

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

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

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

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

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

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

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

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

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

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

- a. Титрування за залишком**
- b. Пряме титрування
- c. Замісникове титрування
- d. Будь-яке титрування
- e. Неводне титрування

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

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

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

- a. Метопролол**
- b. Лабеталол

- c. Фармадипін
- d. Анаприлін
- e. Надолол

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

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

10. Який збудник викликає захворювання сифіліс?

- a. Mycobacterium tuberculosis
- b. Salmonella typhi
- c. Borrelia recurrentis
- d. Corynebacterium diphtheriae

e. Treponema pallidum

11. 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. Inactivated vaccine
- b. Antitoxic serum

c. Anatoxin

- d. Adjuvant
- e. Immunoglobulin

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

- a. Juniperus galbuli
- b. Larix cones

c. Alnus infructescences

- d. Cupressus cones
- e. Platycladus orientalis cones

13. 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. Pericyclic fibers

c. Perivascular fibers

- d. Phloem fibers
- e. Xylem fibers

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

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

15. 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. Bacteria-excluding filters

- b. Autoclaving
- c. Ultraviolet irradiation
- d. Boiling
- e. Disinfectants (chloramine)

16. Який пігмент утворюється в реакції окиснення гему?

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

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

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

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

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

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

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

21. 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 H₂-histamine receptors
- b. Irreversible blockade of H^+K^+ -ATPase**
- c. Blockade of M₁-cholinergic receptors
- d. Stimulation of H^+K^+ -ATPase
- e. Blockade of H₂-histamine receptors

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

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

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

- a. Inhibition of protein synthesis in ribosomes
- b. Disruption of DNA synthesis

c. Inhibition of cytoplasmic \ membrane synthesis

d. Inhibition of cell wall synthesis

e. Inhibition of DNA gyrase

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

a. *Malus domestica*

b. *Citrus limon*

c. *Schisandra chinensis*

d. *Viburnum opulus*

e. *Sorbus aucuparia*

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

a. Cholesterol

b. Higher fatty acids

c. Glucose

d. Glucuronic acid

e. Pyruvate

26. 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. *Staphylococcus aureus*

b. Enterobacteriaceae

c. *Staphylococcus saprophyticus*

d. *Staphylococcus epidermidis*

e. *Pseudomonas aeruginosa*

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

a. Ланцюгові

b. Послідовні

c. Паралельні

d. Пов'язані

e. Фотохімічні

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

a. Iodometry

b. Permanganatometry

c. Nitritometry

d. Dichromatometry

e. Cerimetry

29. Для яких систем характерна седиментація?

a. Розчинів неелектролітів

b. Розчинів електролітів

c. Суспензій

d. Золів

e. Розчинів ВМР

30. До якого класу сполук належить Цитохром P450?

a. Гемопротейн

b. Ліпопротейн

c. Нуклеопротейн

d. Флавопротейн

e. Піридинопротеїн

31. 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. Flagella
- b. Inclusions
- c. Capsule
- d. Cilia

e. Spores

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

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

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

e. Bisacodyl

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

- a. Sodium thiosulfate solution
- b. Potassium dichromate solution
- c. Silver nitrate solution**
- d. Sodium nitrite solution
- e. Potassium permanganate solution

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

- a. H^+
- b. $\cdot NH_3$**
- c. $AlCl_3$
- d. CH_3Cl
- e. NO_2^+

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

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

- a. Metoprolol
- b. Phenyhydrazine (Nifedipine)
- c. Lisinopril**
- d. Clophelin (Clonidine)
- e. Dichlothiazide (Hydrochlorothiazide)

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

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

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

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

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

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

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

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

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

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

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

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

45. Який основний метод лабораторної діагностики ВІЛ інфекції?

- a. Імуноферментний аналіз**
- b. Радіоімунний аналіз
- c. Імунофлуоресцентний
- d. Реакція коагулінації

е. Реакція пасивної гемаглютинації

46. 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. *Mycobacteria*

c. *Spirochetes*

d. *Escherichia coli*

e. *Salmonellae*

47. 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. Circulatory

b. Anemic

c. Hypoxic

d. Tissue

e. Hemic

48. 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. Polyecious

b. Unisexual

c. Monandrous

d. Dioecious

e. Monoecious

49. 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. Cell-mediated

b. Immune complex

c. Cytotoxic

d. Anaphylactic

e. Reactive

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

a. Functional group isomers

b. Mirror (optical) isomers

c. Carbon chain isomers

d. Geometric (cis-trans) isomers

e. Tautomers

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

a. Steroid and thyroid hormones

b. Insulin and glucagon

c. Catecholamines

d. Tropic hormones

e. Oxytocin and vasopressin

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

a. Activation of central α -adrenoceptors

b. Angiotensin-receptor blockade

- c. Inhibition of phosphodiesterase
- d. Calcium channel blockade
- e. Inhibition of angiotensin-converting enzyme

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

- a. Atropine
- b. Adrenaline hydrochloride
- c. Prozerin (Neostigmine)

d. Anaprilin (Propranolol)

- e. Metoprolol

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

- a. Helmholtz energy

b. Entropy change

- c. Gibbs energy
- d. Enthalpy
- e. Intrinsic energy

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

- a. Silver, lead, nickel, potassium, barium, bismuth
- b. Magnesium, calcium, strontium, barium
- c. Calcium, strontium, barium, potassium, bismuth

d. Aluminum, zinc, chromium(II), tin(II), tin(IV), arsenic(III), arsenic(V)

- e. Sodium, potassium, ammonium, silver, lead

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

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

e. Anxiolytic

57. 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 osmotic blood pressure
- c. Increased osmotic pressure of interstitial fluid

d. Decreased oncotic blood pressure

- e. Decreased hydrostatic blood pressure

58. 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. NADH-coenzyme Q reductase

- b. Succinate dehydrogenase
- c. Cytochrome C reductase
- d. Cytochrome oxidase
- e. Adenosine triphosphate synthetase

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

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

d. Wassermann test

- e. Haddelson test

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

increases by:

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

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

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

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

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

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

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

- a. Inactivation of pathogens while preserving the antigenic structure of cells
- b. Artificial reduction of virulent properties of pathogens**
- c. Reduction of immunogenicity of the pathogen
- d. Isolation of protective antigens from microbial cells
- e. Discovering antigenic determinants of the main antigens of the pathogen

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

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

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

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

- a. Silica gel
- b. Kaolin

c. Activated charcoal

d. Bentonite

e. Starch

68. 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. Toxic

b. Nephrotic

c. Inflammatory

d. Asthenic

e. Hypertensive

69. 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. B₁₂ deficiency anemia has been diagnosed. What substance is deficient in this patient, causing the anemia?

a. Pepsin

b. Hydrochloric acid

c. Secretin

d. Castle factor

e. Renin

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

a. Ethane and chlorine in the light

b. Ethane and oxygen

c. Ethylene and chlorine

d. Ethanol and hydrogen chloride

e. Benzene and chlorine in the presence of $AlCl_3$

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

a. Hexane and cyclohexane

b. Butane and isobutane

c. Pentene-1 and pentene-2

d. Propanal and propanone

e. Benzene and methylbenzene

72. 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. Bacteriological method

b. Immunofluorescence

c. Virological method

d. Biological method

e. Immunoblotting

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

a. Salbutamol

b. Insulin

c. Vicasol (Menadione)

d. Bisacodyl

e. Oxytocin

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

a. Capsule

b. Inclusions

c. Mesosomes

- d. Flagella
- e. Spores

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

- a. HClO_4
- b. HCl
- c. CH_3COOH
- d. HNO_3
- e. H_2SO_4

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

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

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

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

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

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

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

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

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

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

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

82. Thiocyanatometric titration method requires secondary standard solution of potassium

thiocyanate that is standardized with standard solution of:

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

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

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

84. 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. Circulatory hypoxia
- c. Respiratory hypoxia
- d. Hypoxic hypoxia
- e. Hemic hypoxia**

85. 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

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

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

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

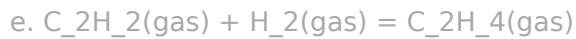
- a. Xanthoproteic test
- b. Ninhydrin test
- c. Lead acetate test
- d. Biuret test**
- e. Sodium nitroprusside test

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

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

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

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



90. 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. Thermal energy
- d. Nuclear energy
- e. Electrical energy

91. 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. Emulsion
- b. Diaphragm
- c. Membrane
- d. Gel
- e. Jelly

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

93. За яким механізмом відбувається приєднання Br_2 до пропену?

- a. S_N
- b. A_N
- c. A_E
- d. S_R
- e. S_E

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

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

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

96. 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. Digestion of carbohydrates
- b. Digestion of proteins
- c. Absorption of proteins
- d. Digestion of fats
- e. Absorption of carbohydrates

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

- a. Rifampicin
- b. Benzylpenicillin sodium
- c. Para-aminosalicylate sodium
- d. Ceftriaxone

e. Isoniazid

98. In E coli cells, the synthesis of pyrimidine nucleotides occurs according to the scheme of the metabolic pathway: $\text{CO}_2 + \text{NH}_3 + 2\text{ATP} \rightarrow \text{S}_1 \rightarrow \text{S}_2 \rightarrow \text{UTP} \rightarrow \text{CTP}$. When CTP concentration in the cell increases, the synthesis of pyrimidine nucleotides stops. What type of regulation is described here?

- a. Enzyme molecule phosphorylation
- b. Attachment of inhibitor proteins

c. Allosteric regulation

- d. Detachment of inhibitor proteins
- e. Partial proteolysis

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

a. Primary

- b. Resistant
- c. Secondary
- d. Reserve
- e. Transitory

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

a. H_2 -histamine receptors blockade

- b. Cholinergic receptors blockade in the sympathetic ganglia
- c. Inhibition of the $\text{H}^+ + \text{K}^+ \text{ ATPase}$ activity
- d. Muscarinic cholinoreceptor blockade
- e. H_1 -histamine receptors blockade

101. 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. Na^+
- b. Sr^{2+}
- c. Ba^{2+}
- d. K^+

e. Ca^{2+}

102. 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. To the cathode
- b. There will be no movement

c. To the anode

- d. First to the cathode, and then to the anode
- e. First to the anode, and then to the cathode

103. 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. Lactate
- b. Ketone bodies

c. Uric acid

- d. Bilirubin
- e. Urea

104. After the examination, the patient was diagnosed with typhus. What is the route of transmission

of this disease?

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

105. Який механізм передачі захворювання епідемічного висипного тифу?

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

106. 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. Fungi
- c. Viruses**
- d. Rickettsia
- e. Bacteria

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

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

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

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

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

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

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

- a. Atropine sulfate
- b. Calcium chloride
- c. Proserin
- d. Unithiol**
- e. Naloxone

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

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

e. Chemiluminescent indicators

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

a. Activation of microsomal oxidation in the liver

b. Inhibition of xanthine oxidase enzyme, inhibition of uric acid synthesis

c. Inhibition of COX-2 enzyme

d. Stimulation of uric acid breakdown

e. Intensification of uric acid excretion by the kidneys

113. 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. *Calendula officinalis*

b. *Echinacea purpurea*

c. *Centaurea cyanus*

d. *Artemisia absinthium*

e. *Arctium lappa*

114. 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. Dyes

b. Detergents

c. Oxidants

d. Alcohols

e. Nitrofurans

115. Від якого показника залежить коагулююча здатність електроліту?

a. Заряду іона-коагулятора

b. Ступеня дисперсності золю

c. Об'єму золю

d. Густини золю

e. Концентрації електроліту

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

a. Tetradynamous

b. Polyadelphous

c. Didynamous

d. Monadelphous

e. Diadelphous

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

a. H_2SO_4

b. $[\text{Ag}(\text{NH}_3)_2]\text{OH}$

c. NaOH

d. Br_2 (H_2O)

e. NaHCO_3

118. В яких структурах рослинних клітин накопичується вторинний крохмаль?

a. Вакуолях

b. Амілопластах

c. Протеопластах

d. Олеопластах

e. Мітохондріях

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

a. Unsaturated hydrocarbons

b. Strong oxidizing agents

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

120. Salts and esters of oxalic acid are called:

a. Oxalates

- b. Malonates
- c. Adipinates
- d. Succinates
- e. Urates

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

- a. Amperometry
- b. Electrolysis
- c. Conductometry

d. Potentiometry

- e. Polarography

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

- a. Alkalimetry
- b. Complexonometry
- c. Permanganatometry
- d. Argentometry

e. Nitritometry

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

e. Translation initiation

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

- a. Acute renal failure
- b. Renal colic

c. Uremia

- d. Nephrotic syndrome
- e. Tubulopathy

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

a. Number of Escherichia coli in 1 liter of water

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

126. 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. Amylase

c. Bilirubin

- d. Albumin
- e. Cholesterol

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

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

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

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

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

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

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

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

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

- a. Br_2
- b. FeCl_3
- c. Tollens reagent
- d. $\text{K}_4[\text{Fe}(\text{CN})_6]$
- e. NaOH

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

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

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

- a. Antimony electrode
- b. Quinhydrone electrode

c. Silver chloride electrode

d. Zinc electrode

e. Glass electrode

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

a. Parts of the rhizome

b. Plantlets

c. Germinated seeds

d. Parts of the tuber

e. Leaf cuttings

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

a. Parenteral

b. Vertical

c. Fecal-oral

d. Airborne-droplet

e. Vector-borne

137. 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. Sedimentation

c. Colloid protection

d. Thixotropy

e. Coagulation

138. 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. Improved preparation technology

b. Increased storage time

c. Protection of colloid solution against coagulation

d. Decreased side effects

e. Increased bactericidal action of silver

139. 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. Exonuclease

b. Helicase

c. Reverse transcriptase

d. DNA-ligase

e. Endonuclease

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

a. Essential hypertension

b. Addiction

c. Hypotension

d. Depression of nervous activity

e. Migraine

141. 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. Glass test tubes

c. Physiological solution

d. Rubber gloves

e. Wire inoculating loops

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

a. Etherification

b. Hydrolysis of sucrose

c. Combustion

d. Neutralization

e. Saponification

143. *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. Inflorescences

d. Grass

e. Seeds

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

a. Oxidative decarboxylation of keto acids

b. Anaerobic glycolysis

c. Urea cycle

d. Tricarboxylic acid cycle

e. Pentose-phosphate pathway

145. Яким методом здійснюють кількісне визначення вісмуту в препараті?

a. Перманганатометрії

b. Аргентометрії

c. Комплексонометрії

d. Меркуриметрії

e. Йодометрії

146. 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. Red

b. Violet

c. Yellow

d. Blue

e. Green

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

a. A

b. C

c. D

d. B₁

e. B₂

148. 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. *Arctium lappa*

b. *Chamomilla recutita*

c. *Artemisia absinthium*

d. *Calendula officinalis*

e. *Bidens tripartita*

149. 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. Biological membrane
- b. Collodion film
- c. Parchment
- d. Gelatine

e. Glass

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

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

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

152. 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. Haploid
- c. Diploid
- d. Tetraploid
- e. Triploid

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

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

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

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

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

156. 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. Functional antagonism

b. Pharmacokinetic incompatibility

- c. Synergism
- d. Pharmaceutical incompatibility
- e. Pharmacodynamic incompatibility

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

- a. Діазепам
- b. Анальгін (метамізол натрію)
- c. Кофеїн-бензоат натрію
- d. Амітриптилін

e. Аміназин (хлорпромазин)

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

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

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

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

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

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

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

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

163. У чоловіка з діагнозом: цукровий діабет виявили такі показники артеріальної крові: pH крові – 7,25, pCO₂ – 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 ацидоз

- c. Змішаний алкалоз
- d. Газовий ацидоз
- e. Газовий алкалоз

164. Який препарат належить до групи блокаторів H₂ – гістамінових рецепторів?

a. Фамотидин

- b. Алохол
- c. Альмагель
- d. Омепразол
- e. Гастроцепін

165. What drug inhibits cholesterol synthesis in the liver?

a. Parmidinum

b. Atorvastatin

- c. Colestipol
- d. Probucol
- e. Fenofibrate

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

a. 0.9% solution of MgCl₂

b. 0.85-0.90% solution of NaCl

- c. 10% solution of CaCl₂
- d. 4.5-5.0% glucose solution
- e. 10% solution of NaCl

167. 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. Lisinopril

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

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

a. Glibenclamide

b. Diclofenac sodium

- c. Loratadine
- d. Paracetamol
- e. Fentanyl

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

a. Prothrombin

- b. Gamma globulin
- c. Transferrin
- d. Ceruloplasmin
- e. Albumin

170. 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. Testosterone

b. Insulin

c. Thyroxine

- d. Cortisol
- e. Glucagon

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

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

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

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

173. Який препарат належить до групи антихолінестеразних засобів?

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

174. 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. Copper sulfate
- b. Iodine alcoholic solution**
- c. Brilliant green
- d. Methylene blue
- e. Formaldehyde solution

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

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

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

177. 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. Equisetiphyta
- c. Polypodiophyta
- d. Pinophyta
- e. Lycopodiophyta**

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

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

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

180. 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. Measles
- b. Pertussis
- c. Influenza
- d. Diphtheria**
- e. Tuberculosis

181. 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. Activity coefficient
- d. Electrical conductivity \ coefficient
- e. Selectivity coefficient**

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

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

183. 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. Pseudomonas aeruginosa
- b. Salmonella enteritidis
- c. Escherichia coli
- d. Streptococcus faecalis
- e. Clostridium perfringens**

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

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

185. 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. Anaerobic culture jar**

- b. Serum-supplemented medium
- c. Pasteur oven
- d. Krotov apparatus
- e. Oxidative medium

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

- a. Ultrafiltration
- b. Electrodialysis
- c. Decantation

d. Dialysis

- e. Compensatory dialysis

187. 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. Facultative anaerobes

c. Obligate anaerobes

- d. Macroaerophiles
- e. Microaerophiles

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

- a. Active
- b. Pathologic
- c. Physiological

d. Passive

- e. Primary

189. 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. Seed
- c. Stem

d. Root

- e. Leaf

190. 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. Gonads
- c. Adrenal glands
- d. Parathyroid glands

e. Pituitary gland

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

- a. Інсулінорезистентність жирової тканини
- b. Гіперпродукція соматотропіну

c. Аутоімунне ушкодження В-клітин

- d. Гіперпродукція глюкагону
- e. Гіперпродукція кортизолу

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

- a. Ca^{2+}
- b. K^+
- c. Co^{2+}
- d. Mn^{2+}

e. Ni^{2+}

193. How many stereoisomeric aldohexoses exist?

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

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

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

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

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

197. 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. Retention hyperlipemia
- b. Hypertrophic obesity
- c. Alimentary hyperlipemia**
- d. Hyperplastic obesity
- e. Transport hyperlipemia

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

199. Select ketose from the monosaccharides listed below:

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

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

- a. Steam distillation**
- b. Potentiometry
- c. Calorimetry

- d. Colorimetry
- e. Conductometry

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

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

202. Early-flowering rhizomatous ephemeroïds include: *Tussilago farfara*, *Convallaria majalis*, and:

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

203. 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. Redox potential of the system**
- c. Concentration of hydroxyl ions
- d. Concentration of hydrogen ions
- e. Ionic strength of the solution

204. До якого виду хроматографії відносять метод газорідинної хроматографії?

- a. Гель-хроматографії
- b. Афинної
- c. Адсорбційної
- d. Розподільної**
- e. Іоннобмінної

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

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

207. 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. Protozoa
- b. Viruses
- c. Mycoplasma**
- d. Viroids
- e. Microfungi

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

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

209. 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. Valeric acid**
- b. HCl
- c. NaOH
- d. Urea
- e. ---

210. 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. Zn(II) ions
- b. Al(III) ions
- c. As(III) ions
- d. Sn(IV) ions
- e. Cr(III) ions**

211. 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. Glucose
- c. Lactate
- d. Malate
- e. Succinate

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

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

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

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

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

of such vaccines?

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

216. 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. Vitamin B1**
- b. Vitamin B2
- c. Biotin
- d. Vitamin PP
- e. Pantothenic acid

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

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

218. Який механізм інгібіторної дії неостигміну (прозерину)?

- a. Окиснення іона заліза в активном у центрі фермента
- b. Конкуренція з ацетилхоліном за активний центр фермента**
- c. Ковалентне зв'язування з субстратом ферменту
- d. Ковалентне зв'язування поза активним центром фермента
- e. Денатурація фермента