. Silique
- C. Hesperidium
- D. Fraga
- E. Cynarrhodium

34. Specify what method of redox titration requires the use of specific indicator - starch - to fix the end point:

- A. Permanganometry
- B. Nitritometry
- C. Bromatometry
- D. Cerimetry
- E. Iodometry

35. A dispensing chemist after conducting a lengthy analysis (psychoemotional stress) developed elevated blood

pressure (160/110 mm Hg). What changes in the neurohumoral regulation can be the cause of blood pressure elevation in this case?

- A. Sympathoadrenal system activation
- B. Renin-angiotensin system activation
- C. Kinin-kallikrein system activation
- D. Activation of aldosterone synthesis and secretion
- E. Sympathoadrenal system inhibition

36. Name the process of cell membrane saturation with a fat-like substance - suberin:

- A. Lignification
- B. Sliming
- C. Cork formation
- D. Mineralisation
- E. Cutinization

37. Steric factor is used for accurate calculation of the velocity constant based on the activation energy. This factor takes the following into account:

- A. Chemical properties of the interacting substances
- B. Temperature of the reaction mixture
- C. Concentration of the reacting substances
- D. Molecular structure of the interacting substances
- E. Mutual orientation of the reacting molecules

38. When an isolated system spontaneously approaches its equilibrium, its entropy:

- A. Approaches zero
- B. Demonstrates linear magnification
- C. Reaches minimum
- D. Reaches maximum
- E. Approaches infinity

39. A patient suffering from neurosis associated with feelings of anxiety and fear was prescribed diazepam. What pharmacological effect of this drug allows to use it for the treatment of this condition?

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

40. High-molecular compounds are being added into colloidal preparations of

silver (protargol, collargol) to increase sol stability. The ability of these compounds to prevent sol coagulation is called:

- A. Electrokinetic potential
- B. Electrophoretic mobility
- C. Protective number
- D. Electrothermodynamic potential
- E. Coagulation threshold

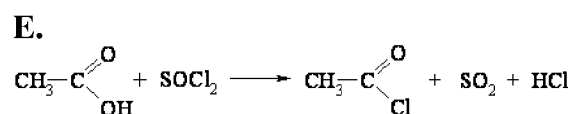
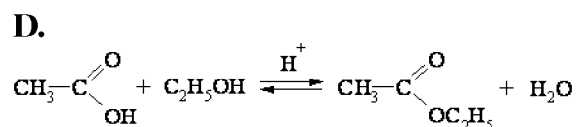
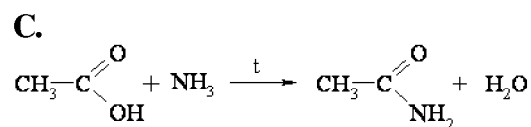
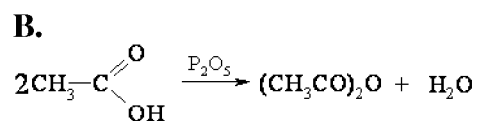
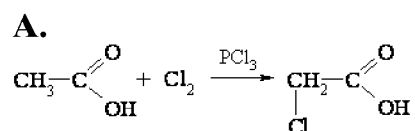
41. A sample section of an axial body shows a complex consisting of phellogen and its derivatives - cork and phelloderm. Name this tissue:

- A. Periderm
- B. Epiblem
- C. Collenchyma
- D. Sclerenchyma
- E. Epidermis

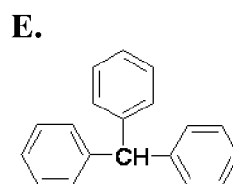
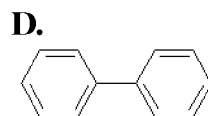
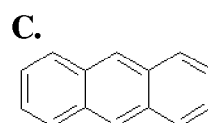
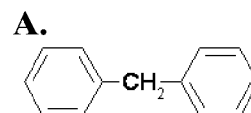
42. The vapor pressure of a boiling liquid is:

- A. Equal to the saturated vapor pressure at room temperature
- B. Equal to one atmosphere
- C. Equal to the saturated vapor pressure at 273 K
- D. Minimal
- E. Maximal

43. Choose the reaction of ester production among those listed below:



44. What compound of those listed below is a condensed arene?



45. Select the correct name of this compound:



- A. 8-Aminopurine
- B. 6-Aminopurine
- C. 4-Aminopurine
- D. 2-Aminopurine
- E. 6-Nitropurine

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

47. The powders that contain belladonna extract and activated charcoal exhibit decreased therapeutic activity. What surface phenomenon leads to decreased activity in this case?

- A. Adsorption
- B. Desorption
- C. Spreading
- D. Adhesion
- E. Cohesion

48. The pharmacopoeial ebullioscopic method for quantitative determination of alcohol in an aqueous-alcoholic mixture is based on experimental determination of:

- A. Osmotic pressure
- B. Boiling temperatures
- C. Solvus temperatures
- D. Resistance
- E. Crystallization temperatures

49. After being stung by bees, the patient developed Quincke's edema. What drug should the patient be urgently administered for treatment of this condition?

- A. Anaprilin (Propranolol)
- B. Platyphylline hydrotartrate
- C. Adrenaline hydrochloride (Epinephrine)
- D. Sodium chloride
- E. Atropine sulfate

50. After a physical exertion, a patient developed an angina pectoris attack due to myocardial ischemia. What statement corresponds the best with the definition of ischemia?

- A. Decreased blood erythrocyte count
- B. Dilation of the arterioles
- C. Increased supply of the tissues with oxygen
- D. Imbalance between the needed and received blood supply to the tissues
- E. Oxygen deficiency in the circulatory system

51. During examination a patient that complained of edemas presents with proteinuria, arterial hypertension, hypoproteinemia, and retention hyperlipidemia. Name this syndrome:

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

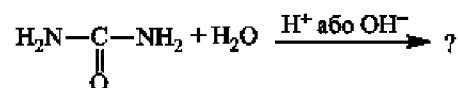
52. The presence of colibacilli in water indicates its fecal contamination. What is coli titer?

- A. The number of colibacilli in 1 liter of water
- B. The total number of bacteria in 1 liter of water
- C. The minimum amount of water, where the presence of colibacilli can be detected
- D. The total number of bacteria in 1 milliliter of water
- E. The number of colibacilli in 1 milliliter of water

53. Gout develops when purine nucleotide metabolism is disturbed. A doctor prescribed the patient allopurinol that is a competitive inhibitor of:

- A. Lactate dehydrogenase
- B. Hexokinase
- C. Succinate dehydrogenase
- D. Alcohol dehydrogenase
- E. Xanthine oxidase

54. Specify the products of urea hydrolysis:



- A.  $\text{CO}_2 + \text{H}_2\text{O} + 2\text{NH}_3$
- B.  $\text{CO}_2 + \text{N}_2 + 3\text{H}_2$
- C.  $\text{CO}_2 + \text{N}_2 + 3\text{H}_2\text{O}$
- D.  $\text{CO} + \text{N}_2 + 3\text{H}_2$
- E.  $\text{CO} + 2\text{NH}_3$

55. A colloidal solution of a medicinal substance was obtained in the laboratory. Why is a high-molecular substance being added to the colloidal solution?

- A. To increase its stability
- B. To coagulate the colloidal solution
- C. To coalesce the colloidal solution
- D. To precipitate the colloidal solution
- E. To decrease its stability

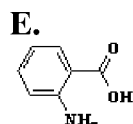
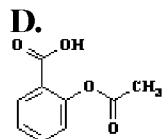
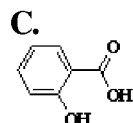
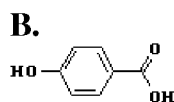
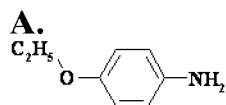
56. Increased concentration of active oxygen forms is a mechanism of pathogenesis in a number of diseases. To prevent this process, antioxidants are prescribed. Select an antioxidant from the list below:

- A. Alpha-tocopherol
- B. Scopolamine
- C. Glucose
- D. Starch
- E. Cobalamine

57. What reaction for determination of ammonium cations is a specific one?

- A.** Reaction with sodium hexanitrocobaltate(III)  
**B.** Reaction with sodium hexanitrocobaltate(III) in an acidic medium  
**C.** Reaction with hydroxides of alkaline metals during heating  
**D.** Reaction with potassium hexahydroxoantimonate  
**E.** Reaction with potassium tetraiodohydrargyrate(II) in an alkaline medium

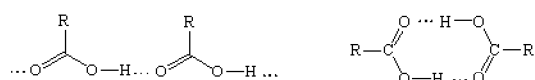
**58.** Salicylic acid derivatives are widely used in medicine. Specify the formula of salicylic acid:



**59.** The following is used to determine the titrant volume in the process of titrimetric analysis:

- A.** Cylinders  
**B.** Measuring glasses  
**C.** Measuring tubes  
**D.** Measuring flasks  
**E.** Burettes

**60.** What type of bonds participates in creation of both linear and cyclic carboxylic acid associates in the form of dimers?



- A.** Donor-acceptor bonds  
**B.** Polar covalent bonds  
**C.** Nonpolar covalent bonds  
**D.** Hydrogen bonds  
**E.** Ionic bonds

**61.** Examination of the smears prepared from the cerebrospinal fluid of a sick child detected gram-negative bean-shaped diplococci that were located inside the leukocytes. Name the likely causative agent:

- A.** Rickettsia  
**B.** Streptococcus  
**C.** Staphylococcus  
**D.** Gonococcus  
**E.** Meningococcus

**62.** Transformation  $C_2H_4$  (alkene)  $\rightarrow$   $C_2H_6$  (alkane) occurs during the following reaction:

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

**63.** Help the doctor to choose a nonsteroidal anti-inflammatory drug that is a COX-2 inhibitor and does not damage the stomach:

- A.** Diclofenac sodium  
**B.** Celecoxib  
**C.** Indometacin  
**D.** Acetylsalicylic acid  
**E.** Paracetamol

**64.** What phenomenon can be observed when directed lightbeam passes through  $MnO_2$  sol solution?

- A.** Light reflection  
**B.** Light refraction  
**C.** Optimal anisotropy  
**D.** Light interference  
**E.** Light scattering

**65.** What common feature of cations  $Al^{3+}$ ,  $Zn^{2+}$ ,  $Cr^{3+}$ , and  $Sn^{2+}$  places them all into the IV analytical group (acid-base classification)?

- A.** Acid-soluble hydroxides  
**B.** Amphoterism of hydroxides  
**C.** Hydroxides that are soluble in excess of ammonia solution  
**D.** High solubility of some salts  
**E.** Water-insoluble salts



66. A patient presents with decreased secretory function of the stomach, which is accompanied by anemia. What vitamin has anti-anemic action?

- A. Nicotinic acid
- B. Cobalamin
- C. Thiamine
- D. Retinol
- E. Tocopherol

67. A 25-year-old man has an appointment with the dentist. Several minutes after his oral cavity was lavaged with furacilin (nitrofurazone) the patient developed significant labial edema. What type of allergic reaction is observed in this case?

- A. Anaphylactic
- B. Cytolytic
- C. Immune complex
- D. Delayed-type hypersensitivity
- E. Stimulated

68. A mountain-dweller has blood hemoglobin of 180 g/L. Increased hemoglobin synthesis in the conditions of chronic hypoxia occurs due to bone marrow stimulation with:

- A. Adrenaline
- B. Vasopressin
- C. Noradrenaline
- D. Thyroxine
- E. Erythropoietin

69. Microscopy of a smear that was prepared from the material obtained from the patient detected there large bacilli with blunt ends that were arranged in a chain. After the causative agent was inoculated into a nutrient medium with addition of penicillin, the bacilli became spherical and started resembling a pearl necklace. This phenomenon is characteristic of the following causative agent:

- A. Tularemia
- B. Anthrax
- C. Candidiasis
- D. Plague
- E. Cholera

70. Select an alicyclic hydrocarbon from the listed compounds:

- A. Anthracene
- B. Cyclohexene
- C. Phenanthrene
- D. Benzene
- E. Naphthalene

71. Folk medicine uses the flowers of white dead-nettle (*Lamium album*) to treat pancreatic diseases, catarrh of the upper respiratory tract, etc. This plant belongs to the following family:

- A. *Solanaceae*
- B. *Labiatae*
- C. *Fabaceae*
- D. *Scrophulariaceae*
- E. *Asteraceae*

72. Pharmacopoeia reaction to determine benzoate ions requires interaction with the solution of:

- A. Acetic anhydride
- B. Resorcin
- C. Diphenylamine
- D. Potassium chloride
- E. Iron(III) chloride

73. Bacterioscopical method of laboratory diagnostics of infections requires staining microslides according to various staining techniques. Gram staining technique is used for:

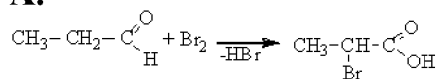
- A. Spore staining
- B. Detection of capsules
- C. Detection of flagella
- D. Differentiation of bacteria
- E. Detection of plasmids

74. In a closed garage, a driver was staying for a long time in his car, with the engine running. After a time he developed a headache and started vomiting. This condition is caused by formation of the following compound:

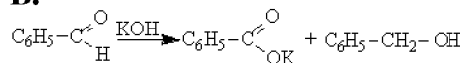
- A. Deoxyhemoglobin
- B. Cyanmethemoglobin
- C. Oxyhemoglobin
- D. Myoglobin
- E. Carboxyhemoglobin

75. Specify the Cannizzaro reaction (disproportionation of aldehydes) among the reactions given below:

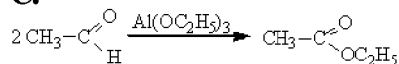
A.



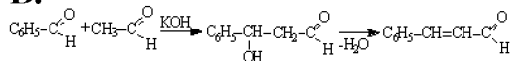
B.



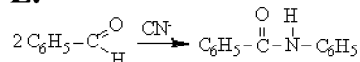
C.



D.



E.



76. A 34-year-old woman with bronchitis presents with persistent dry non-productive cough. The doctor prescribed her a centrally acting antitussive drug. Name this drug:

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

77. A diagnosis can be made based on detection of the antibodies to the causative agent of an infectious disease in the patient's blood serum. What type of analysis is it?

- A. Microbiological method
- B. Microscopy
- C. Biological method
- D. Serological method
- E. Allergy test

78. An analyst performed a reaction for thiosulfate ions with inorganic acids. Specify the analytical effect of such reaction:

- A. Formation of a black precipitate
- B. Solution turbidity and production of a gas with characteristic odor
- C. Formation of a green precipitate
- D. Formation of a red precipitate
- E. Formation of a blue precipitate

79. What compound will form as a result of 3-methylpyridine oxidation?

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

80. A 45-year-old woman diagnosed with fibromyoma developed microcytic hypochromic anemia due to profuse hemorrhages. What type of anemia is it, based on the mechanism of its development?

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

81. A patient is suspected to have pulmonary tuberculosis. A sample of his sputum was obtained for analysis. What technique is most advisable for staining of the prepared smears?

- A. Mayer staining technique
- B. Gram staining technique
- C. Loeffler staining technique
- D. Ziehl-Neelsen staining technique
- E. Neisser staining technique

82. 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. Chloride ions
- C. Carbonate ions
- D. Bismuth ions
- E. Lead ions

83. A patient with allergic rhinitis was prescribed loratadine. This drug belongs to the following group of antiallergic agents:

- A. H<sub>2</sub>-antagonists
- B. Leukotriene receptor antagonists
- C. H<sub>1</sub>-antagonists
- D. Membrane stabilizers
- E. Glucocorticosteroids

84. What method of analysis is based on light refraction at the interface of two transparent media?

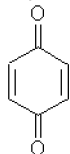
- A. Refractometry
- B. Coulometry
- C. Turbidimetry
- D. Conductometry
- E. Polarimetry

85. To treat thrombosis, the doctor prescribed the patient a direct-acting anticoagulant. Name this drug:

- A. Heparin
- B. Warfarin
- C. Syncumar (Acenocoumarol)
- D. Phenilin (Phenindione)
- E. Vicasol (Menadione)

86. Which of the compounds given below is an aromatic one?

A.



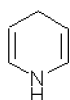
B.



C.



D.



E.



87. To obtain butane

$CH_3 - CH_2 - CH_2 - CH_3$  from chloroethane

$CH_3 - CH_2 - Cl$ , the following reaction is used:

- A. Zinin reaction
- B. Kononov reaction
- C. Kucherov reaction
- D. Wurtz reaction
- E. Finkelstein reaction

88. Seitz filters are widely used in laboratory practice. What is their

purpose?

- A. Virus destruction
- B. Measurement of water contamination
- C. Sterilization by means of filtration
- D. Growing of bacteriophages
- E. Disinfection of solutions

89. Help the doctor to choose a narcotic analgesic that can be used for labor pain relief:

- A. Analgin (Metamizole sodium)
- B. Paracetamol
- C. Promedol (Trimeperidine)
- D. Morphine
- E. Codeine phosphate

90. A patient diagnosed with peptic ulcer disease of the stomach in the phase of exacerbation was brought into the inpatient department. Consult a medical intern, what drug will reduce the function of gastric glands by blocking  $H_2$ -receptors:

- A. Famotidine
- B. Atropine sulfate
- C. Platyphylline hydrotartrate
- D. Metocinium
- E. Belladonna dry extract

91. When medicinal antitoxic sera are being administered in practice, the patient always receives precisely measured doses. What units are used to measure the activity of these sera?

- A. Lethal
- B. Flocculation
- C. International
- D. Bacteriostatic
- E. Hemolytic

92. When glucose breaks down during glycolysis, a number of transformations occur. In the first reaction, glucose 6-phosphate transforms into the following compound:

- A. Acetyl coenzyme A
- B. Mannose 6-phosphate
- C. Fructose 6-phosphate
- D. Fructose 1-phosphate
- E. Galactose 1-phosphate

93. To treat glaucoma, the doctor decided to prescribe the patient a direct-acting cholinomimetic agent. Name this drug:

- A. Sulfacyl sodium (Sulfacetamide)
- B. Pilocarpine hydrochloride
- C. Platyphylline hydrotartrate
- D. Atropine sulfate
- E. Zinc sulfate

94. To determine the viscosity of sputum that contains high-molecular compounds, one can simply measure the relative viscosity of the liquid. The relative viscosity is characterized by:

- A. The limit value of the reduced viscosity of a solution as the solute concentration approaches zero
- B. The ratio of the relative viscosity of a solution to mass concentration of a solution
- C. The ratio of the relative viscosity of a solution to mass fraction of a solution
- D. The ratio of the absolute viscosity of a solution to the solvent viscosity
- E. The difference between viscosity values of a solution and a solvent

95. Name the drug of choice for the treatment of trichomonas infection:

- A. Tetracycline
- B. Gentamicin
- C. Norfloxacin
- D. Metronidazole
- E. Amoxicillin

96. Coumarins, vitamin *K* antagonists, suppress the processes of blood coagulation. What protein synthesis is blocked by coumarins?

- A. Gamma globulin
- B. Prothrombin
- C. Albumin
- D. Transferrin
- E. Ceruloplasmin

97. Pharmacopoeia reaction with potassium hexacyanoferrate(II) for detection of zinc cations produces:

- A. Yellow precipitate
- B. Violet precipitate
- C. White precipitate
- D. Red precipitate
- E. Black precipitate

98. Glass electrodes are often used in pharmaceutical analysis. What type of electrodes are they?

- A. Simple redox
- B. Ion-selective
- C. Complex redox
- D. First kind
- E. Second kind

99. In the result of prolonged fasting, carbohydrate stores in the human body disappear rapidly. What metabolic reactions maintain blood glucose levels in this case?

- A. Glycogenolysis
- B. Anaerobic glycolysis
- C. Gluconeogenesis
- D. Aerobic glycolysis
- E. Pentose-phosphate pathway

100. A chemotherapeutic agent has a bactericidal effect against streptococci, staphylococci, bacilli, and clostridia. According to its action spectrum this drug belongs to the following group:

- A. Antituberculous agents
- B. Broad spectrum antibacterial agents
- C. Antiviral agents
- D. Broad spectrum antifungal agents
- E. Narrow spectrum antibacterial agents

101. What cations belong to the II analytical group according to the acid-base classification?

- A. Potassium, barium, bismuth
- B. Aluminum, magnesium, zinc
- C. Zinc, aluminum, chromium
- D. Calcium, strontium, barium
- E. Silver, lead, mercury(I)

102. Synthesis of a medicinal substance occurs in an isolated system. What is a direction criterion of spontaneous processes?

- A. Gibbs energy
- B. Intrinsic energy
- C. Entropy change
- D. Helmholtz energy
- E. Enthalpy

103. A patient suffers from intense cough with production of viscous sputum. What drug can thin the sputum and facilitate expectoration?

- A. Acetylcysteine
- B. Prenoxdiazine
- C. Codeine phosphate
- D. Glaucine
- E. Butamirate

**104.** What titration method should be used for determination of a volatile substance?

- A. Titration of separate sample weights
- B. Titration with instrumentally fixed equivalence point
- C. Substitution titration
- D. Back titration
- E. Direct titration

**105.** The patient's feces were inoculated into an alkaline peptone medium. Six hours later there was observed growth of the causative agent that manifested as a bluish film. The smear contains curved bacilli. What is the likely causative agent?

- A. *Vibrio cholerae*
- B. *Escherichia coli*
- C. *Pseudomonas aeruginosa*
- D. *Mycobacterium tuberculosis*
- E. *Salmonella enterica*

**106.** 6M of sodium hydroxide solution and 3% hydrogen peroxide solution was added into the solution being analyzed. The solution colored yellow when heated, which indicates the presence of:

- A. Lead cations
- B. Chromium(III) cations
- C. Aluminum cations
- D. Tin(II) cations
- E. Zinc cations

**107.** Old radish roots are less juicy, their storage xylem becomes porous and hard due to significant proliferation and lignification of:

- A. Parenchyma
- B. Bast fibers
- C. Companion cells
- D. Vessels
- E. Sieve tubes

**108.** A potassium dichromate solution was sent for analysis. One of the physico-chemical methods of analysis was used for its quantitative determination. Name this method:

- A. Fluorimetry
- B. Spectrophotometry
- C. Coulometry
- D. Polarimetry
- E. Turbidimetry

**109.** You work in the pharmacy located on the premises of a

dermatovenerological clinic. Consult a medical intern what antibiotic is the drug of choice for treatment of syphilis:

- A. Ciprofloxacin
- B. Lincomycin hydrochloride
- C. Chloramphenicol
- D. Benzylpenicillin sodium salt
- E. Streptomycin sulfate

**110.** A woman with parkinsonism was prescribed a dopamine precursor for relief of muscular rigidity. Name this drug:

- A. Paracetamol
- B. Atropine sulfate
- C. Levodopa
- D. Aminazine
- E. Scopolamine hydrobromide

**111.** A sodium hydroxide solution and a hydrogen peroxide solution were added into an unknown mixture, which resulted in formation of a precipitate. However, this precipitate disappeared, when these substances were added in excess. It indicates the presence of cations of the following analytical group:

- A. VI
- B. III
- C. II
- D. V
- E. IV

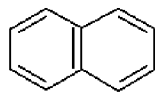
**112.** Sedimentation is the process of:

- A. Spontaneous fragmentation of the particles of a dispersed material in a liquid or gaseous medium when processed with electric current
- B. Agglutination of the particles of a dispersed material when processed with electrolyte solution
- C. Agglutination of the particles of a dispersed material in a liquid medium with formation of aggregates
- D. Precipitation of the particles of a dispersed material in a liquid or gaseous medium due to the gravitational forces
- E. Particle enlargement in a liquid medium

**113.** In terms of numbers of species the *Asteraceae* family is the largest among the *Magnoliophyta*. Some species of this family that are used in medicine were entered into the "Red Book of Ukraine" and need protection. Name one such species:

- A. *Centaurea cyanus*
- B. *Helianthus annuus*
- C. *Artemisia vulgaris*
- D. *Arnica montana*
- E. *Taraxacum officinale*

114. What numerical value must be assigned to  $n$ , for the Huckel's rule ( $4n+2$ ) to be observed in naphthalene?



- A.  $n=0$
- B.  $n=8$
- C.  $n=2$
- D.  $n=4$
- E.  $n=1$

115. Many drugs must be manufactured under strictly aseptic conditions. One possible source of microbiological contamination of drugs is laboratory glassware. What method should be used to sterilize the glassware?

- A. Tyndallization
- B. Dry heat
- C. Ignition
- D. Pasteurization
- E. Boiling

116. Cholesterol derivatives produced in the liver are necessary for digestion of lipids. Name these derivatives:

- A. Calciferols
- B. Catecholamines
- C. Bile acids
- D. Corticosteroids
- E. Acetyl coenzyme A

117. A man's diet consists mostly of fatty foods. What enzyme should he be prescribed to normalize his digestive processes?

- A. Catalase
- B. Lipase
- C. DNase
- D. Hyaluronidase
- E. Maltase

118. 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. Gymnosperms
- B. Monocotyledons
- C. Dicotyledons
- D. Polypodiophyta
- E. Algae

119. During lancing an abscess in the oral cavity, it produces a yellow-green discharge. What cells are always present and predominant in the purulent exudate?

- A. Lymphocytes
- B. Basophils
- C. Neutrophils
- D. Eosinophils
- E. Erythrocytes

120. The representatives of *Lamiaceae* family have a leaf arrangement, where the pairs of leaves growing from two neighboring nodes on a stem are situated in two mutually opposite planes. What type of leaf arrangement is it?

- A. Spiral leaf arrangement
- B. Whorled leaf arrangement
- C. Opposite leaf arrangement
- D. Opposite decussate leaf arrangement
- E. Rosette leaf arrangement

121. A nurse asks, what drug has a hypoglycemic effect because it stimulates pancreatic beta-cells. What will you answer?

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

122. A patient complains of a pain in his right leg. During foot examination, his foot is pale, diminished in size, and exhibits a local decrease in temperature. What disturbance of local blood circulation is observed in this patient?

- A. Venous hyperemia
- B. Metabolic arterial hyperemia
- C. Ischemia
- D. Neuroparalytic arterial hyperemia
- E. Neurotonic arterial hyperemia

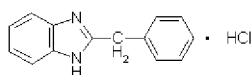
123. Gastric secretory function of a patient was analyzed. No hydrochloric acid and no enzymes were detected in the gastric juice of the patient. Name this condition:

- A. Achylia
- B. Hypoaciditas
- C. Hypochlorhydria
- D. Achlorhydria
- E. Hyperchlorhydria

124. A person has been stung by a bee. The stung area developed redness and edema. What is the main mechanism of edema development?

- A. Decreased oncotic blood pressure
- B. Increased hydrostatic blood pressure
- C. Disturbed lymphatic efflux
- D. Decreased osmotic blood pressure
- E. Increased permeability of the capillaries

125. Dibazol (Bendazol) is a hypotensive antispasmodic drug. Its mechanism of action is based on its ability to block phosphodiesterase type 4 enzyme activity. This drug



contains the following heterocyclic compound in its structure:

- A. Benzimidazole
- B. Pyridine
- C. Thiazole
- D. Benzene
- E. Pyrimidine

126. The presence of essential oil glandules, achene fruits, and capitulum inflorescences are the characteristic diagnostic characters of the following plant family:

- A. *Lamiaceae*
- B. *Asteraceae*
- C. *Rosaceae*
- D. *Solanaceae*
- E. *Scrophylariaceae*

127. In the human body, some carbohydrates cannot be digested in the gastrointestinal tract. Select one such carbohydrate:

- A. Sucrose
- B. Cellulose
- C. Lactose
- D. Starch
- E. Glycogen

128. Reaction of sodium ions with potassium hexahydroxoantimonate(V) in a neutral medium produces

precipitate. Specify the color of this precipitate:

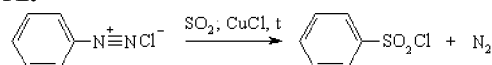
- A. White
- B. Red
- C. Yellow
- D. Green
- E. Blue

129. One of the methods of methanol poisoning treatment requires administration of ethanol (*per os* or intravenously) in the amounts that cause intoxication in a healthy person. Why is this treatment method effective?

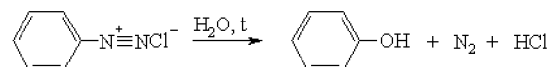
- A. Ethanol blocks alcohol dehydrogenase coenzyme
- B. Ethanol inhibits methanol diffusion
- C. Ethanol inactivates alcohol dehydrogenase
- D. Ethanol breaks-up faster than methanol
- E. Ethanol competes with methanol for the active site of alcohol dehydrogenase

130. Select an azo coupling reaction from the reactions given below:

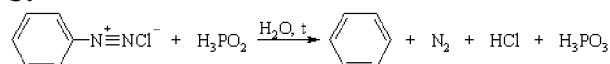
A.



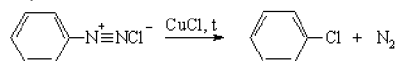
B.



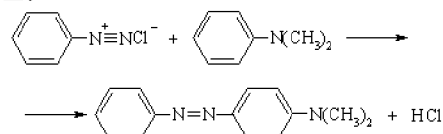
C.



D.



E.



131. An unconscious patient was brought into the intensive care unit. Acetone breath, acute hyperglycemia, and ketonemia are detected. What complication of diabetes mellitus occurred in this case?

- A. Diabetic coma
- B. Acute acetone poisoning
- C. Hypoglycemic coma
- D. Nephritis
- E. Cataract

132. What reagents allow to confirm the presence of a primary amino group in the molecule of *n*-aminobenzoic acid, if isonitrile test is used?

- A.  $Br_2, H_2O$
- B.  $CHCl_3, NaOH$
- C.  $NaHCO_3$
- D.  $I_2, NaOH$
- E.  $KMnO_4$

133. Name the psychostimulant with analeptic properties, which is a purine derivative:

- A. Mezapam (Medazepam)
- B. Sulpiride
- C. Caffeine and sodium benzoate
- D. Tramadol
- E. Sodium bromide

134. A couple came to the genetic consultation for their newborn child to be examined. Karyotype test detects an additional chromosome in the 21 pair. What diagnosis can be made?

- A. Turner syndrome
- B. Edwards syndrome
- C. Klinefelter syndrome
- D. Patau syndrome
- E. Down syndrome

135. Hydrogen peroxide content can be determined without indicators, by means of the following redox titration:

- A. Alkalimetry
- B. Permanganatometry
- C. Acidimetry
- D. Complexometric titration
- E. Argentometry

136. What reference electrode should be used for potentiometric determination in a solution that contains ammonia and sodium hydroxide?

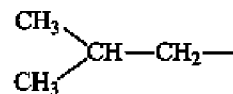
- A. Silver chloride
- B. Platinum
- C. Silver
- D. Glass
- E. Zinc

137. A patient with croupous pneumonia developed body temperature up to  $40^\circ C$ .

What type of body temperature is it, based on its elevation?

- A. -
- B. High
- C. Subfebrile
- D. Hyperpyretic
- E. Moderate

138. Specify the correct name of a radical with the following structural formula:



- A. N-Butyl
- B. Isobutyl
- C. Tert-Butyl
- D. Butyl
- E. Sec-Butyl

139. Explain to a medical intern, what is the correct term for the phenomenon, when prolonged taking of a medicine results in its reduced effectiveness:

- A. Sensitization
- B. Tachyphylaxis
- C. Cumulation
- D. Dependence
- E. Acquired tolerance

140. Upon examination of a flower it is determined to have one pistil made up of a single free carpel. Therefore, this gynoecium can be identified as:

- A. Paracarpous
- B. Monocarpous
- C. Syncarpous
- D. Lysicarpous
- E. Apocarpous

141. A certain perennial plant of *Polygonaceae* family was harvested on a water meadow. The plant has a thick horizontal serpentine rhizome and apical spicate inflorescences consisting of small pink flowers. What plant was harvested?

- A. *Polygonum hydropiper*
- B. *Rumex acetosa*
- C. *Polygonum persicaria*
- D. *Polygonum bistorta*
- E. *Polygonum aviculare*

142. Proteolytic enzymes of gastrointestinal tract catalyze protein hydrolysis. What chemical bonds do these enzymes break?



- A. Glycosidic bonds
- B. Ether bonds
- C. Phosphodiester bonds
- D. Hydrogen bonds
- E. Peptide bonds

**143.** Potassium permanganate concentration in a solution can be determined by means of photometric analysis. What value is measured for this purpose?

- A. Optical density
- B. Potential of an indicator electrode
- C. Half-wave potential
- D. Refractive index
- E. Rotation angle of the plane of polarization

**144.** Name the process of spontaneous adhesion of drops to each other in an emulsion:

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

**145.** The process of electrolyte adsorption obeys the Fajans-Paneth law, according to which crystals adsorb:

- A. Only the ions or atoms that belong to the structure of their lattice or are isomorphic with them
- B. Only anions
- C. Only the ions that do not belong to the structure of their lattice
- D. All ions from a solution
- E. Only cations

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

- A. Stimulates  $\beta$ -adrenergic receptors
- B. Blocks  $\alpha$ -adrenergic receptors
- C. Blocks muscarinic receptors
- D. Blocks  $\beta$ -adrenergic receptors
- E. Inhibits angiotensin-converting enzyme

**147.** A 38-year-old pregnant woman with uterine bleeding was brought into the admission room. What changes are likely to be observed in the blood of the woman in labor?

- A. Erythrocytosis
- B. Decreased hematocrit
- C. Leukopenia
- D. Increased hematocrit
- E. Monocytosis

**148.** To determine anions of the I analytical group, they need to be processed with:

- A. Alkaline solution
- B. Inorganic acid solution
- C.  $BaCl_2$  solution in an acidic medium
- D.  $AgNO_3$  solution in an acidic medium
- E.  $BaCl_2$  solution in a neutral or slightly alkaline medium

**149.** Immune sera are used for seroprophylaxis and serotherapy of infectious diseases. What immunity is formed in such cases?

- A. Artificial active
- B. Artificial passive
- C. Natural passive
- D. Innate hereditary
- E. Natural active

**150.** It is known that nitrogen-fixing and cellulose-fermenting bacteria cannot exist separately. What type of interaction between organisms is it?

- A. Symbiosis
- B. Antagonism
- C. Metabiosis
- D. Synergism
- E. Satellitism