

1. 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.  $\text{NaOH}$

c. ---

d.  $\text{HCl}$

e. Urea

2. 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. Decantation

c. Dialysis

d. Compensatory dialysis

e. Electrodialysis

3. How many stereoisomeric aldohexoses exist?

a. 8

b. 2

c. 6

d. 4

e. 16

4. Яким методом здійснюють кількісне визначення вісмуту в препараті?

a. Перманганатометрії

b. Меркуриметрії

c. Йодометрії

d. Аргентометрії

e. Комплексонометрії

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

a. Tollens reagent

b.  $\text{Br}_2$

c.  $\text{K}_4[\text{Fe}(\text{CN})_6]$

d.  $\text{FeCl}_3$

e.  $\text{NaOH}$

6. Який препарат належить до групи блокаторів  $\text{H}_2$  – гістамінових рецепторів?

a. Алохол

b. Омепразол

c. Фамотидин

d. Гастроцепін

e. Альмагель

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

a. Паралельні

b. Послідовні

c. Пов'язані

d. Фотохімічні

e. Ланцюгові

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

a. Enthalpy

b. Gibbs energy

c. Helmholtz energy

d. Entropy change

e. Intrinsic energy

9. 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 B2

d. Vitamin B1

e. Biotin

10. 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. Tetradynamous

e. Didynamous

11. 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. Lactate

b. Acetyl-CoA

c. Malate

d. Succinate

e. Glucose

12. 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<sub>12</sub> deficiency anemia has been diagnosed. What substance is deficient in this patient, causing the anemia?

a. Secretin

b. Pepsin

c. Castle factor

d. Hydrochloric acid

e. Renin

13. Для яких систем характерна седиментація?

a. Розчинів ВМР

b. Золів

c. Суспензій

d. Розчинів електролітів

e. Розчинів неелектролітів

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

a. 2--4 times

b. Temperature does not affect reaction rate

c. 10 times

d. 5 times

e. 1.5 times

15. 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. Tubular

c. Labiate

- d. Saucer-shaped
- e. Funnelform

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

17. What drug inhibits cholesterol synthesis in the liver?

- a. Atorvastatin**
- b. Probucol
- c. Parmidinum
- d. Colestipol
- e. Fenofibrate

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

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

19. 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. Immunoblotting**
- b. Virological method
- c. Immunofluorescence
- d. Bacteriological method
- e. Biological method

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

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

22. За яким механізмом відбувається приєднання Br<sub>2</sub> до пропену?

- a. A\_N
- b. S\_E
- c. A\_E**
- d. S\_N
- e. S\_R

23. 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. *Schisandra chinensis*

b. *Citrus limon*

c. *Sorbus aucuparia*

d. *Viburnum opulus*

e. *Malus domestica*

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

a.  $C_6H_6 + Cl_2$

b.  $CH_2=CH_2 + Cl_2$

c.  $CH_3CH_2OH + HCl$

d.  $CH_3-CH_3 + O_2$

e.  $C_2H_6 + Cl_2$

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

a. Надолол

b. Метопролол

c. Анаприлін

d. Лабеталол

e. Фармадипін

26. Який основний метод лабораторної діагностики ВІЛ інфекції?

a. Імуноферментний аналіз

b. Реакція пасивної гемаглютинації

c. Реакція коаглютинації

d. Радіоімунний аналіз

e. Імунофлуоресцентний

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

a. Conductometry

b. Potentiometry

c. Polarography

d. Electrolysis

e. Amperometry

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

a. Isotonic coefficient

b. Fugacity

c. Activity

d. Concentration

e. Degree of dissociation

29. 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. Monandrous

b. Dioecious

c. Polyecious

d. Monoecious

e. Unisexual

30. 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. Diphtheria

b. Tuberculosis

- c. Measles
- d. Influenza
- e. Pertussis

31. До якого класу сполук належить Цитохром P450?

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

32. Який препарат належить до групи антихолінергічних засобів?

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

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

34. 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. Acholia
- c. Arterial hypotension
- d. Cholemia
- e. Suprahepatic jaundice

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

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

36. 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. Decreased hydrostatic blood pressure
- d. Decreased oncotic blood pressure
- e. Increased osmotic pressure of interstitial fluid

37. 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. Microfungi
- d. Mycoplasma
- e. Viroids

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

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

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

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

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

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

41. 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. Anaphylactic
- c. Cell-mediated
- d. Reactive
- e. Cytotoxic**

42. В яких структурах рослинних клітин накопичується вторинний крохмаль?

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

43. Який пігмент утворюється в реакції окиснення гему?

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

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

45. 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. Magnesium, calcium, strontium, barium

- c. Sodium, potassium, ammonium, silver, lead
- d. Silver, lead, nickel, potassium, barium, bismuth
- e. Calcium, strontium, barium, potassium, bismuth

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

47. 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. To the cathode
- e. First to the cathode, and then to the anode

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

a. Cortisol

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

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

- a. Гіперпродукція соматотропіну
- b. Гіперпродукція кортизолу
- c. Інсулінорезистентність жирової тканини
- d. Гіперпродукція глюкагону

e. Аутоімунне ушкодження В-клітин

50. 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. As(III) ions
- b. Al(III) ions
- c. Sn(IV) ions
- d. Zn(II) ions

e. Cr(III) ions

51. 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. tRNA
- c. mRNA

d. DNA

e. rRNA

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

- a. Artificial passive
- b. Natural passive
- c. Natural active
- d. Artificial active

e. Innate

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

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

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

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

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

56. 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. Fecal-oral
- d. Vector-borne**
- e. Parenteral

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

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

58. 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. Increased permeability of the capillaries**
- c. Disturbed lymphatic efflux
- d. Decreased oncotic blood pressure
- e. Decreased osmotic blood pressure

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

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

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

- a. Anaerobic glycolysis**



- b. Urea cycle
- c. Tricarboxylic acid cycle
- d. Pentose-phosphate pathway
- e. Oxidative decarboxylation of keto acids

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

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

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

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

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

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

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

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

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

66. 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. Paracetamol
- c. Metamizole
- d. Celecoxib
- e. Diclofenac sodium

67. 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. Jelly
- d. Membrane
- e. Gel

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

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

69. 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 decreases permeability of cell membranes
- c. It regulates differentiation of epithelial cells
- d. It regulates water-salt exchange

e. It is a component of the mitochondrial respiratory chain

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

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

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

- a. Benzene and chlorine in the presence of  $\text{AlCl}_3$
- b. Ethane and oxygen
- c. Ethylene and chlorine

d. Ethane and chlorine in the light

e. Ethanol and hydrogen chloride

72. 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 C
- c. Phospholipase A2
- d. Phospholipase A1
- e. Phospholipase D

73. 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. Ploskirev agar
- b. Egg-yolk salt agar
- c. Endo agar
- d. Levine formulation (eosin methylene blue agar)

e. Blood agar

74. У чоловіка з діагнозом: цукровий діабет виявили такі показники артеріальної крові: pH крові – 7,25,  $\text{pCO}_2$  – 37 мм рт. ст., SB – 19,5 ммоль/л, BB – 39 ммоль/л, BE – (-7) ммоль/л, кетонові тіла крові – 1,9 ммоль/л, титраційна кислотність сечі – 50 ммоль/добу. Яке порушення кислотно-основного стану у пацієнта?

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

e. Метаболічний ацидоз

75. 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. Lead acetate test
- c. Xanthoproteic test
- d. Ninhydrin test
- e. Biuret test**

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

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

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

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

79. 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. Glass**
- c. Gelatine
- d. Collodion film
- e. Parchment

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

- a. Nuclear energy
- b. Thermal energy
- c. Electrical energy**
- d. Mechanical energy
- e. Electromagnetic energy

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

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

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

- a. Round capitulum**

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

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

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

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

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

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

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

- a. Metoprolol
- b. Atropine
- c. Prozerin (Neostigmine)
- d. Adrenaline hydrochloride
- e. Anaprilin (Propranolol)**

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

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

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

89. 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. Green
- b. Blue
- c. Red**

- d. Yellow
- e. Violet

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

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

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

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

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

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

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

- a. Roots with rhizomes**
- b. Leaves
- c. Inflorescences
- d. Seeds
- e. Grass

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

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

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

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

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

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

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

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

- a. Albumin
- b. Prothrombin**
- c. Transferrin
- d. Gamma globulin
- e. Ceruloplasmin

99. Select ketose from the monosaccharides listed below:

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

100. 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 forms strong covalent bonds with the active site of the enzyme
- c. Inhibitor has no effect on the enzyme's affinity for its substrate
- d. Inhibitor is a structural analogue of the enzyme
- e. Inhibitor is a structural analogue of the substrate**

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

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

102.  $\text{CH}_3\text{-CH}_2\text{-OH}$  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. Geometric (cis-trans) isomers
- c. Carbon chain isomers
- d. Mirror (optical) isomers
- e. Tautomers

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

104. 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. Capsule
- b. Inclusions

- c. Flagella
- d. Cilia

**e. Spores**

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

- a. Flagella
- b. Mesosomes
- c. Inclusions
- d. Spores

**e. Capsule**

106. 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. Bilirubin**

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

107. 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. Artemisia absinthium**

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

108. 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. Arginine
- c. Citrulline

**d. Carbamoyl phosphate**

e. Fumaric acid

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

110. 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. Aplastic anemia
- b. Protein-deficiency anemia

**c. Hemolytic anemia**

- d. Iron-deficiency anemia
- e. Metaplastic anemia

111. 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 thrombin**

b. Production of active thromboplastin

**c. Adhesion, aggregation, agglutination of platelets**

d. Production of fibrin monomer

e. Production of fibrin polymer

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

**a. Alnus infructescences**

b. Larix cones

c. Cupressus cones

d. Juniperus galbuli

e. Platycladus orientalis cones

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

a. Chamomilla recutita

**b. Adonis vernalis**

c. Allium cepa

d. Carum carvi

e. Thymus serpyllum

114. До якого виду хроматографії відносять метод газорідинної хроматографії?

**a. Розподільної**

b. Афінної

c. Іоннообмінної

d. Адсорбційної

e. Гель-хроматографії

115. 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 saprophyticus

b. Pseudomonas aeruginosa

**c. Staphylococcus aureus**

d. Enterobacteriaceae

e. Staphylococcus epidermidis

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

a. Amlodipine

b. Atenolol

c. Cozaar (Losartan)

d. Enalapril

**e. Hydrochlorothiazide**

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

a. Кофеїн-бензоат натрію

b. Амітриптилін

c. Діазепам

d. Анальгін (метамізол натрію)

**e. Аміназин (хлорпромазин)**

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

a. Minimum

b. Equal to saturated vapor pressure at room temperature

c. Maximum

d. Equal to saturated vapor pressure at 273 K

**e. Equal to atmospheric pressure**



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

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

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

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

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

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

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

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

124. 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. Paracetamol**
- e. Nurofen (Ibuprofen)

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

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

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

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

127. 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. *Rickettsia*
- b. *Bacteria*
- c. **Viruses**
- d. *Protozoa*
- e. *Fungi*

128. 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. Potassium permanganate solution
- c. Sodium thiosulfate solution
- d. **Silver nitrate solution**
- e. Potassium dichromate 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. **Translation initiation**
- b. Transcription termination
- c. Translation termination
- d. Replication initiation
- e. Transcription initiation

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

131. 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. **Thyroxine**
- b. Cortisol
- c. Glucagon
- d. Testosterone
- e. Insulin

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

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

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

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

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

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

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

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

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

137. 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. 0.9% solution of  $MgCl_2$
- c. 10% solution of  $CaCl_2$
- d. 4.5-5.0% glucose solution
- e. 0.85-0.90% solution of NaCl**

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

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

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

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

140. 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. Augmentin (Co-amoxiclav)
- b. Loperamide**

- c. Thiamine
- d. Mannitol
- e. Dexamethasone

141. Від якого показника залежить коагулююча здатність електроліту?

- a. Густини золю
- b. Ступеня дисперсності золю
- c. Концентрації електроліту
- d. Об'єму золю

e. Заряду іона-коагулятора

142. 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. Anaerobic culture jar

c. Oxidative medium

d. Pasteur oven

e. Serum-supplemented medium

143. 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. Solubility of hydroxides in acids

b. Good solubility of some salts

c. Solubility of hydroxides in an excess ammonia solution

d. Amphotericity of hydroxides

e. Insolubility of salts in water

144. 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. Escherichia coli

d. Salmonella enteritidis

e. Streptococcus faecalis

145. 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. Parathyroid glands

b. Pituitary gland

c. Gonads

d. Adrenal glands

e. Thyroid gland

146. 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. Glass test tubes

b. Simple nutrient medium

c. Wire inoculating loops

d. Physiological solution

e. Rubber gloves

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

a. Celanid (Lanatoside C)

b. Adoniside

c. Strophanthin K

d. Corglycon

e. Digitoxin

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

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

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

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

150. 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. Alimentary hyperlipemia
- c. Hyperplastic obesity
- d. Hypertrophic obesity
- e. Transport hyperlipemia

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

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

152. 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. Propanal and acetic acid
- d. Propanal and formic acid
- e. Acetic acid and formic acid

153. 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

154. 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. Cytochrome C reductase
- d. Adenosine triphosphate synthetase
- e. Succinate dehydrogenase

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. Calcium chloride
- c. Atropine sulfate
- d. Naloxone

e. Proserin

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

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

e. Propanal and propanone

157. 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. Lactate dehydrogenase
- b. Creatine kinase
- c. Pepsin
- d. Aldolase

e. Amylase

158. 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. Spore-formers

- b. Prototrophic
- c. Acid-fast
- d. Thermophilic
- e. Anaerobic

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

160. 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. Desorption
- c. Recuperation
- d. Cohesion

e. Adsorption

161. 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. Methylene blue
- b. Brilliant green

c. Iodine alcoholic solution

- d. Formaldehyde solution
- e. Copper sulfate

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

- a. Cerimetry
- b. Dichromatometry

c. Nitritometry

- d. Iodometry
- e. Permanganatometry

163. 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. Folic acid
- c. Cholecalciferol
- d. Nicotinic acid**
- e. Cobalamin

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

165. Який механізм інгібіторної дії неостигміну (прозерину)?

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

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

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

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

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

- a. Bentonite
- b. Kaolin
- c. Silica gel
- d. Starch
- e. Activated charcoal**

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

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

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

- a. Strong reducing agents
- b. Weak reducing agents
- c. Saturated hydrocarbons
- d. Strong oxidizing agents**

e. Unsaturated hydrocarbons

171. 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. Protein biosynthesis

b. DNA repair

c. DNA replication

d. Genetic recombination

e. RNA processing

172. Який збудник викликає захворювання сифіліс?

a. *Mycobacterium tuberculosis*

b. *Corynebacterium diphtheriae*

c. *Borrelia recurrentis*

d. *Salmonella typhi*

e. *Treponema pallidum*

173. 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. Oxidants

c. Alcohols

d. Detergents

e. Nitrofurans

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

a. White

b. Green

c. Yellow

d. Red

e. Blue

175. 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. Primary

c. Reserve

d. Secondary

e. Resistant

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

a. Silver chloride electrode

b. Glass electrode

c. Antimony electrode

d. Zinc electrode

e. Quinhydrone electrode

177. 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. Allosteric regulation

b. Attachment of inhibitor proteins

c. Detachment of inhibitor proteins

d. Partial proteolysis

e. Enzyme molecule phosphorylation

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

a. Retabolil (nandrolone)



b. Adrenaline hydrochloride (epinephrine)

c. Heparin

d. Glibenclamide

e. Prednisolone

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

a. *Helianthus annuus*

b. *Hyoscyamus niger*

c. *Inula helenium*

d. *Digitalis grandiflora*

e. *Sorbus aucuparia*

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

a. Calcination

b. Tyndallization

c. Dry heat

d. Filtration

e. Pasteurization

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

a. Novocainamide (Procainamide)

b. Castor oil

c. Atropine sulfate

d. Sodium sulfate

e. Bisacodyl

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

a. Physiological

b. Primary

c. Pathologic

d. Active

e. Passive

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

a. Basidiomycota

b. Lichenophyta

c. Zygomycota

d. Chytridiomycota

e. Ascomycota

184. 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. Leaf

b. Rhizome

c. Stem

d. Seed

e. Root

185. What cation of the third analytical group can be precipitated using the group reagent  $\text{H}_2\text{SO}_4$  only in the presence of ethanol (binds water and concentrates the solution)?

a.  $\text{Sr}^{2+}$

b.  $\text{K}^{+}$

c.  $\text{Ca}^{2+}$

d.  $\text{Ba}^{2+}$

e.  $\text{Na}^+$

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

a.  $\text{AlCl}_3$

b.  $\text{NO}_2^+$

c.  $\text{CH}_3\text{Cl}$

d.  $\text{NH}_3$

e.  $\text{H}^+$

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

a. Higher fatty acids

b. Cholesterol

c. Glucose

d. Glucuronic acid

e. Pyruvate

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

a. Inhibition of COX-2 enzyme

b. Stimulation of uric acid breakdown

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

d. Activation of microsomal oxidation in the liver

e. Intensification of uric acid excretion by the kidneys

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

a. Oxytocin

b. L-thyroxine

c. Prednisolone

d. Progesterone

e. Insulin

190. 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. Conductometry

c. Colorimetry

d. Potentiometry

e. Calorimetry

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

a. Widal test

b. Gruber test

c. Haddelson test

d. Wright test

e. Wassermann test

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

a. Number of enterococci in 1 liter of water

b. Number of pseudomonads in 1 liter of water

c. Number of Escherichia coli in 1 liter of water

d. Number of coliphages in 1 liter of water

e. Number of staphylococci in 1 liter of water

193. 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. Pinophyta

- b. Equisetiphyta
- c. Bryophyta
- d. Lycopodiophyta**
- e. Polypodiophyta

194. 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. Restrictive**
- c. Peripheral
- d. Thoracic diaphragm
- e. Central

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

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

196. 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. Tissue
- b. Hemic
- c. Anemic
- d. Circulatory**
- e. Hypoxic

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

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

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

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

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

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

- a. Complexonometry
- b. Permanganatometry
- c. Nitritometry**

- d. Alkalimetry
- e. Argentometry

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

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

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

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

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

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

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

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

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

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

207. Який механізм передачі захворювання епідемічного висипного тифу?

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

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

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

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

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

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

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

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

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

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

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

213. Salts and esters of oxalic acid are called:

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

214. 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. Endonuclease
- c. Exonuclease
- d. Reverse transcriptase**
- e. Helicase

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

- a. Mesodermis
- b. Pericycle
- c. Exodermis
- d. Endodermis**

e. Central axial cylinder

216. 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. Immune complex
- b. Autoallergic
- c. Cytotoxic
- d. Delayed-type hypersensitivity

**e. Anaphylactic**

217. 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. Tetraploid
- b. Diploid
- c. Polyploid
- d. Triploid

**e. Haploid**

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

- a. *Ledum palustre*
- b. *Arctostaphylos uva-ursi*
- c. *Chelidonium majus*

**d. *Sambucus nigra***

e. *Urtica dioica*