

1. What pharmacological effect of diazepam allows using it in the treatment of neuroses?

- a. Analgesic
- b. Diuretic
- c. Anxiolytic
- d. Antidepressant
- e. Antipyretic

2. An elderly patient suffers from constipation caused by colon hypotonia. What drug should be prescribed?

- a. Atropine sulfate
- b. Castor oil
- c. Novocainamide (Procainamide)
- d. Bisacodyl
- e. Sodium sulfate

3. What solution is used to determine the mass-volume fraction of ammonia in a solution?

- a. Iodine solution
- b. Hydrochloric acid solution
- c. Sulfuric acid solution
- d. Sodium hydroxide solution
- e. Potassium permanganate solution

4. A patient with an acute myocardial infarction had been receiving heparin as a component of complex therapy. After a time, the patient developed hematuria. What drug is indicated as an antidote to heparin?

- a. Neodicoumarin (ethyl biscoumacetate)
- b. Aminocaproic acid
- c. Fibrinogen
- d. Vicasol (Menadione)
- e. Protamine sulfate

5. Which one of the listed compounds belongs to conjugated dienes?

- a.  $\text{CH}_2=\text{CH}-\text{CH}_2-\text{CH}=\text{CH}_2$
- b.  $\text{CH}_2=\text{CH}-\text{C}(\text{CH}_3)_2-\text{CH}=\text{CH}_2$
- c.  $\text{CH}_2=\text{C}=\text{CH}-\text{CH}_2-\text{CH}_3$
- d.  $\text{CH}_2=\text{C}=\text{CH}_2$
- e.  $\text{CH}_2=\text{CH}-\text{CH}=\text{CH}-\text{CH}_3$

6. When harvesting herbal raw material of calendula and chamomile, their inflorescences are being collected. What type of inflorescence is it?

- a. Umbel
- b. Flat capitulum
- c. Spike
- d. Round capitulum
- e. Corymb

7. Первинні та вторинні нітроалкани є таутомерними сполуками. Яка таутомерія характерна для них?

- a. Аци-нітротаутомерія
- b. Аміно-імінна
- c. Кето-енольна
- d. Азольна
- e. Лактам-лактимна

8. What reaction occurs according to the free-radical (SR) mechanism?

- a.  $\text{CH}_3\text{CH}_2\text{OH} + \text{HCl}$
- b.  $\text{C}_6\text{H}_6 + \text{Cl}_2$
- c.  $\text{C}_2\text{H}_6 + \text{Cl}_2$
- d.  $\text{CH}_3-\text{CH}_3 + \text{O}_2$

e.  $\text{CH}_2=\text{CH}_2+\text{Cl}_2$

9. The presence of antibodies to HIV has been established in the analyzed serum by means of enzyme-linked immunosorbent assay. What method or reaction must be used to confirm the diagnosis of AIDS?

- a. Biological method
- b. Immunofluorescence
- c. Bacteriological method
- d. Virological method

**e. Immunoblotting**

10. Thiocyanatometric titration method requires secondary standard solution of potassium thiocyanate that is standardized with standard solution of:

- a. Sulfuric acid
- b. Silver nitrate**
- c. Iron (II) sulfate
- d. Copper (II) nitrate
- e. Hydrochloric acid

11. The therapeutic properties of activated charcoal are due to its large specific surface area. Name the phenomenon, when gas absorption occurs only at the surface of a solid object:

- a. Recuperation
- b. Adsorption**
- c. Adhesion
- d. Desorption
- e. Cohesion

12. Яким методом здійснюють кількісне визначення вісмуту в препараті?

- a. Перманганатометрії
- b. Аргентометрії
- c. Комплексонометрії**
- d. Меркуриметрії
- e. Йодометрії

13. A child had been administered antidiphtheric serum. What resistance was formed in the child?

- a. Primary
- b. Physiological
- c. Passive**
- d. Active
- e. Pathologic

14. What indicator is used, when sodium carbonate is being quantified in the preparation by means of acid-base titration?

- a. Diphenylamine
- b. Methyl orange**
- c. Murexide
- d. Methylene blue
- e. Ferroin

15. According to Van't Hoff rule, when the temperature is raised by 10 degrees, the reaction rate increases by:

- a. 10 times
- b. Temperature does not affect reaction rate
- c. 1.5 times
- d. 5 times
- e. 2--4 times**

16. Isotonicity is one of the requirements for infusion solutions. What aqueous salt solution is used in clinical practice as an isotonic solution?

- a. 10% solution of NaCl
- b. 4.5-5.0% glucose solution
- c. 10% solution of CaCl<sub>2</sub>
- d. 0.85-0.90% solution of NaCl
- e. 0.9% solution of MgCl<sub>2</sub>

17. There are certain patterns of chemical and biological processes occurring with the drug in the body. Reduced absorption of tetracycline when it is co-administered with antacids is an example of:

- a. Pharmacodynamic incompatibility
- b. Functional antagonism
- c. Pharmaceutical incompatibility
- d. Synergism
- e. Pharmacokinetic incompatibility

18. What substance is used as an indicator in the back titration of an aqueous solution of acetic acid?

- a. Diphenylcarbazone
- b. Diphenylamine
- c. Murexide
- d. Phenolphthalein
- e. Eriochrome black T

19. You are studying the silvery downy plant of Asteraceae family, which is rich with essential oils and bitters. Harvested are apical sprouts with panicle of small round flower heads. This plant is:

- a. Chamomilla recutita
- b. Arctium lappa
- c. Bidens tripartita
- d. Artemisia absinthium
- e. Calendula officinalis

20. Microscopy of the smears obtained from the coating on the patient's tonsils was stained according to the Neisser technique. The staining revealed thin yellow bacilli with dark blue grains at their ends, arranged in the form of the Roman numeral V. What pathology can be suspected based on the results of microscopy?

- a. Influenza
- b. Diphtheria
- c. Measles
- d. Pertussis
- e. Tuberculosis

21. How many stereoisomeric aldohexoses exist?

- a. 16
- b. 4
- c. 6
- d. 8
- e. 2

22. Having examined the patient, the doctor made a diagnosis of tick-borne encephalitis. What is the route of transmission of this disease?

- a. Airborne-droplet
- b. Vertical
- c. Vector-borne
- d. Fecal-oral
- e. Parenteral

23. In the process of creating vaccines, pathogens of infectious diseases are being attenuated. What is the essence of the attenuation process?

- a. Discovering antigenic determinants of the main antigens of the pathogen
- b. Inactivation of pathogens while preserving the antigenic structure of cells
- c. Reduction of immunogenicity of the pathogen

- d. Isolation of protective antigens from microbial cells
- e. Artificial reduction of virulent properties of pathogens

24. What type of cardiac arrhythmia occurs as a result of simultaneous disruption of excitability and conduction functions?

- a. Sinus tachycardia
- b. Atrial fibrillation
- c. Respiratory arrhythmia
- d. Extrasystole
- e. Atrioventricular block

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

- a. Prenoxdiazine
- b. Glaucine
- c. Butamirate
- d. Acetylcysteine
- e. Codeine phosphate

26. What tissue can be characterized by permeable cells located within the root of the primary structure?

- a. Central axial cylinder
- b. Endodermis
- c. Mesodermis
- d. Pericycle
- e. Exodermis

27. The mechanism of action of hormones depends on their chemical nature. What hormones can penetrate the membrane and bind with intracellular receptors?

- a. Catecholamines
- b. Oxytocin and vasopressin
- c. Steroid and thyroid hormones
- d. Tropic hormones
- e. Insulin and glucagon

28. A study of the microbiological purity of tablet formulations is conducted on the production site. After cultivating samples on mannitol salt agar, golden-yellow colonies grow up. Microscopic examination of colonies establishes the presence of gram-positive bacteria of spherical shape, located in clusters; microorganisms has the ability to coagulate the plasma. The pure culture of which of the following bacteria is discovered?

- a. Pseudomonas aeruginosa
- b. Enterobacteriaceae
- c. Staphylococcus epidermidis
- d. Staphylococcus aureus
- e. Staphylococcus saprophyticus

29. One hour after a child took polyvitamins in the dosage form of a syrup, the child developed a markedly itching urticaria-type rash all over the body. What type of allergic response can be characterized by this sign?

- a. Anaphylactic
- b. Immune complex
- c. Delayed-type hypersensitivity
- d. Autoallergic
- e. Cytotoxic

30. Який механізм інгібіторної дії неостигміну (прозерину)?

- a. Окиснення іона заліза в активном у центрі фермента
- b. Конкуренція з ацетилхоліном за активний центр фермента
- c. Денатурація фермента

- d. Ковалентне зв'язування поза активним центром фермента
- e. Ковалентне зв'язування з субстратом ферменту

31. A benzimidazole derivative, omeprazole, has been prescribed to a patient with a duodenal ulcer accompanied by an increased secretion of gastric juice. What is the mechanism of action of this drug?

- a. Stimulation of H<sub>2</sub>-histamine receptors
- b. Stimulation of  $H^+$ , K<sup>+</sup> -ATPase
- c. Irreversible blockade of  $H^+$ , K<sup>+</sup> -ATPase
- d. Blockade of H<sub>2</sub>-histamine receptors
- e. Blockade of M<sub>1</sub>-cholinergic receptors

32. Etiological factors of infectious diseases can be infectious agents with diverse ultrastructure. Which of the following groups does not have cellular structure, protein synthesis, enzymatic and energy systems?

- a. Protozoa
- b. Viruses
- c. Fungi
- d. Bacteria
- e. Rickettsia

33. Microscopy shows that basidia with basidiospores are formed on the hymenium. What division do these fungi belong to?

- a. Chytridiomycota
- b. Lichenophyta
- c. Ascomycota
- d. Zygomycota
- e. Basidiomycota

34. The type of bacterial respiration is of great importance for the growth and reproduction of bacteria. Some species are unable to reproduce in the presence of oxygen and use sulfate respiration. What are these microorganisms called?

- a. Obligate aerobes
- b. Macroaerophiles
- c. Facultative anaerobes
- d. Obligate anaerobes
- e. Microaerophiles

35. The main mechanism of ammonia neutralization in the body is the biosynthesis of urea. The cycle of urea synthesis begins with the formation of a certain high-energy compound. What high-energy compound is it?

- a. Argininosuccinate
- b. Fumaric acid
- c. Carbamoyl phosphate
- d. Arginine
- e. Citrulline

36. Action of a number of drugs is based on the effect of competitive inhibition of enzyme activity. Name its characteristic feature.

- a. Inhibition degree does not depend on the substrate concentration
- b. Inhibitor is a structural analogue of the enzyme
- c. Inhibitor forms strong covalent bonds with the active site of the enzyme
- d. Inhibitor is a structural analogue of the substrate
- e. Inhibitor has no effect on the enzyme's affinity for its substrate

37. Який спосіб титрування використовують, якщо до розчину досліджуваної речовини додають точно виміряний надлишок допоміжного титранта?

- a. Титрування за залишком
- b. Замісникове титрування
- c. Пряме титрування

- d. Неводне титрування
- e. Будь-яке титрування

38. Many serological reactions require strictly aseptic conditions. What method of sterilization is optimal for decontamination of laboratory glassware?

- a. Tyndallization
- b. Pasteurization
- c. Calcination
- d. Filtration
- e. Dry heat

39. A 53-year-old person has been admitted into the gastroenterology department with complaints of dyspeptic disorders and melena. Objectively, the patient has splenomegaly, ascites, and dilated superficial veins of the anterior abdominal wall. What syndrome can be characterized by these signs?

- a. Suprahepatic jaundice
- b. Cholemia
- c. Acholia
- d. Arterial hypotension
- e. Portal hypertension

40. Early-flowering rhizomatous ephemeroids include: *Tussilago farfara*, *Convallaria majalis*, and:

- a. *Carum carvi*
- b. *Chamomilla recutita*
- c. *Thymus serpyllum*
- d. *Adonis vernalis*
- e. *Allium cepa*

41. What is the mechanism of action of beta-lactam antibiotics?

- a. Inhibition of DNA gyrase
- b. Inhibition of cytoplasmic \ membrane synthesis
- c. Inhibition of protein synthesis \ in ribosomes
- d. Disruption of DNA synthesis
- e. Inhibition of cell wall synthesis

42. To obtain exotoxins of some microorganisms, these microorganisms are inoculated into liquid nutrient medium, where microbial cultivation occurs and toxins are produced. At a certain stage it is necessary to remove the microbial cells from the medium, that is, to separate the toxins from microbes. What method should be applied in this case?

- a. Autoclaving
- b. Bacteria-excluding filters
- c. Ultraviolet irradiation
- d. Disinfectants (chloramine)
- e. Boiling

43. A doctor has prescribed a nonsteroidal anti-inflammatory drug to relieve inflammation and pain syndrome. Name this drug:

- a. Loratadine
- b. Fentanyl
- c. Glibenclamide
- d. Paracetamol
- e. Diclofenac sodium

44. What has an effect on the coagulating action of the coagulant ion, according to the Schulze-Hardy rule?

- a. Polarization
- b. Hydration ability
- c. Ionic charge
- d. Adsorbability
- e. Ionic size

45. What family of viruses has a unique reverse transcriptase enzyme?

- a. Togaviruses
- b. Flaviviruses
- c. Reoviruses
- d. Retroviruses**
- e. Picornaviruses

46. A man has undergone a course of radiotherapy and chemotherapy. The drug complex included 5-fluorodeoxyuridine that is an inhibitor of thymidylate synthase. This drug blocks the synthesis of a certain substance. What substance is it?

- a. DNA**
- b. Protein
- c. rRNA
- d. mRNA
- e. tRNA

47. Name the ability of high-molecular compounds to prevent precipitation of lyophobic sols and deposition of cholesterol plaques on the vessel walls:

- a. Coacervation
- b. Thixotropy
- c. Sedimentation
- d. Colloid protection**
- e. Coagulation

48. The third analytical group of cations (acid-base classification) includes  $\text{Ca}^{2+}$ ,  $\text{Sr}^{2+}$ ,  $\text{Ba}^{2+}$ . What acid can function as a precipitator agent (group reagent) for these cations?

- a.  $\text{HNO}_3$
- b.  $\text{HClO}_4$
- c.  $\text{HCl}$
- d.  $\text{H}_2\text{SO}_4$**
- e.  $\text{CH}_3\text{COOH}$

49. During bacteriology of the feces of a patient with diarrhea, a pure culture of rod-shaped, slightly bent microorganisms was isolated. In the microslide, these microorganisms resemble schools of fish. Their inoculation on alkaline media (alkaline peptone water) results in formation of a blue-tinted film after 6 hours. What pathogen has such properties?

- a. *Vibrio cholerae***
- b. Spirochetes
- c. Salmonellae
- d. Mycobacteria
- e. *Escherichia coli*

50. Rhizome of a species belonging to the Asteraceae family is polycephalous, succulent, has lysigenous cavities, accumulates inulin. Such underground organ is characteristic of:

- a. *Hyoscyamus niger*
- b. *Inula helenium***
- c. *Digitalis grandiflora*
- d. *Helianthus annuus*
- e. *Sorbus aucuparia*

51. До якого виду хроматографії відносять метод газорідинної хроматографії?

- a. Адсорбційної
- b. Іоннообмінної
- c. Афінної
- d. Гель-хроматографії
- e. Розподільної**

52. The second stage of detoxification involves joining certain chemical compounds with functional groups of toxins. Select one such compound:

- a. Pyruvate
- b. Glucuronic acid**
- c. Glucose
- d. Cholesterol
- e. Higher fatty acids

53. For the symptomatic treatment of diarrhea, the doctor prescribed the patient a drug that inhibits intestinal peristalsis after making sure that the patient's diarrhea was of non-infectious origin. What drug was prescribed in this case?

- a. Mannitol
- b. Augmentin (Co-amoxiclav)
- c. Thiamine
- d. Dexamethasone
- e. Loperamide**

54. The bacterial culture obtained from a patient does not grow when exposed to oxygen. Conditions suitable for bacterial culture growth can be created in:

- a. Krotov apparatus
- b. Oxidative medium
- c. Anaerobic culture jar**
- d. Pasteur oven
- e. Serum-supplemented medium

55. A patient demonstrates symmetrical dermatitis on the palms. A doctor made a diagnosis of pellagra. What vitamin deficiency can result in such symptoms?

- a. Ascorbic acid
- b. Cholecalciferol
- c. Nicotinic acid**
- d. Cobalamin
- e. Folic acid

56. Which of the listed plants is a bush with imparipinnate leaves, decussate leaf arrangement, and juicy black fruits?

- a. Chelidonium majus
- b. Sambucus nigra**
- c. Ledum palustre
- d. Arctostaphylos uva-ursi
- e. Urtica dioica

57. What drug should be prescribed to a patient with bronchospasm?

- a. Insulin
- b. Oxytocin
- c. Vicasol (Menadione)
- d. Bisacodyl
- e. Salbutamol**

58. A woman, who works at a factory that produces phenylhydrazine, came to a hospital with complaints of general weakness, dizziness, and drowsiness. Her blood has signs of anemia with high levels of reticulocytosis, anisocytosis, and poikilocytosis; isolated normocytes are present in the woman's blood. What type of anemia is it?

- a. Protein-deficiency anemia
- b. Iron-deficiency anemia
- c. Hemolytic anemia**
- d. Aplastic anemia
- e. Metaplastic anemia

59. An analytical chemist performs a qualitative analysis of cations that belong to the sixth analytical group. If nickel ions are processed with Chugaiev's reagent (dimethylglyoxime), a colored compound is produced. What is the color of the resulting compound?



- a. Yellow
- b. Red**
- c. Green
- d. Blue
- e. Violet

60. What parameter takes into account the deviation of the properties of a real solution from an ideal one?

- a. Isotonic coefficient
- b. Degree of dissociation
- c. Concentration
- d. Activity**
- e. Fugacity

61. In the roots of primary structure, the nutrient reserves are stored in the:

- a. Central axial cylinder
- b. Exodermis
- c. Mesodermis**
- d. Pericycle
- e. Endodermis

62. In order to carry out the silver cations identification, HCl was added to the solution. Later, the formed solution was followed by adding the solution of ammonia. Specify which of the below-mentioned compounds are formed in such case?

- a.  $[\text{Ag}(\text{NH}_3)_3]\text{Cl}$
- b.  $[\text{Ag}_2(\text{NH}_3)_3]\text{Cl}$
- c.  $[\text{Ag}(\text{NH}_3)_2]\text{Cl}$**
- d. AgOH
- e.  $\text{AgCl}$

63. A human is immune to the plague of cattle and dogs. What type of immunity is it?

- a. Artificial active
- b. Natural active
- c. Natural passive
- d. Innate**
- e. Artificial passive

64. A man came to a doctor complaining of a headache, pain in the throat during swallowing, and an increase in the body temperature. He was diagnosed with tonsillitis. What changes in the patient's blood can be expected in this case?

- a. Neutrophilic leukocytosis**
- b. Eosinophilic leukocytosis
- c. Monocytosis
- d. Lymphocytosis
- e. Basophilic leukocytosis

65. Vitamins can enhance each other's effects, when taken simultaneously. What vitamin potentiates the activity of vitamin P?

- a. C**
- b. A
- c. D
- d. B<sub>1</sub>
- e. B<sub>2</sub>

66. During harvesting of a herbal raw material (belladonna), the plants had burns and patches of withering and rot. What microorganisms cause this kind of damage in plants?

- a. Microfungi
- b. Mycoplasma**
- c. Protozoa

- d. Viroids
- e. Viruses

67. During the assessment of air purity in an aseptic unit of a pharmacy, sedimentation analysis resulted in growth of small colonies with areas of hemolysis. What medium was used for inoculation in this case?

- a. Endo agar
- b. Egg-yolk salt agar
- c. Levine formulation (eosin methylene blue agar)
- d. Ploskirev agar
- e. Blood agar**

68. To preserve valuable varietal qualities of peppermint, the optimal method of its propagation was chosen. What method is it?

- a. Leaf cuttings
- b. Germinated seeds
- c. Plantlets
- d. Parts of the tuber
- e. Parts of the rhizome**

69. People, who were indoors during a fire, suffer from a carbon monoxide poisoning. What type of hypoxia is observed in such cases?

- a. Tissue hypoxia
- b. Hemic hypoxia**
- c. Circulatory hypoxia
- d. Hypoxic hypoxia
- e. Respiratory hypoxia

70. What type of fruit is characteristic of *Atropa belladonna*?

- a. Berry**
- b. Hesperidium
- c. Capsule
- d. Silique
- e. Legume

71. Salts and esters of oxalic acid are called:

- a. Adipinates
- b. Malonates
- c. Oxalates**
- d. Succinates
- e. Urates

72. What cation of the third analytical group can be precipitated using the group reagent  $H_2SO_4$  only in the presence of ethanol (binds water and concentrates the solution)?

- a.  $Ba^{2+}$
- b.  $Na^{+}$
- c.  $K^{+}$
- d.  $Ca^{2+}$**
- e.  $Sr^{2+}$

73. Який із патогенетичних факторів відіграє провідну роль у розвитку набряків у пацієнтів після тривалого голодування?

- a. Підвищення онкотичного тиску в тканинах
- b. Зниження онкотичного тиску крові**
- c. Зниження осмотичного тиску крові
- d. Підвищення осмотичного тиску інтерстиціальної рідини
- e. Зниження гідростатичного тиску крові

74. What can be used to distinguish formic acid from acetic acid?

- a.  $\text{H}_2\text{SO}_4$
- b.  $\text{NaHCO}_3$
- c.  $\text{NaOH}$
- d.  $[\text{Ag}(\text{NH}_3)_2]\text{OH}$
- e.  $\text{Br}_2 (\text{H}_2\text{O})$

75. In the course of an experiment in the mesenteric vein of a toad a thrombus was created with a crystal of common salt. What processes occurred during the first stage of thrombus formation?

- a. Production of fibrin monomer
- b. Production of thrombin
- c. Adhesion, aggregation, agglutination of platelets
- d. Production of fibrin polymer
- e. Production of active thromboplastin

76. Which compound of those listed below is an alicyclic hydrocarbon?

- a. Anthracene
- b. Cyclohexene
- c. Benzene
- d. Phenanthrene
- e. Naphthalene

77. Caffeine is one of the alkaloids contained in tea and coffee. Caffeine is contraindicated in case of:

- a. Hypotension
- b. Migraine
- c. Depression of nervous activity
- d. Addiction
- e. Essential hypertension

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

- a. Entropy change
- b. Gibbs energy
- c. Intrinsic energy
- d. Helmholtz energy
- e. Enthalpy

79. What drug inhibits cholesterol synthesis in the liver?

- a. Parimidine
- b. Probucol
- c. Atorvastatin
- d. Colestipol
- e. Fenofibrate

80. A patient with gingivitis was prescribed oral cavity irrigation with 0.02% potassium permanganate solution. What group of antiseptics does this drug belong to?

- a. Alcohols
- b. Nitrofurans
- c. Detergents
- d. Oxidants
- e. Dyes

81. A 37-year-old man developed leg edema after prolonged fasting. What pathogenetic factor plays the leading role in the development of edema in this case?

- a. Increased oncotic pressure in the tissues
- b. Decreased oncotic blood pressure
- c. Decreased osmotic blood pressure
- d. Increased osmotic pressure of interstitial fluid
- e. Decreased hydrostatic blood pressure

82. Select ketose from the monosaccharides listed below:

- a. Mannose
- b. Fructose**
- c. Glucose
- d. Arabinose
- e. Ribose

83. A patient, who has been suffering from chronic glomerulonephritis for the last 4 years, presents with a large amount of protein (4g/L) that appeared in the urinalysis. The levels of triglycerides and cholesterol increased in the patient's blood. What syndrome has complicated the course of the main disease in this case?

- a. Nephrotic**
- b. Toxic
- c. Asthenic
- d. Hypertensive
- e. Inflammatory

84. A patient, who was prescribed famotidine for peptic ulcer disease, came to a pharmacy. What mechanism underlies the action of this medicine?

- a. Muscarinic cholinoreceptor blockade
- b. Inhibition of the  $H^+K^+ATPase$  activity
- c. Cholinergic receptors blockade in the sympathetic ganglia
- d.  $H_1$ -histamine receptors blockade
- e.  $H_2$ -histamine receptors blockade**

85. A woman with hypertension came to a doctor complaining of dry cough that developed against the background of her therapy. What antihypertensive drug was she taking?

- a. Atenolol
- b. Furosemide
- c. Nifedipine
- d. Dichlothiazide (Hydrochlorothiazide)
- e. Lisinopril**

86. In cases of severe pancreatitis, physicians usually prescribe the drugs that help prevent pancreatic autolysis. These drugs inhibit the following type of enzymes:

- a. Phosphatases
- b. Proteases**
- c. Lipases
- d. Dehydrogenases
- e. Amylases

87. Corolla of a zygomorphic hermaphroditic flower consists of 5 petals: the largest one is called the banner, the two lateral petals are called the wings, and the two fused petals are forming the keel. Such corolla is characteristic of medicinal plants of Leguminosae family. Name the type of corolla:

- a. Papilionaceous**
- b. Funnelform
- c. Tubular
- d. Labiate
- e. Saucer-shaped

88. What titrimetric method of analysis uses both external and internal indicators?

- a. Alkalimetry
- b. Permanganatometry
- c. Nitritometry**
- d. Argentometry
- e. Complexonometry

89. In medicine and pharmacy, such phenomena as adsorption, wetting, adhesion, etc. can be observed. What are they called?

- a. Molecular-kinetic phenomena
- b. Electrokinetic phenomena
- c. Physico-chemical phenomena
- d. Optical phenomena
- e. Superficial phenomena**

90. After the examination, the patient was diagnosed with typhus. What is the route of transmission of this disease?

- a. Vector-borne transmission**
- b. Fecal-oral transmission
- c. Vertical transmission
- d. Parenteral transmission
- e. Airborne droplet transmission

91. On X-ray examination of the 59-year-old patient, in the lower lobe of the right lung there was detected a distinct shadow, differential for tumor. It was pre-determined that the tumor is benign. Which of the following features characterizes the tumor as benign?

- a. Metastasis
- b. Infiltrating growth
- c. Cancer cachexia
- d. Invasion in surrounding tissues
- e. Expansive growth**

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

- a. Calcium
- b. Barium
- c. Aluminium**
- d. Potassium
- e. Sodium

93. Osmotic pressure is an important characteristic of biological fluids. Semipermeable membranes are necessary for penetration of solvent molecules. What substance cannot be used as a semipermeable membrane?

- a. Parchment
- b. Gelatine
- c. Biological membrane
- d. Collodion film
- e. Glass**

94. In common corn (*Zea mays*), male spikelets are gathered in an apical panicle and female flowering spikelets form dense axillary spadices. What type of plant is *Zea mays*?

- a. Dioecious
- b. Monandrous
- c. Polyecious
- d. Monoecious**
- e. Unisexual

95. A patient complains of loss of appetite, weight loss, weakness, and abdominal pain. Laboratory blood test shows the following: Hb --- 90 g/L; erythrocytes ---  $2.0 \cdot 10^{12}/L$ ; color index --- 1.4.  $B_{12}$  deficiency anemia has been diagnosed. What substance is deficient in this patient, causing the anemia?

- a. Pepsin
- b. Secretin
- c. Castle factor**
- d. Hydrochloric acid
- e. Renin

96. In what pair of substances the both of them form a precipitate of metallic silver when Tollens reagent is added (during heating)?

- a. Propanal and formic acid
- b. Acetic acid and formic acid
- c. Propanal and acetic acid
- d. Propanol and formic acid
- e. Ethanol and formic acid

97. A patient has been diagnosed with acute pancreatitis. For diagnostic purposes, it is necessary to measure the activity of a certain enzyme in the patient's blood. What enzyme is it?

- a. Pepsin
- b. Creatine kinase
- c. Amylase
- d. Lactate dehydrogenase
- e. Aldolase

98. The patient is presented to the hospital with the phenomena of growing respiratory failure. He has clinical signs of bilateral subtotal pneumonia. The clinical diagnosis is confirmed by X-ray examination. What type of respiratory failure does this patient most likely have?

- a. Obstructive
- b. Thoracic diaphragm
- c. Central
- d. Peripheral
- e. Restrictive

99. In medical practice barbiturates are used as sleeping pills. These substances act similar to rothenone and are inhibitors of tissue respiration. The mechanism of their action takes place on the enzymatic level. Which of the following enzymes do these substances inhibit?

- a. Cytochrome oxidase
- b. NADH-coenzyme Q reductase
- c. Succinate dehydrogenase
- d. Cytochrome C reductase
- e. Adenosine triphosphate synthetase

100. Для представників якої родини характерні такі ознаки: плівчасті прилистки зростаються в розтруб, плід псевдомонокарпний горіхоподібний?

- a. Lamiaceae
- b. Rosaceae
- c. Fabaceae
- d. Polygonaceae
- e. Brassicaceae

101. In snake venom there is a substance that causes erythrocyte hemolysis when it is introduced into a human organism. Blood test revealed a large amount of lysolecithin (lysophosphatidylcholine). What enzyme leads to accumulating lysolecithin in blood?

- a. Phospholipase D
- b. Neuraminidase
- c. Phospholipase A2
- d. Phospholipase C
- e. Phospholipase A1

102. What drug should not be prescribed for the treatment of arterial hypertension in a patient with gout?

- a. Enalapril
- b. Cozaar (Losartan)
- c. Amlodipine
- d. Atenolol
- e. Hydrochlorothiazide

103. What common property of cation compounds  $\text{Al}^{3+}$ ,  $\text{Zn}^{2+}$ ,  $\text{Cr}^{3+}$ ,  $\text{Sn}^{2+}$  unites them within the IV analytical group (acid-base classification)?

- a. Solubility of hydroxides in an excess ammonia solution
- b. Insolubility of salts in water
- c. Amphotericity of hydroxides**
- d. Solubility of hydroxides in acids
- e. Good solubility of some salts

104. Under conditions of prolonged intoxication, a significant decrease in the activity of aminoacyl-tRNA synthetases can be observed. What metabolic process is disrupted in this case?

- a. RNA processing
- b. Genetic recombination
- c. DNA repair
- d. DNA replication
- e. Protein biosynthesis**

105. What hormonal drug is used in cases of atonic uterine bleeding?

- a. Progesterone
- b. Oxytocin**
- c. L-thyroxine
- d. Insulin
- e. Prednisolone

106. What pair of compounds can be classified as functional group isomers?

- a. Hexane and cyclohexane
- b. Propanal and propanone**
- c. Butane and isobutane
- d. Benzene and methylbenzene
- e. Pentene-1 and pentene-2

107. A person came to a doctor with complaints of loss of sensitivity and pain along the peripheral nerves. Blood testing revealed elevated levels of pyruvic acid. What vitamin can cause such changes, if it is deficient in the body?

- a. Pantothenic acid
- b. Vitamin PP
- c. Vitamin  $\text{B}_2$
- d. Biotin
- e. Vitamin  $\text{B}_1$**

108. What is the vapor pressure of a liquid at its boiling point?

- a. Maximum
- b. Equal to saturated vapor pressure at room temperature
- c. Equal to atmospheric pressure**
- d. Equal to saturated vapor pressure at 273 K
- e. Minimum

109. During the analysis of the cations that belong to the fourth analytical group (acid-base classification), their processing with a group reagent makes it possible not only to separate, but also to identify the following ions:

- a.  $\text{Sn(IV)}$  ions
- b.  $\text{As(III)}$  ions
- c.  $\text{Zn(II)}$  ions
- d.  $\text{Al(III)}$  ions
- e.  $\text{Cr(III)}$  ions**

110. Який препарат із групи психотропних засобів блокує дофамінові рецептори?

- a. Амітриптилін
- b. Анальгін (метамізол натрію)
- c. Аміназин (хлорпромазин)**

- d. Кофеїн-бензоат натрію
- e. Діазепам

111. Proteins are the catalysts of biochemical processes. What type of homogeneous catalysis includes the processes with their participation?

- a. Enzyme catalysis
- b. Gas-phase homogeneous catalysis
- c. Coordination catalysis
- d. Acid-base catalysis
- e. Redox catalysis

112. Water samples were received by a bacteriological laboratory for determining their coli index. What is the coli index?

- a. Number of coliphages in 1 liter of water
- b. Number of enterococci in 1 liter of water
- c. Number of Escherichia coli in 1 liter of water
- d. Number of staphylococci in 1 liter of water
- e. Number of pseudomonads in 1 liter of water

113.  $\text{CH}_3\text{-CH}_2\text{-OH}$  and  $\text{CH}_3\text{-O-CH}_3$  are a pair of compounds that can be classified as isomers of the following type:

- a. Carbon chain isomers
- b. Geometric (cis-trans) isomers
- c. Tautomers
- d. Mirror (optical) isomers
- e. Functional group isomers

114. The student is studying a plant organ with radial symmetry, unlimited growth and positive geotropism. It provides nourishment, vegetative reproduction and plant fastening in the soil. Which of the following is described?

- a. Rhizome
- b. Leaf
- c. Seed
- d. Stem
- e. Root

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

- a. Acid-fast
- b. Spore-formers
- c. Prototrophic
- d. Thermophilic
- e. Anaerobic

116. Який патогенез розвитку цукрового діабету 1-го типу?

- a. Гіперпродукція глюкагону
- b. Гіперпродукція кортизолу
- c. Інсулінорезистентність жирової тканини
- d. Гіперпродукція соматотропіну
- e. Аутоімунне ушкодження В-клітин

117. Для яких систем характерна седиментація?

- a. Розчинів неелектролітів
- b. Розчинів ВМР
- c. Суспензій
- d. Розчинів електролітів
- e. Золів

118. A person has been stung by a bee. The stung area developed redness and edema. What is the



main mechanism of edema development?

- a. Increased hydrostatic blood pressure
- b. Decreased oncotic blood pressure
- c. Decreased osmotic blood pressure
- d. Increased permeability of the \\ capillaries**
- e. Disturbed lymphatic efflux

119. Який препарат належить до групи блокаторів H<sub>2</sub> – гістамінових рецепторів?

- a. Омепразол
- b. Альмагель
- c. Фамотидин**
- d. Алохол
- e. Гастроцепін

120. Gastric herbal tea contains oval brown lignified "cones" up to 1.5 cm long, which are:

- a. *Platycladus orientalis* cones
- b. *Juniperus galbuli*
- c. *Larix* cones
- d. *Cupressus* cones
- e. *Alnus* infructescences**

121. Elevated levels of ketone bodies were detected in the blood of a patient with diabetes mellitus. Ketone bodies are synthesized from the following compound:

- a. Acetyl-CoA**
- b. Lactate
- c. Glucose
- d. Malate
- e. Succinate

122. Який механізм передачі захворювання епідемічного висипного тифу?

- a. Парентеральний
- b. Фекально-оральний
- c. Трансмісивний**
- d. Повітряно-крапельний
- e. Вертикальний

123. During photosynthesis within plant cell chloroplasts there is short-term retained starch being produced, which rapidly hydrolyzes into glucose. This starch is called:

- a. Transitory
- b. Reserve
- c. Resistant
- d. Primary**
- e. Secondary

124. Surfactants are 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. ---
- e. \$NaOH\$

125. A patient with Cushing syndrome has persistent hyper- \\ glycemia and glucosuria. In this case, increased synthesis and secretion of a certain hormone can be observed. What hormone is it?

- a. Insulin
- b. Thyroxine
- c. Glucagon
- d. Adrenaline

**e. Cortisol**

126. What reagent can be used to distinguish maltose (a reducing disaccharide) from sucrose (a non-reducing disaccharide)?

- a.  $\text{Br}_2$
- b.  $\text{FeCl}_3$

**c. Tollens reagent**

- d.  $\text{NaOH}$
- e.  $\text{K}_4[\text{Fe}(\text{CN}_6)]$

127. Interferons are natural antiviral and antitumor agents. What is their mechanism of action?

- a. Repair activation
- b. Replication activation
- c. Transcription activation
- d. Protein synthesis increase

**e. Protein synthesis depression**

128. Select the halogenated antiseptic that would be preferable for a child to pack in the first aid kit, when going to a summer camp:

**a. Iodine alcoholic solution**

- b. Copper sulfate
- c. Methylene blue
- d. Brilliant green
- e. Formaldehyde solution

129. Streptomycin like other aminoglycosides, by binding to the 30S subunit of ribosomes, prevents the attachment of formylmethionyl-tRNA) What process is being disrupted as a result of this effect?

- a. Transcription termination
- b. Replication initiation
- c. Transcription initiation
- d. Translation termination

**e. Translation initiation**

130. To determine the qualitative content of a drug, a sample of the analyte solution was processed with 2M solution of HCl. A white precipitate, soluble in aqueous ammonia solution, was formed. This analytical effect indicates the presence of the following cations:

- a. Mercury(II) cations
- b. Silver(I) cations**
- c. Tin(II) cations
- d. Mercury(I) cations
- e. Lead(II) cations

131. What adsorbent is used as a suspension to relieve the intoxication caused by alkaloid poisoning?

- a. Bentonite
- b. Kaolin

**c. Activated charcoal**

- d. Starch
- e. Silica gel

132. When a galvanic cell operates under standard conditions, the chemical energy of the redox process transforms into the following type of energy:

- a. Mechanical energy
- b. Electromagnetic energy

**c. Electrical energy**

- d. Thermal energy
- e. Nuclear energy

133. In E) coli cells, the synthesis of pyrimidine nucleotides occurs according to the scheme of the metabolic pathway:  $\text{CO}_2 + \text{NH}_3 + 2\text{ATP} \rightarrow \text{S1} \rightarrow \text{S2} \rightarrow \text{UTP} \rightarrow \text{CTP}$ . When CTP concentration in the cell

increases, the synthesis of pyrimidine nucleotides stops. What type of regulation is described here?

- a. Partial proteolysis
- b. Attachment of inhibitor proteins
- c. Detachment of inhibitor proteins
- d. Enzyme molecule phosphorylation
- e. Allosteric regulation

134. An analytical chemist conducts a qualitative analysis of cations of the second group. What reagent can be used to separate lead chloride from chlorides of other cations of the second group?

- a. Hot water
- b. Ammonia
- c. Sodium hydroxide
- d. Hydrochloric acid
- e. Sodium chloride

135. Reaction of sodium ions with potassium hexahydroxoantimonate (V) in a neutral medium produces precipitate. Specify the color of this precipitate:

- a. Red
- b. Yellow
- c. Green
- d. White
- e. Blue

136. A man has a nitrate poisoning. What type of hypoxia will develop in this case?

- a. Hemic hypoxia
- b. Circulatory hypoxia
- c. Tissue hypoxia
- d. Hypoxic hypoxia
- e. Respiratory hypoxia

137. Який збудник викликає захворювання сифіліс?

- a. *Corynebacterium diphtheriae*
- b. *Mycobacterium tuberculosis*
- c. *Salmonella typhi*
- d. *Borrelia recurrentis*
- e. *Treponema pallidum*

138. A woman in the state of ketoacidotic coma has loud rapid respiration: a labored expiration with active participation of expiratory muscles occurs after a deep inspiration. What type of pathological respiration is it?

- a. Biot
- b. Cheyne-Stokes
- c. Kussmaul
- d. Gasping
- e. Stenotic

139. What transformation is accompanied by an increase in entropy?

- a.  $\text{NH}_4\text{-NO}_2(\text{solid}) = \text{N}_2(\text{gas}) + 2\text{H}_2\text{O}(\text{gas})$
- b.  $\text{C}_2\text{H}_2(\text{gas}) + \text{H}_2(\text{gas}) = \text{C}_2\text{H}_4(\text{gas})$
- c.  $\text{N}_2(\text{gas}) + \text{O}_2(\text{gas}) = 2\text{NO}(\text{gas})$
- d.  $2\text{H}_2\text{S}(\text{gas}) + 3\text{O}_2(\text{gas}) = 2\text{SO}_2(\text{gas}) + 2\text{H}_2\text{O}(\text{gas})$
- e.  $\text{CaO}(\text{solid}) + \text{CO}_2(\text{gas}) = \text{CaCO}_3(\text{solid})$

140. What cations belong to the IV analytical group according to the acid-base classification?

- a. Aluminum, zinc, chromium(II), tin(II), tin(IV), arsenic(III), arsenic(V)
- b. Silver, lead, nickel, potassium, barium, bismuth
- c. Sodium, potassium, ammonium, silver, lead
- d. Magnesium, calcium, strontium, barium
- e. Calcium, strontium, barium, potassium, bismuth

141. Preparations of colloid silver -- Protargol (silver proteinate) and Collargol (colloid silver) -- contain proteine compounds besides their active substance. What is the function of proteins in these preparations?

- a. Increased storage time
- b. Improved preparation technology
- c. Decreased side effects
- d. Increased bactericidal action of silver
- e. Protection of colloid solution against coagulation**

142. What value determines the degree to which foreign ions can influence the potential of an ion-selective electrode?

- a. Diffusion coefficient
- b. Osmotic coefficient
- c. Electrical conductivity coefficient
- d. Activity coefficient
- e. Selectivity coefficient**

143. What cardiac glycoside is obtained from lily of the valley?

- a. Digitoxin
- b. Adoniside
- c. Celanid (Lanatoside C)
- d. Corglycon**
- e. Strophanthin K

144. До якого класу сполук належить Цитохром P450?

- a. Піридинопротеїн
- b. Гемопротеїн**
- c. Флавопротеїн
- d. Нуклеопротеїн
- e. Ліпопротеїн

145. A student studies the digestive system of vertebrates. The organ that is being studied is primarily located in the right upper quadrant of the abdomen. It detoxifies various metabolites, produces hormones and digestive biochemicals, regulates glycogen storage, synthesizes proteins, and decomposes red blood cells. What organ is being studied by the student?

- a. Liver**
- b. Heart
- c. Kidneys
- d. Lungs
- e. Pancreas

146. Який препарат належить до групи антихолінестеразних засобів?

- a. Дипіроксим
- b. Прозерин (неостигмін)**
- c. Ацетилхолін
- d. Дитилін (суксаметонію хлорид)
- e. Ізонітрозин

147. What cation can be detected with Chugaiev's agent (Dimethylglyoxime)?

- a.  $\text{Ca}^{2+}$
- b.  $\text{K}^+$
- c.  $\text{Co}^{2+}$
- d.  $\text{Ni}^{2+}$**
- e.  $\text{Mn}^{2+}$

148. A man developed agranulocytosis after pneumonia treatment with sulfonamides. Antibodies to neutrophils were detected in the patient's blood. This pathology belongs to the following type of allergic reactions:

- a. Immune complex

- b. Cell-mediated
- c. Anaphylactic
- d. Cytotoxic
- e. Reactive

149. Який основний метод лабораторної діагностики ВІЛ інфекції?

- a. Реакція коагутинації
- b. Реакція пасивної гемаглютинації
- c. Імунофлуоресцентний
- d. Імуноферментний аналіз
- e. Радіоімунний аналіз

150. A patient has been hospitalized with signs of carbon monoxide poisoning. What type of hypoxia is characteristic of this condition?

- a. Tissue hypoxia
- b. Hypoxic hypoxia
- c. Respiratory hypoxia
- d. Hemic hypoxia
- e. Circulatory hypoxia

151. What reference electrode can be used in the potentiometric analysis of a medicinal substance?

- a. Silver chloride electrode
- b. Quinhydrone electrode
- c. Zinc electrode
- d. Antimony electrode
- e. Glass electrode

152. У чоловіка з діагнозом: цукровий діабет виявили такі показники артеріальної крові: pH крові – 7,25,  $pCO_2$  – 37 мм рт. ст., SB – 19,5 ммоль/л, BB – 39 ммоль/л, BE – (-7) ммоль/л, кетонів тіла крові – 1,9 ммоль/л, титраційна кислотність сечі – 50 ммоль/добу. Яке порушення кислотно-основного стану у пацієнта?

- a. Метаболічний ацидоз
- b. Змішаний алкалоз
- c. Газовий алкалоз
- d. Змішаний ацидоз
- e. Газовий ацидоз

153. In redox titrimetry, the indicators that are added to the reaction system respond to the changes in the:

- a. Degree of ionization of the substance being analyzed
- b. Concentration of hydroxyl ions
- c. Ionic strength of the solution
- d. Concentration of hydrogen ions
- e. Redox potential of the system

154. The fruit is a bright-red juicy follicle with a sweet-sour taste. Its seeds are kidney-shaped and smell similar to lemon. Such fruits belong to:

- a. *Malus domestica*
- b. *Schisandra chinensis*
- c. *Citrus limon*
- d. *Viburnum opulus*
- e. *Sorbus aucuparia*

155. A patient with signs of mercury poisoning has been delivered into an admission room. What antidote should be prescribed in this case?

- a. Unithiol
- b. Proserin
- c. Calcium chloride
- d. Naloxone

e. Atropine sulfate

156. Total protein in blood serum is one of metabolic indicators. What test is usually used in clinical laboratories to determine this value?

- a. Sodium nitroprusside test
- b. Xanthoproteic test
- c. Biuret test
- d. Lead acetate test
- e. Ninhydrin test

157. What physico-chemical method is used to determine the pH of solutions for injections?

- a. Potentiometry
- b. Electrolysis
- c. Conductometry
- d. Polarography
- e. Amperometry

158. To stop a fever, the patient was prescribed a centrally acting non-narcotic analgesic that, unlike the other drugs in this group, has relatively weak anti-inflammatory effect. What drug is it?

- a. Paracetamol
- b. Analgin (Metamizole)
- c. Aspirin
- d. Indomethacin
- e. Nurofen (Ibuprofen)

159. Від якого показника залежить коагулююча здатність електроліту?

- a. Об'єму золю
- b. Густини золю
- c. Концентрації електроліту
- d. Заряду іона-коагулятора
- e. Ступеня дисперсності золю

160. Preventive examination revealed an enlargement of the patient's thyroid gland, exophthalmos, high body temperature, and an elevated heart rate of 110/min. What hormone levels should be measured in the patient's blood in this case?

- a. Cortisol
- b. Testosterone
- c. Glucagon
- d. Insulin
- e. Thyroxine

161. A 55-year-old man came to a doctor with complaints of acute pain in his big toes. Meat and wine remain permanently in his diet. The doctor suspects gout. What substance must be measured in the patient's blood to confirm this diagnosis?

- a. Bilirubin
- b. Ketone bodies
- c. Urea
- d. Lactate
- e. Uric acid

162. Cultivated annual plant with glands and indumentum has alternate obovate leaves and flat capitulum inflorescences with orange pseudoligulate ray florets and yellow tubular disc florets. Specify this plant.

- a. Echinacea purpurea
- b. Calendula officinalis
- c. Centaurea cyanus
- d. Arctium lappa
- e. Artemisia absinthium

163. A patient with gout has been prescribed allopurinol. What is the mechanism of action of this drug?

- a. Intensification of uric acid excretion by the kidneys
- b. Stimulation of uric acid breakdown
- c. Inhibition of COX-2 enzyme
- d. Activation of microsomal oxidation in the liver
- e. Inhibition of xanthine oxidase enzyme, inhibition of uric acid synthesis**

164. Different structures of the bacterial cell perform different special functions. This component provides the adaptive capabilities of the bacterium and its protection against the adverse conditions of the environment. What component is it?

- a. Cilia
- b. Spores**
- c. Flagella
- d. Inclusions
- e. Capsule

165. The patient, who suffers from rheumatoid arthritis and concomitant duodenal ulcer should be prescribed a non-steroidal anti-inflammatory drug. What drug is most suitable in this case?

- a. Diclofenac sodium
- b. Celecoxib**
- c. Acetylsalicylic acid
- d. Paracetamol
- e. Metamizole

166. Various types of immunobiological agents are used for immunoprophylaxis of infectious diseases. What type of prophylaxis involves the use of immune sera and gamma globulins?

- a. Immunotropic
- b. Specific active
- c. General
- d. Specific passive**
- e. Non-specific

167. В яких структурах рослинних клітин накопичується вторинний крохмаль?

- a. Мітохондріях
- b. Амілопластах**
- c. Олеопластах
- d. Протеопластах
- e. Вакуолях

168. A 10-year-old child has height of 178 cm and body mass of 67 kg. These presentations are caused by the functional disturbance of the:

- a. Thyroid gland
- b. Adrenal glands
- c. Pituitary gland**
- d. Parathyroid glands
- e. Gonads

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

- a. Spike**
- b. Thyse
- c. Capitulum
- d. Spadix
- e. Panicle

170. What substances can be determined by means of substitution titration using the iodometric method?

- a. Strong oxidizing agents**

- b. Unsaturated hydrocarbons
- c. Saturated hydrocarbons
- d. Weak reducing agents
- e. Strong reducing agents

171. What type of indicators is used in the acid-base method of quantitative analysis?

- a. Chemiluminescent indicators
- b. pH indicators**
- c. Redox indicators
- d. Metallochromic indicators
- e. Adsorption indicators

172. In the process of asexual reproduction, higher spore-forming plants have the ability to form spores, which is an adaptation to life on dry land. What set of chromosomes do their spores have?

- a. Polyploid
- b. Triploid
- c. Diploid
- d. Haploid**
- e. Tetraploid

173. Cosmetic cream against mimic wrinkles contains "vitamin Q10" --- ubiquinone. What is the metabolic role of this vitamin-like substance?

- a. It is a component of the mitochondrial respiratory chain**
- b. It decreases permeability of cell membranes
- c. It regulates differentiation of epithelial cells
- d. It regulates water-salt exchange
- e. It stimulates collagen synthesis

174. Select a nucleophile among the particles and molecules given below.

- a.  $\text{NO}_2^+$
- b.  $\text{NH}_3$**
- c.  $\text{H}^+$
- d.  $\text{AlCl}_3$
- e.  $\text{CH}_3\text{Cl}$

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

- a. Chloroform
- b. Distilled water
- c. Benzene
- d. Ethyl alcohol**
- e. Amyl alcohol

176. За яким механізмом відбувається приєднання  $\text{Br}_2$  до пропену?

- a.  $\text{S}_\text{E}$
- b.  $\text{A}_\text{E}$**
- c.  $\text{S}_\text{R}$
- d.  $\text{S}_\text{N}$
- e.  $\text{A}_\text{N}$

177. A local general practitioner recommends taking interferon for influenza prevention. What is the mechanism of action of this drug?

- a. Blocks virus protein synthesis**
- b. Inhibits virion exit from cells
- c. Prevents adsorption of virus in cell receptors
- d. Blocks virus stripping
- e. Disrupts the process of virus assembly



178. Як називаються реакції в яких багаторазово повторюється цикл елементарних актів за участю активних частинок?

- a. Ланцюгові
- b. Послідовні
- c. Пов'язані
- d. Паралельні
- e. Фотохімічні

179. Який пігмент утворюється в реакції окиснення гему?

- a. Каротин
- b. Білівердин
- c. Уробіліноген
- d. Хлорофіл
- e. Стеркобіліноген

180. Helmholtz energy is the direction criterion of an arbitrary process at a constant:

- a. Entropy and pressure
- b. Temperature and pressure
- c. Internal energy and volume
- d. Temperature and volume
- e. Entropy and volume

181. The biological study of spores and pollen revealed tetrahedral spores with a semi-circular base and reticular surface in the pollen. These spores belong to:

- a. Bryophyta
- b. Lycopodiophyta
- c. Pinophyta
- d. Equisetophyta
- e. Polypodiophyta

182. What stage of chronic renal failure can be characterized by metabolic acidosis, azotemia, itching, ammonia breath, and impaired functioning of vital organs?

- a. Nephrotic syndrome
- b. Tubulopathy
- c. Uremia
- d. Acute renal failure
- e. Renal colic

183. Which of the listed species of medicinal plants is considered to be a weed?

- a. *Mentha piperita*
- b. *Salvia officinalis*
- c. *Plantago major*
- d. *Convallaria majalis*
- e. *Papaver somniferum*

184. What reagents produce a reaction that follows the free radical (SR) mechanism?

- a. Benzene and chlorine in the presence of  $AlCl_3$
- b. Ethylene and chlorine
- c. Ethane and chlorine in the light
- d. Ethanol and hydrogen chloride
- e. Ethane and oxygen

185. After eating strawberries, a child developed itchy red spots on the skin (urticaria). What type of leukocytosis would be detected in this child?

- a. Basophilic
- b. Neutrophilic
- c. Lymphocytic
- d. Monocytic
- e. Eosinophilic

186. For tetanus prevention, a toxin that has been neutralized with formalin (0.4%) at the temperature of 39°C for four weeks is used. What kind of preparation is it?

- a. Adjuvant
- b. Antitoxic serum
- c. Anatoxin
- d. Immunoglobulin
- e. Inactivated vaccine

187. Pastes are used in medicine to treat skin diseases. What type of disperse systems are they?

- a. Suspensions
- b. Foams
- c. Aerosols
- d. Powders
- e. Emulsions

188. After a physical exertion, a patient developed an angina pectoris attack caused by myocardial ischemia. What definition most accurately describes the concept of ischemia?

- a. Decreased erythrocyte count in the blood
- b. Increased oxygen delivery to tissues
- c. Dilation of arterioles
- d. Oxygen deficiency in the circulatory system
- e. Discrepancy between the blood supply to the tissues and the need for it

189. What is the most common side effect of inhaled corticosteroids?

- a. Osteoporosis
- b. Subcapsular cataract
- c. Oropharyngeal candidiasis
- d. Arterial hypertension
- e. Increased body mass

190. What reaction can be classified as a pseudo-first-order reaction?

- a. Saponification
- b. Combustion
- c. Etherification
- d. Neutralization
- e. Hydrolysis of sucrose

191. During examination it appeared that the patient's sclera and oral mucosa are icteric. What biochemical blood value can be expected to be increased?

- a. Glucose
- b. Bilirubin
- c. Cholesterol
- d. Albumin
- e. Amylase

192. A patient was prescribed losartan for treatment of arterial hypertension. What mechanism of action does this drug have?

- a. Inhibition of angiotensin-converting enzyme
- b. Angiotensin-receptor blockade
- c. Calcium channel blockade
- d. Activation of central  $\alpha$ -adrenoceptors
- e. Inhibition of phosphodiesterase

193. Coumarins, vitamin K antagonists, suppress the processes of blood coagulation. Synthesis of what protein is blocked by coumarins?

- a. Prothrombin
- b. Transferrin
- c. Gamma globulin
- d. Ceruloplasmin

e. Albumin

194. To what electrode will the protein particle move during electrophoresis, if its isoelectric point is 4.0 and the pH of the solution is 5.0?

- a. First to the anode, and then to the cathode
- b. There will be no movement
- c. To the anode**
- d. First to the cathode, and then to the anode
- e. To the cathode

195. A dissected flower has numerous stamens that are united by the stamen filaments into several bundles. What is this type of androecium?

- a. Polyadelphous**
- b. Diadelphous
- c. Monadelphous
- d. Tetrastaminal
- e. Didynamous

196. The method consisting in removal of low-molecular impurities from colloidal systems and high-molecular compound solutions by semipermeable membrane diffusion is called:

- a. Electrodialysis
- b. Decantation
- c. Compensatory dialysis
- d. Ultrafiltration
- e. Dialysis**

197. Pathogenic bacteria in the human body can form structures that protect them from phagocytosis. Name these structures.

- a. Flagella
- b. Inclusions
- c. Spores
- d. Capsule**
- e. Mesosomes

198. The majority of live vaccines are made from microbes with reduced virulence. What is the name of such vaccines?

- a. Adsorbed vaccines
- b. Attenuated vaccines**
- c. Adjuvant vaccines
- d. Anatoxin vaccines
- e. Denatured vaccines

199. What drug has a hypoglycemic effect due to stimulation of pancreatic beta cells?

- a. Retabolil (nandrolone)
- b. Glibenclamide**
- c. Adrenaline hydrochloride (epinephrine)
- d. Prednisolone
- e. Heparin

200. Sclerenchyma fibers, formed by procambium or parenchyma around vascular bundles or secretory cavities, strengthen and protect them. What type of fibers is it?

- a. Cortical fibers
- b. Perivascular fibers**
- c. Phloem fibers
- d. Xylem fibers
- e. Pericyclic fibers

201. Serology is the leading method of syphilis diagnostics. What test is used to diagnose this disease?

- a. Gruber test
- b. Haddelson test
- c. Widal test

d. Wassermann test

- e. Wright test

202. A dry-heat box is used for sterilization of various materials and instruments in a bacteriological laboratory. This sterilization method can be applied to the following objects:

- a. Simple nutrient medium
- b. Physiological solution

c. Glass test tubes

- d. Wire inoculating loops
- e. Rubber gloves

203. A patient has been warned that the medicine prescribed to him can cause a cough. Name this medicine:

a. Lisinopril

- b. Phenyhydine (Nifedipine)
- c. Dichlothiazide (Hydrochlorothiazide)
- d. Clonidine (Clonidine)
- e. Metoprolol

204. What enzyme allows for synthesis of various genes from template RNA to DNA in genetic engineering (this enzyme catalyzes the process observed in RNA-viruses)?

- a. DNA-ligase
- b. Exonuclease

c. Reverse transcriptase

- d. Endonuclease
- e. Helicase

205. What drug is a non-selective beta-blocker?

- a. Proserin (Neostigmine)
- b. Metoprolol
- c. Atropine
- d. Adrenaline hydrochloride

e. Anaprilin (Propranolol)

206. Sulfanilamides contain a primary aromatic amino group in their structure. What method is used for quantitative determination of these compounds?

a. Nitritometry

- b. Iodometry
- c. Cerimetry
- d. Permanganatometry
- e. Dichromatometry

207. Essential oils are used both in pharmaceutical and cosmetic industry. To extract essential oils from herbal raw material the following technology is used:

- a. Calorimetry
- b. Conductometry
- c. Colorimetry
- d. Potentiometry

e. Steam distillation

208. Total content of chloride, bromide, and iodide ions in the investigated solution can be quantitatively determined with the following titrant:

- a. Sodium nitrite solution
- b. Sodium thiosulfate solution

c. Silver nitrate solution

- d. Potassium permanganate solution

e. Potassium dichromate solution

209. A 50-year-old patient in a poor condition was presented to the hospital. Objectively, the skin and visible mucous membranes are cyanotic, arterial blood saturation --- 88%, NiBP --- 90/60 mm Hg, pulse is 117 per minute, respiratory rate is 22 per minute. From the history it is known that the patient suffers from chronic heart failure. Which of the following types of hypoxia is most likely to develop in this case?

a. Anemic

b. Tissue

c. Circulatory

d. Hypoxic

e. Hemic

210. Який вид лікарських речовин належить до групи бур'янів?

a. *Plantago major*

b. *Papaver somniferum*

c. *Salvia officinalis*

d. *Convallaria majalis*

e. *Mentha piperita*

211. *Glycyrrhiza glabra* L., a valuable medicinal plant, is widely used in official and folk medicine. What part of the plant is harvested?

a. Leaves

b. Roots with rhizomes

c. Grass

d. Inflorescences

e. Seeds

212. A patient developed neuritis of the facial nerve after five months of tuberculosis treatment. What drug has caused this side effect?

a. Benzylpenicillin sodium

b. Isoniazid

c. Rifampicin

d. Para-aminosalicylate sodium

e. Ceftriaxone

213. A patient presents with hypoxia. What metabolic process activates when oxygen supply is insufficient?

a. Pentose-phosphate pathway

b. Urea cycle

c. Anaerobic glycolysis

d. Oxidative decarboxylation of keto acids

e. Tricarboxylic acid cycle

214. To assess the bacterial contamination of the soil, where humans or animals are the source of contamination, the presence of sanitary indicator microorganisms must be determined. What microorganism indicates old fecal contamination of the soil?

a. *Clostridium perfringens*

b. *Pseudomonas aeruginosa*

c. *Salmonella enteritidis*

d. *Streptococcus faecalis*

e. *Escherichia coli*

215. In order to facilitate usage and achievement of necessary therapeutic effect, the drug or medicinal plant material is given a certain dosage form. Indicate the dosage form in the form of a free-disperse system:

a. Diaphragm

b. Jelly

c. Membrane

d. Emulsion

e. Gel

216. In the patient, a gallstone lodged in the common bile duct has blocked the flow of bile into the intestine. What digestive process will be disturbed in this case?

a. Absorption of proteins

b. Absorption of carbohydrates

c. Digestion of proteins

d. Digestion of carbohydrates

e. Digestion of fats

217. Який із нижченаведених антигіпертензивних препаратів призначається пацієнтам із бронхіальною астмою?

a. Анаприлін

b. Надолол

c. Лабеталол

d. Метопролол

e. Фармадипін

218. Hyperlipemia can be observed in 2--3 hours after eating fatty food. 9 hours later lipid content normalizes again. How can this condition be characterized?

a. Hyperplastic obesity

b. Alimentary hyperlipemia

c. Retention hyperlipemia

d. Hypertrophic obesity

e. Transport hyperlipemia