



**STATE ORGANIZATION
«TESTING BOARD FOR PROFESSIONAL COMPETENCE ASSESSMENT OF
HIGHER EDUCATION TRAINEES IN MEDICINE AND PHARMACY AT THE
MINISTRY OF HEALTH OF UKRAINE»**

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Variant 59

**TEST ITEMS
FOR THE UNIFIED STATE QUALIFICATION EXAM
TEST COMPONENT
STAGE 1**

PHARMACY

KROK 1

1. Mutation in the gene that controls the synthesis of beta chain results in formation of abnormal hemoglobin forms. Select the mutant hemoglobin:

- A. HbS
- B. HbA
- C. HbF
- D. HbA2
- E. HbA1

2. A sample of water used in the manufacture of medicines is sent to a laboratory for sanitary-virological analysis. What group of viruses would indicate a fecal contamination of the water and the need for its additional purification, if it is detected in the water sample?

- A. Orthomyxoviridae
- B. Picornaviridae
- C. Retroviridae
- D. Flaviviridae
- E. Herpesviridae

3. A 40-year-old man was prescribed antibiotics as a part of the complex therapy for peptic ulcer disease of the stomach. Which of the following combinations is indicated in this case?

- A. Amoxicillin + clarithromycin
- B. Oxacillin + nalidixic acid
- C. Levomycetin (chloramphenicol) + ampicillin
- D. Streptomycin + benzylpenicillin
- E. Phenoxymethylpenicillin + lincomycin

4. A mother with a 6-year-old child came to a local pediatrician. She complains that her child has sore throat and problems with breathing. The doctor suspects laryngeal diphtheria. What external breathing disorder can develop with such localization of the disease?

- A. Slow, deep, with labored expiration
- B. Slow, deep, with labored inspiration
- C. Biot respiration
- D. Rapid, shallow
- E. Cheyne-Stokes respiration

5. Nitrate anions, unlike nitrite anions, do not interact with:

- A. Diphenylamine
- B. Iron(II) sulfate and sulfuric acid
- C. Sulfanilic acid
- D. Antipyrine
- E. Potassium permanganate

6. Select an indicator for argentometric

determination of chloride ions using the Mohr method:

- A. Diphenylcarbazone
- B. Methyl red
- C. Eosin
- D. Fluorescein
- E. Potassium chromate

7. In monocotyledonous plants metabolism end-products are often represented by multiple needle crystals of calcium oxalate arranged in clusters. Name these structures:

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

8. 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

9. Explain to a doctor, what drug has the effect, closest to acetylcysteine, and can be used as its substitute, if acetylcysteine is not available in a pharmacy:

- A. Libexin (Prenoxdiazine)
- B. Sodium chloride
- C. Sodium bicarbonate
- D. Ambroxol
- E. Codeine phosphate

10. Name the psychostimulant with analeptical action, which is a purine derivative:

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

11. What substances given below are not surfactants?

- A. Inorganic acids, bases, and their salts
- B. Alcohols and soaps
- C. Aldehydes and alcohols
- D. Amines and sulfonic acids
- E. Carboxylic acids and soaps

12. Cerebrospinal fluid of a patient diagnosed with meningitis was taken for analysis. To detect the causative agent,

the sample was inoculated in a nutrient medium. Prior to that, a serum had been added to the medium. What causative agent is expected to be obtained in this case?

- A. Meningococcus
- B. Mycobacteria
- C. Staphylococcus
- D. Viruses
- E. Rickettsia

13. One day after eating meatballs in the school canteen, several students came to the nurse's office complaining of stomachache, vomiting, high body temperature, and diarrhea. One of the students was hospitalized in a severe condition. What microorganisms can be the cause of this food toxicoinfection?

- A. Salmonellae
- B. Meningococci
- C. Streptococci
- D. Shigellae
- E. Clostridia

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

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

15. Illegal emigrants from Somalia were detained at the Ukrainian border. During medical examination, their 3-year-old child presents with muscle hypotonia and dystrophy, skin depigmentation, decreased turgor, and enlarged abdomen. The child is underweight. The diagnosis of kwashiorkor was made. This pathology is a type of partial starvation, namely the deficiency of:

- A. Lipids
- B. Carbohydrates
- C. Proteins
- D. Energy
- E. Vitamins

16. A doctor has prescribed the patient a dopamine precursor for treatment of Parkinson's disease. After administration of this drug, the patient's mobility and mental processes improved and the ability to concentrate was restored. The maximum effect was observed after a

month of treatment. Name this drug:

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

17. On the surface of a crystalline substance predominantly those ions are adsorbed that compose the crystalline lattice or are isomorphous to its ions, forming in the process a hard-to-dissolve compound with crystalline ions. Name the author (authors) of this rule:

- A. Paneth, Fajans
- B. Rehbinder
- C. Duclaux, Traube
- D. Schulze, Hardy
- E. Van 't Hoff

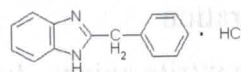
18. A nurse asks, what drug has a hypoglycemic effect because it stimulates pancreatic beta-cells. What will you answer?

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

19. Among NSAIDs, the least damaging effect on the gastrointestinal mucosa is characteristic of:

- A. Butadion (Phenylbutazone)
- B. Celecoxib
- C. Acetylsalicylic acid
- D. Diclofenac
- E. Naproxen

20. 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:



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

21. During a morphological analysis, a student noticed that the analyzed flower

has two long stamens and two short ones. Therefore, its androecium is:

- A. Didynamous
- B. Diadelphous
- C. Syngenesious
- D. Tetradynamous
- E. Tetradelphous

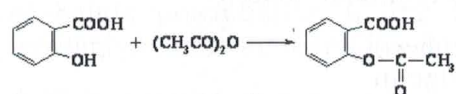
22. To improve the effect of a bioactive substance on a lesion focus, the emulsion dosage form is used. Emulsions can be prepared by comminution of liquid substances in a liquid medium. What is the name of this process?

- A. Peptization
- B. Condensation
- C. Sedimentation
- D. Dispersion
- E. Coagulation

23. Microscopy of a vaginal discharge detects round and oval Gram-positive cells that gemmate and form a pseudomycelium. What medicines must be recommended for treatment, if the diagnosis of candidiasis is confirmed?

- A. Clotrimazole, nystatin
- B. Erythromycin, monomycin
- C. Sulgin (sulfaguanidine), phthalazol (phthalylsulfathiazole)
- D. Penicillin, streptomycin
- E. Tetracycline, oleandomycin

24. Acetylsalicylic acid is produced in the course of the following reaction:



What type of reaction is it?

- A. Reduction
- B. Elimination
- C. Electrophilic substitution
- D. Acylation
- E. Addition

25. A woman with type 1 diabetes mellitus developed hyperglycemic coma. Examination revealed metabolic acidosis. This condition developed because of accumulation of the following in the blood:

- A. Ammonium ions
- B. Ketone bodies
- C. Residual nitrogen
- D. Bile acids
- E. Indirect bilirubin

26. Select an alicyclic hydrocarbon from the listed compounds:

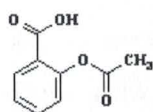
- A. Anthracene
- B. Phenanthrene
- C. Benzene
- D. Cyclohexene
- E. Naphthalene

27. What gas decolorizes bromine water?

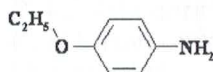
- A. Ethane
- B. Ethen
- C. Butane
- D. Methane
- E. Propane

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

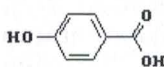
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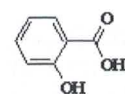
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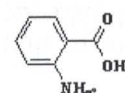
C.



D.



E.



29. What method of analysis can an analytical chemist use to determine the aluminum content in a medicinal product alumag (maalox, algedrate + magnesium hydroxide) by means of an indirect titration?

- A. Complexometric titration
- B. Argentometry
- C. Iodometry
- D. Mercurimetry
- E. Dichromatometry

30. A patient in a state of psychosis was prescribed the following antipsychotic:

- A. Diazepam
- B. Cyclodol (Trihexyphenidyl)
- C. Aminazine (Chlorpromazine)
- D. Phenobarbital
- E. Caffeine

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

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

32. Isoniazid is a drug with anti-tuberculosis action. It is an anti-vitamin of:

- A. Tocopherol
- B. Riboflavin
- C. Pantothenic acid
- D. Ascorbic acid
- E. Nicotinic acid

33. Some hormones are synthesized from amino acids in the body. What amino acid is the precursor to the thyroxine hormone?

- A. Histidine
- B. Glutamine
- C. Tyrosine
- D. Cysteine
- E. Arginine

34. What group of broncholytics should be ordered by the pulmonary department for treatment of patients with bronchial asthma?

- A. Anticholinesterase drugs
- B. Muscarinic agonists
- C. Beta-adrenergic antagonists
- D. Beta-2-adrenergic agonists
- E. Nicotinic agonists

35. Why must iodimetric determination be performed in cold conditions?

- A. When heated, iodine can be easily oxidized by atmospheric oxygen
- B. When heated, iodine decomposes to form atomic iodine
- C. Reactions with iodine become less selective, when heated
- D. When heated, iodine becomes more volatile and the sensitivity of starch indicator decreases
- E. When heated, iodine reacts with water to form hypoiodous acid (HIO)

36. Staphylococcus was isolated from the vomitus of a child with signs of food poisoning caused by pastry. What pathogenicity factor of staphylococci causes toxic infection syndrome?

- A. Protein A
- B. Hyaluronidase
- C. Hemolysin
- D. Exfoliative toxin
- E. Enterotoxin

37. During a morphological description of *Salvia sclarea*, students noticed its bright bracts. They serve to attract pollinating insects and are a modification of a:

- A. Leaf
- B. Receptacle
- C. Androecium
- D. Pedicel
- E. Shoot

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

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

39. A simple leaf is being analyzed. Its lamina is divided and the incisions are deep enough to reach its base. Therefore, this leaf is:

- A. Pinnatisect or palmatisect
- B. Digitate
- C. Ternate
- D. Partite
- E. Lobate

40. Antidepressants can increase the content of catecholamines in the synaptic cleft. What is the mechanism of action of these drugs?

- A. Inhibit monoamine oxidase
- B. Inhibit xanthine oxidase
- C. Activate aminotransferase
- D. Activate decarboxylase
- E. Inhibit aminotransferase

41. A case of hepatitis A was registered at a school. What drug should be used for specific prevention in the children, who were in a contact with the sick classmate?

- A. Immunoglobulin
- B. Ribavirin
- C. Interferon
- D. Inactivated vaccine
- E. Live vaccine

42. Name the method of binding foreign ions in an analysis:

- A. Analytical coprecipitation
- B. Analytical extraction
- C. Analytical masking
- D. Analytical concentration
- E. Analytical separation

43. Because of protracted diarrhea, a 5-year-old child developed vision disorders, frequent inflammations of oral mucosa, and conjunctivitis, which can indicate a developing hypovitaminosis of vitamin:

- A. B₆
- B. B₁
- C. B₂
- D. PP
- E. A

44. What method is based on the reactions of halide precipitation in the form of sparingly soluble mercury(I) salts?

- A. Permanganometry
- B. Rodanometry
- C. Argentometry
- D. Mercurimetry
- E. Trilonometry

45. The researcher, while conducting the qualitative analysis that involves precipitation of the third analytical group cation sulfates (Ca^{2+} , Sr^{2+} , Ba^{2+}), has to reduce the solubility of the sulfates. What substance should the researcher use for this purpose?

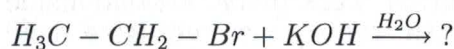
- A. Distilled water
- B. Benzene
- C. Amyl alcohol
- D. Ethyl alcohol
- E. Chloroform

46. When studying a herbarium specimen

of *Persicaria maculosa*, the following diagnostic sign, characteristic of all *Polygonaceae* family representatives, was noted:

- A. Ochrea
- B. Legume fruits
- C. Essential oil glands
- D. No petioles
- E. Compound leaves

47. The end-product of heating bromoethane with an aqueous solution of potassium hydroxide is:



- A. Ethanol
- B. Ethanoic acid
- C. Diethyl ether
- D. Ethane
- E. Ethene

48. A system is in a state of isobaric-isothermal equilibrium. What function must be used to describe the process in this case?

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

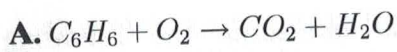
49. A 25-year-old man has an appointment with the dentist. Several minutes after his oral cavity was lavaged with furacilin (nitrofurazone) the patient developed significant labial edema. What type of allergic reaction is observed in this case?

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

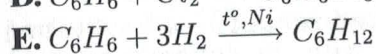
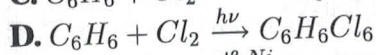
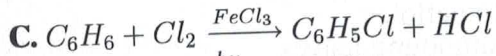
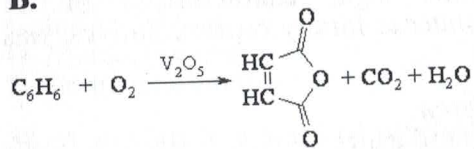
50. What drugs have the most pronounced antisecretory effect?

- A. Selective anticholinergics
- B. Proton pump inhibitors
- C. Histamine H₂-receptor antagonists
- D. De-Nol (Bismuthate tripotassium dicitrate)
- E. Antacids

51. Which of the following reactions is a substitution reaction?



B.



52. In March, the children in a kindergarten were given a salad made from fresh cabbage stored in a cold cellar. Several hours later, many of these children developed signs of food poisoning. What microorganisms are the likely cause of poisoning in this case, considering the conditions in which they were reproducing?

- A. Psychrophiles
- B. Thermophiles
- C. Resident
- D. Mesophiles
- E. Facultative

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

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

54. A narcological department has received a man diagnosed with morphinism. The doctor notes decreased pharmacological activity of morphine. Name the phenomenon, when drug effectiveness is decreased after its repeated administration:

- A. Summation
- B. Material cumulation
- C. Antagonism
- D. Functional cumulation
- E. Tolerance

55. A man with gout has a significant increase in blood levels of uric acid. Uric acid is an end product of the metabolism of:

- A. Globulins
- B. Triglycerides
- C. Purine bases
- D. Albumins
- E. Fatty acids

56. What mucolytic agent would you recommend for a patient with acute bronchitis to facilitate expectoration?

- A. Glaucine
- B. Acetylcysteine
- C. Codeine
- D. Hydrocodone
- E. Libexin (Prenoxdiazine)

57. Essential oil glandules, achene fruits, and capitulum inflorescences are the characteristic diagnostic characters of the following plant family:

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

58. A man came to a doctor complaining of a severe joint pain. Urinalysis shows increased levels of uric acid, which indicates:

- A. Increased glycogenolysis activity
- B. Increased glycolysis activity
- C. Increased synthesis of ketone bodies
- D. Increased activity of fatty acid beta-oxidation
- E. Intensive breakdown of purine nucleotides

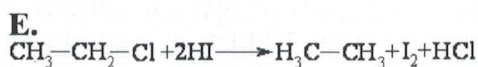
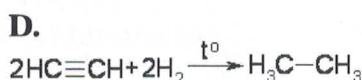
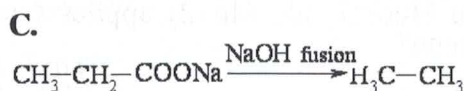
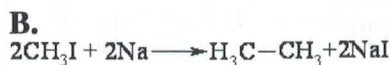
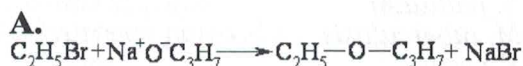
59. One week after an inpatient treatment with penicillin, a microorganism that was initially susceptible to this antibiotic developed a resistance to penicillin, tetracyclines, aminoglycosides, and macrolides. What mechanism of antibiotic resistance formation is observed in this case?

- A. Phenotypic
- B. Spontaneous
- C. Natural selection
- D. Mutational
- E. R-plasmid

60. A child with mental retardation is diagnosed with cretinism. What hormone deficiency is the main factor in the development of nervous system dysfunction in this disease?

- A. Catecholamines
- B. Estrogens
- C. Thyroid hormones
- D. Glucocorticoids
- E. Androgens

61. Specify the Wurtz reaction among those given below:



62. After a stress, a woman has problems sleeping. What medicine is preferable for the treatment of insomnia in this case?

- A. Nitrazepam
- B. Barbitol
- C. Aminazine (Chlorpromazine)
- D. Chloral hydrate
- E. Phenobarbital

63. During the blooming season a 45-year-old woman developed an 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. Monocytosis
- C. Lymphocytosis
- D. Basophilia
- E. Eosinophilia

64. A 50-year-old patient in a poor condition was brought to the hospital. Objectively, the skin and visible mucosa are cyanotic, arterial blood saturation – 88%, NiBP – 90/60 mm Hg, pulse is 117/min., respiratory rate is 22/min. The patient has a history of chronic heart failure. Which of the following types of hypoxia is most likely to develop in this case?

- A. Tissue
- B. Circulatory
- C. Hypoxic
- D. Anemic
- E. Hemic

65. A man developed a hypertensive crisis. He received an intravenous injection of a drug that caused a short-term increase in pressure, which then decreased. What drug was used?

- A. Enalapril
- B. Nitroglycerine
- C. Clophelin (Clonidine)
- D. Nifedipine
- E. Anaprilin (Propranolol)

66. Foams belong to the following type of disperse systems:

- A. Colloidal dispersion systems
- B. Hydrosols
- C. Ion-molecular systems
- D. Bound dispersed systems
- E. Fibrillar systems

67. A man with essential hypertension takes diuretics as prescribed by a doctor. What imbalances of water-salt metabolism can develop in this case?

- A. Hypokalemia
- B. Hypercalcemia
- C. Hypernatremia
- D. Hyperkalemia
- E. Hypoglycemia

68. To separate cations of the 6th analytical group from cations of the 5th analytical group (acid-base classification), the following is used:

- A. Excess sulfuric acid solution
- B. Excess sodium hydroxide solution
- C. Silver nitrate solution
- D. Acetic acid solution
- E. Excess ammonia solution

69. A woman underwent a gastroduodenoscopy that revealed decreased functioning of the gastroesophageal junction with reflux of gastric contents into the esophagus. What sign is the main indicator of this disorder?

- A. Heartburn
- B. Diarrhea
- C. Problematic swallowing
- D. Nausea
- E. Palpitations

70. To take a medicinal mixture an

accurate dosage is needed. For this purpose, the following is added to a suspension as a stabilizer:

- A. Sodium chloride
- B. Ethanol
- C. Glucose
- D. Starch
- E. Gelatin

71. A woman came to a pediatrician complaining of deteriorating condition of her child. The disorder manifests in enlarged fontanelle, a delay in tooth eruption, and bone deformation. What medicine must be prescribed first in this case?

- A. Cholecalciferol
- B. Thiamine bromide
- C. Cyanocobalamin
- D. Allopurinol
- E. Proserin (Neostigmine)

72. Examination of an underground organ of *Poligonatum odoratum* shows that it is horizontally oriented, uniformly thick and has nodes, internodes, round indentations, and an apical bud. Therefore, it is a:

- A. Root crop
- B. Rhizome
- C. Underground stolon
- D. Root tuber
- E. Main root

73. Surfactants are the compounds that lower the surface tension (or interfacial tension) between two liquids, between a gas and a liquid, or between a liquid and a solid. Which of the following substances exhibits the properties of a surfactant at the air-water interface?

- A. Urea
- B. Valeric acid
- C. HCl
- D. NaOH
- E. -

74. 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?

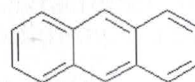
- A. Neutrophils
- B. Erythrocytes
- C. Basophils
- D. Eosinophils
- E. Lymphocytes

75. Microscopy of a microslide prepared from the enlarged inguinal node of

a patient and stained according to Loeffler technique (methylene blue) detected there chaotically arranged ovoid bacteria. The poles of the bacteria are stained more intensively. Such presentation is characteristic of the following microorganism:

- A. *T. pallidum*
- B. *M. tuberculosis*
- C. *Y. pestis*
- D. *N. gonorrhoeae*
- E. *L. interrogans*

76. What numerical value must n have, so that the Huckel rule ($4n+2$) applies for anthracene?



- A. n=3
- B. n=0
- C. n=1
- D. n=2
- E. n=10

77. On the teeth of a leaf blade, water droplets are excreted through a constantly open gap between two guard cells of the epidermis. This structure is a:

- A. Sticky hair
- B. Osmophor
- C. Hydathode
- D. Glandular hair
- E. Nectary

78. Entropy, as one of the main thermodynamic functions, is a measure of:

- A. Total energy of a system
- B. Energy that can be used to perform work
- C. Dissipated energy
- D. Enthalpy
- E. Internal energy of a system

79. A swamp plant has gladiate leaves and spadix inflorescences with a bract. Its rhizomes are thick, light, aromatic, pink on section, with clearly visible and closely placed leaf scars and adventitious roots. These underground organs belong to:

- A. *Valeriana officinalis*
- B. *Acorus calamus*
- C. *Ledum palustre*
- D. *Sanguisorba officinalis*
- E. *Bidens tripartita*

80. For burn treatment, a man was

prescribed a 2% antiseptic solution that produces manganese dioxide, when in contact with tissues, and has astringent and anti-inflammatory effect. Name this antiseptic:

- A. Potassium permanganate
- B. Lugol solution
- C. Brilliant green
- D. Hydrogen peroxide
- E. Phenol

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

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

82. During a surgery, narcosis overdose caused signs of acute hypoxia, indicated by increased heart rate of 124/min. and tachypnea. What type of hypoxia is observed in this case?

- A. Tissue
- B. Hypoxic
- C. Mixed
- D. Circulatory
- E. Respiratory

83. A patient suffers from Down's syndrome that manifests as a mental retardation, shortness of stature, pathologically short fingers and toes, and eyes with a mongoloid slant. Karyotype analysis revealed trisomy 21. What group of diseases does this pathology belong to?

- A. Blastopathy
- B. Molecular genetic disease
- C. Fetopathy
- D. Chromosomal disorder
- E. Gametopathy

84. What antibiotic is used for treatment of syphilis?

- A. Benzylpenicillin
- B. Amphotericin
- C. Nystatin
- D. Streptomycin
- E. Kanamycin

85. After eating early vegetables that had high nitrite levels, a child developed hemic hypoxia. It is caused by accumulation of the following substance:

- A. Carboxyhemoglobin
- B. Deoxyhemoglobin
- C. Oxyhemoglobin
- D. Carphemoglobin
- E. Methemoglobin

86. Hydrosols of sulfur, cholesterol, and rosin are obtained by adding alcohol solutions of these substances to water. These sols are obtained using the following method:

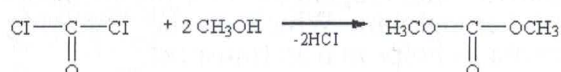
- A. Hydrolysis reaction
- B. Solvent replacement
- C. Double-replacement reaction
- D. Oxidation reaction
- E. Condensation from vapor

87. The gravimetric determination of moisture in pharmaceutical products is performed, using the following method:

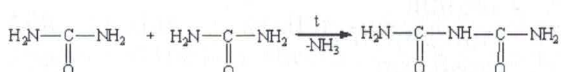
- A. Indirect volatilization gravimetry
- B. Particulate gravimetry and direct volatilization gravimetry
- C. Particulate gravimetry
- D. Direct volatilization gravimetry
- E. Precipitation gravimetry

88. Specify the scheme of biuret formation among the reactions given below:

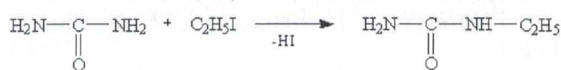
A.



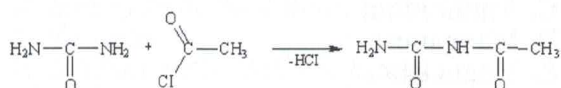
B.



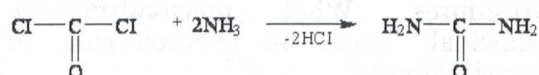
C.



D.



E.



89. Based on their structure, disperse systems can be divided into:

- A. Coarse dispersed and microheterogeneous
- B. Free dispersed and bound dispersed
- C. Lyophilic and lyophobic
- D. Hydrosols and organosols
- E. Hydrosols and aerosols

90. A woman with peptic ulcer disease of the stomach was prescribed antibacterial treatment. It is aimed at the following pathogen:

- A. *H. pylori*
- B. *St. aureus*
- C. *Cl. perfringens*
- D. *Cl. trachomatis*
- E. *E. coli*

91. If addition of an alkali solution and heating provokes the release of ammonia in an analyzed solution, it indicates that the analyzed solution contains the following ions:

- A. NH_4^+
- B. NO_3^-
- C. Na^+
- D. K^+
- E. NO_2^-

92. During hemoglobin catabolism, iron is released. Then it enters the bone marrow and is again used for the synthesis of hemoglobin. Which of the following proteins helps in iron transport?

- A. Ceruloplasmin
- B. Transcobalamin
- C. Albumin
- D. Haptoglobin
- E. Transferrin

93. Salts of an unknown cation, when brought into the flame of a burner, change the flame color to brick-red. What cation is it?

- A. Calcium
- B. Lead
- C. Ammonium
- D. Manganese
- E. Magnesium

94. Ultraviolet irradiation is used in medicine in various physiotherapeutic procedures. What mechanism of medicinal action is characteristic of ultraviolet rays?

- A. Activation of cholesterol synthesis
- B. Intensification of cell division
- C. Decrease of melanin synthesis in the skin
- D. Activation of vitamin D synthesis
- E. Activation of drug action

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

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

96. A woman has accidentally cut her skin. 20 minutes later she noticed that the wound did not stop bleeding. What vitamin is absent or deficient in this case, causing this condition?

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

97. An iron(III) hydroxide sol is positively charged. What ion has the lowest coagulation threshold in this sol?

- A. Cl^-
- B. Na^+
- C. Cu^{2+}
- D. SO_4^{2-}
- E. J^-

98. Every year in autumn, a coniferous gymnosperm exhibits a fall of soft needles that grow on its short shoots. It is characteristic of the following genus:

- A. *Abies*
- B. *Pinus*
- C. *Picea*
- D. *Cedrus*
- E. *Larix*

99. A man suffers from cholelithiasis. What medicine should he be prescribed for biliary colic relief?

- A. Pancreatin
- B. Bisacodyl
- C. Contrykal (Aprotinin)
- D. Almagel (Algeldrate + magnesium hydroxide)
- E. Magnesium sulfate

100. When examining a material taken

from a patient diagnosed with diphtheria, a pure culture of microorganisms was obtained. The culture was identified as a toxigenic strain of *Corynebacterium diphtheriae*. What serological reaction is used in bacteriological laboratories to determine the toxigenicity of *Corynebacterium diphtheriae*?

- A. Precipitation in gel
- B. Neutralization
- C. Agglutination
- D. Indirect hemagglutination
- E. Complement fixation

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

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

102. Activation of lipid peroxidation is one of the mechanisms that damage biostructures and cause development of a cellular pathology. Name the compound that takes part in neutralization of organic peroxides:

- A. Glutathione
- B. Taurine
- C. Methionine
- D. Glycine
- E. Alanin

103. A certain natural heteropolysaccharide anticoagulant is widely used in pharmaceutical practice. Name this anticoagulant:

- A. Heparin
- B. Keratan sulfate
- C. Dermatan sulfate
- D. Chondroitin sulfate
- E. Hyaluronic acid

104. A pharmacy has decided to use a biological method for quality control of instrument sterilization in an autoclave. What microorganisms optimally should be used for this purpose?

- A. *Streptococcus pyogenes*
- B. *Borrelia recurrentis*
- C. *Yersinia pestis*
- D. *Salmonella typhi*
- E. *Bacillus subtilis*

105. For annual influenza prevention, the WHO recommends to use the vaccines of

the Influvac type that contain components of virion envelope. What type of vaccines is it?

- A. Recombinant
- B. Live
- C. Subunit
- D. Anti-idiotypic
- E. Anatoxin

106. A tea for cough relief contains comminuted roots of a plant. The roots are bright yellow and sweet. They were identified as the roots of:

- A. *Althaea officinalis*
- B. *Sanguisorba officinalis*
- C. *Glycyrrhiza glabra*
- D. *Acorus calamus*
- E. *Valeriana officinalis*

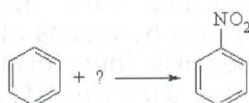
107. Microscopy of a smear that was prepared from the material obtained from the patient detected there large bacilli with blunt ends that were arranged in a chain. After the causative agent was inoculated into a nutrient medium with addition of penicillin, the bacilli became spherical and started resembling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

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

108. During a sanitary-microbiological analysis of the soil, the number of sanitary indicative microorganisms must be determined. Name these microorganisms:

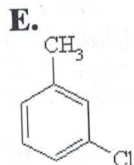
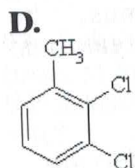
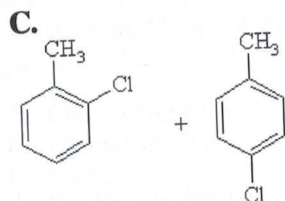
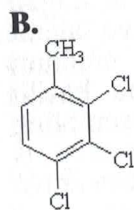
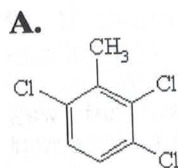
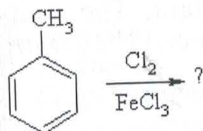
- A. *Streptococcus faecalis*, *Clostridium perfringens*
- B. *Candida fungi*, *Streptococcus faecalis*
- C. *Streptococcus haemolyticus*, *Streptococcus faecalis*
- D. *Staphylococcus aureus*, *Clostridium perfringens*
- E. *Streptococcus faecalis*, *E.coli*, *Clostridium perfringens*

109. Benzene nitration occurs in the presence of:



- A. KNO_2
 B. $NaNO_2$ (excess HCl)
 C. Diluted HNO_3 , t, p
 D. Concentrated HNO_3 (concentrated H_2SO_4) (nitrating mixture)
 E. CH_3COONO_2

110. What compound will be produced as the result of toluene chlorination in the presence of $FeCl_3$ catalyst?



111. What anions interfere with the determination of halide ions by means of the Volhard method, because they form a strong colorless complex with iron(III) ions?

- A. NO_2^-
 B. MnO_4^-
 C. F^-
 D. SO_3^{2-}
 E. NO_3^-

112. Emulsions are thermodynamically unstable. In them, the droplets of dispersed phase merge together spontaneously, causing the emulsion to stratify. Name this phenomenon:

- A. Solubilization
 B. Deformation
 C. Coalescence
 D. Wetting
 E. Contraction

113. Dimethylethylamine belongs to:

- A. Secondary amines
 B. Quaternary ammonium salts
 C. Primary amines
 D. Tertiary amines
 E. -

114. A solution contains calcium, barium, aluminum, potassium, and sodium cations. Into this solution a small amount of ammonium hydroxide and alizarin solution were added, which resulted in production of a red precipitate. What ion was detected in the result of this reaction?

- A. Aluminum
 B. Calcium
 C. Potassium
 D. Barium
 E. Sodium

115. Bactericidal drug rivanol contains the following heterocyclic structure:

- A. Anthracene
 B. Isoquinoline
 C. Acridine
 D. Quinoline
 E. Phenanthrene

116. A woman presents with poor twilight vision and dry conjunctiva and cornea. What vitamin deficiency can cause such disorders?

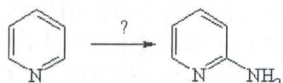
- A. B
 B. D
 C. C
 D. A
 E. B_{12}

117. The pharmacopoeial ebullioscopic method for quantitative determination of alcohol in an aqueous-alcoholic mixture is

based on experimental determination of:

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

118. What reagent must interact with pyridine to obtain 2-aminopyridine?



- A. Ammonium hydroxide
- B. Ammonium chloride
- C. Ammonia
- D. Hydrazine
- E. Sodium amide

119. A taproot plant develops a crown of basal leaves in the first year of its life and blooms and produces fruits in the second year of its life, after which it dies. Therefore, this plant is:

- A. Perennial herbaceous
- B. Perennial prostrate shrub
- C. Annual herbaceous
- D. Biennial herbaceous
- E. Perennial shrub

120. A process, during which a chemical interaction occurs between the adsorbate molecules and the active centers of an adsorbent, is called:

- A. Desorption
- B. Sublimation
- C. Adsorption
- D. Solvation
- E. Chemosorption

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

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

122. A child with type 1 diabetes mellitus made an insulin injection on an empty stomach. 15 minutes later the child developed acute hunger, tremor, excessive sweating, and dizziness. What caused this condition in the child?

- A. Hyperglycemia
- B. Hypoglycemia
- C. Ketonemia
- D. Hyperlipemia
- E. Glucosuria

123. A 35-year-old woman came to a pharmacy to buy a drug for relief from a dry hacking cough. Which of the following drugs is indicated in this case?

- A. -
- B. Libexin (Prenoxdiazine)
- C. Mucaltin (*Althaeae officinalis* extract)
- D. Amoxicillin
- E. Ambroxol

124. A man with clinical diagnosis of tularemia received a subcutaneous tularin injection to confirm this diagnosis. What method of analysis did the doctor use in this case?

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

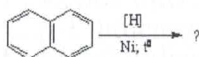
125. Autopsy of a lab rat that for the period of 24 hours remained in an immobilization chamber revealed gastric erosions. What hormones can cause erosions in this case?

- A. Glucocorticoids
- B. Estrogens
- C. Glucagon
- D. Mineralocorticoids
- E. Insulin

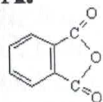
126. Photometry is one of the most common instrumental methods of analysis. It is based on the measurement of:

- A. Rotation angle
- B. Refractive index
- C. Optical density
- D. Wavelength
- E. Fluorescence intensity

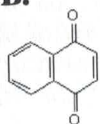
127. What compound is formed after complete hydrogenation of naphthalene?



A.



B.



C.



D.



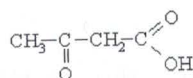
E.



128. Microscopy of *Papaver somniferum* pericarp revealed tubular structures with white latex. Name these structures:

- A. Lysigenous cavities
- B. Schizogenous ducts
- C. Secretory glandules
- D. Secretory cells
- E. Laticifers

129. What name does this compound have in the IUPAC nomenclature?

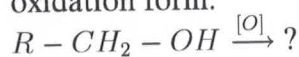


- A. -
- B. β -Ketopropionic acid
- C. Butyric acid
- D. 3-Oxobutanoic acid
- E. Butyraldehyde

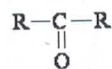
130. Polarimetry is used to determine the compounds that contain an asymmetric carbon atom. What compound can be determined, using this method?

- A. Glucose
- B. Cuprum sulfate
- C. Sodium chloride
- D. Calcium nitrate
- E. Potassium iodide

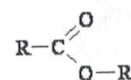
131. Primary alcohols upon their oxidation form:



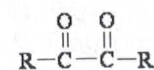
A.

B. $\text{R}-\text{CH}_2-\text{O}-\text{CH}_2-\text{R}$

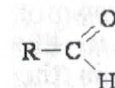
C.



D.

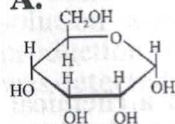


E.

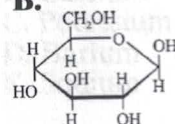


132. Which formula corresponds with β -D-glucopyranose?

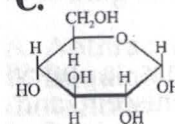
A.



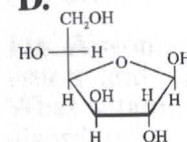
B.



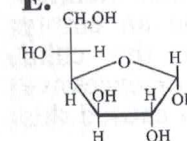
C.



D.



E.



133. Sedimentation is characteristic of the following systems:

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

134. The Helmholtz energy is a direction criterion of a spontaneous process at a constant:

- A. Internal energy and volume
- B. Entropy and volume
- C. Entropy and pressure
- D. Temperature and pressure
- E. Temperature and volume

135. A man with *Trichomonas urethritis* was prescribed an imidazole derivative for treatment. Name this drug:

- A. Metronidazole
- B. Nitroxoline
- C. Furacilin (Nitrofuril)
- D. Ciprofloxacin
- E. Azithromycin

136. 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 given proserin (neostigmine). What term can be used to describe the interaction between these two drugs?

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

137. A herbaceous plant has upright stems, branching in their upper part. The leaves and flowers contain dark cavities. The inflorescence is an apical corymb with yellow flowers. The fruit is a trihedral capsule. This description is characteristic of:

- A. *Capsella bursa-pastoris*
- B. *Thea sinensis*
- C. *Hypericum perforatum*
- D. *Althaea officinalis*
- E. *Ledum palustre*

138. The stem surface of a woody plant is being studied. It is noted that the cells are parenchymal, dead, with suberized membranes. Therefore, this is:

- A. Phellogen
- B. Cork
- C. Phelloderm
- D. Sclerenchyma fibers
- E. Vessels

139. In systematic analysis of group IV cations, hydrogen peroxide should be added along with the group reagent. Why should it be added?

- A. For formation of peroxide compounds of these cations
- B. For destruction of hydrate complexes
- C. For formation of hydroxo- and oxoanions of these elements at the highest oxidation degrees
- D. For more complete precipitation of these cations
- E. For formation of hydroxo- and oxoanions of these elements at the lowest oxidation degrees

140. Biological fluids (sera, enzyme and vitamin solutions, etc.) are vulnerable to high temperatures, which is why they are sterilized under the temperature of 56–58°C. They are heated 5–6 times, with 24-hour-long intervals between them. What sterilization method is it?

- A. Moist heat sterilization
- B. Flaming
- C. Tyndallization
- D. Autoclaving
- E. Pasteurization

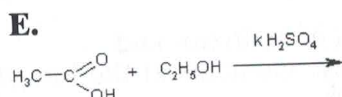
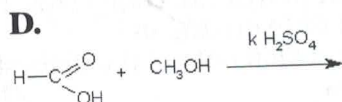
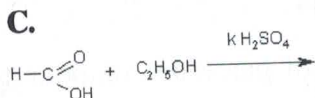
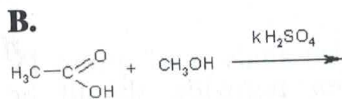
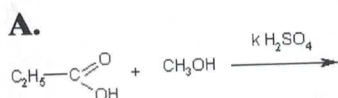
141. When glucose breaks down during glycolysis, a number of transformations occur. In the first reaction, glucose 6-phosphate transforms into the following compound:

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

142. What indicators are used to determine the titration endpoint in the acid-base titration method?

- A. Adsorption indicators
- B. Redox indicators
- C. pH indicators
- D. Metal indicators
- E. Luminescent indicators

143. Ethyl formate is produced in the result of the following reaction:



144. Which of the following compounds is a complex ether (an ester)?

- A.** $\text{C}_2\text{H}_5\text{OH}$
- B.** $\text{CH}_3\text{COOCH}_3$
- C.** $\text{C}_{15}\text{H}_{31}\text{COOH}$
- D.** $\text{CH}_3 - \text{O} - \text{C}_2\text{H}_5$
- E.** $\text{CH}_3 - \text{O} - \text{CH}_3$

145. If there is no strophanthin in the pharmacy stock, the following cardiac glycoside can be used as its substitute:

- A.** Corglycon (Convallatoxin)
- B.** Digitoxin
- C.** Adonisid (*Adonis vernalis* glycosides)
- D.** Izolanid (Lanatoside C)
- E.** -

146. Bacterioscopic method of laboratory diagnostics of infections requires staining microslides according to various staining techniques. The Gram staining technique is used for:

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

147. An analytical chemist conducts a qualitative analysis of phosphate ions, using a pharmacopoeial reaction that produced a yellow precipitate as a result. What reagent did the expert use?

- A.** Hydrochloric acid
- B.** Silver nitrate
- C.** Potassium chloride
- D.** Sodium nitrate
- E.** Potassium nitrate

148. To treat alcoholism in a patient, the doctor used the mechanism for suppressing ethanol addiction that amplifies the toxic effect of alcohol. What ethanol oxidation product is neurotoxic?

- A.** Carbon dioxide
- B.** Acetaldehyde
- C.** Ammonia
- D.** Lactate
- E.** Pyruvate

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

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

150. What is a subject to solubilization in a concentrated aqueous soap solution (sodium stearate)?

- A.** Neutral fat
- B.** Glucose
- C.** Calcium chloride
- D.** Ethanol
- E.** Water