

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

2. 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. Digitalis grandiflora
- c. Helianthus annuus
- d. Hyoscyamus niger
- e. Sorbus aucuparia

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

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

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

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

- a. Haddelson test
- b. Gruber test
- c. Wright test
- d. Widal test
- e. Wassermann test**

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

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

7. Для яких систем характерна седиментація?

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

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

- a. Propanal and acetic acid
- b. Acetic acid and formic acid

- c. Propanol and formic acid
- d. Ethanol and formic acid

**e. Propanal and formic acid**

9. 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. Unisexual

**b. Monoecious**

- c. Polyecious
- d. Dioecious
- e. Monandrous

10. Який збудник викликає захворювання сифіліс?

**a. *Treponema pallidum***

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

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

- a. Фармадипін
- b. Лабеталол

**c. Метопролол**

- d. Надолол
- e. Анаприлін

12. 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. Decreased erythrocyte count in the blood

**c. Discrepancy between the blood supply to the tissues and the need for it**

- d. Oxygen deficiency in the circulatory system
- e. Dilation of arterioles

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

a. Butane and isobutane

**b. Propanal and propanone**

- c. Pentene-1 and pentene-2
- d. Hexane and cyclohexane
- e. Benzene and methylbenzene

14. 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. *Escherichia coli*
- c. *Mycobacteria*
- d. *Spirochetes*

**e. *Vibrio cholerae***

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

- a. Inhibition of angiotensin-converting enzyme
- b. Activation of central  $\alpha$ -adrenoceptors
- c. Calcium channel blockade

**d. Angiotensin-receptor blockade**

- e. Inhibition of phosphodiesterase

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

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

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

18. Який основний метод лабораторної діагностики ВІЛ інфекції?

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

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

20. 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. Synergism
- c. Pharmacokinetic incompatibility**
- d. Pharmaceutical incompatibility
- e. Pharmacodynamic incompatibility

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

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

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

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

- a. Ланцюгові**
- b. Фотохімічні
- c. Паралельні

- d. Послідовні
- e. Пов'язані

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

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

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

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

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

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

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

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

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

30. До якого класу сполук належить Цитохром P450?

- a. Нуклеопротейн
- b. Флавопротейн
- c. Ліпопротейн
- d. Гемопротейн**

e. Піридинопротеїн

31. 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. Adrenaline
- b. Insulin
- c. Glucagon
- d. Cortisol**
- e. Thyroxine

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

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

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

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

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

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

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

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

36. What drug inhibits cholesterol synthesis in the liver?

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

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

38. In cases of severe pancreatitis, physicians usually prescribe the drugs that help prevent

pancreatic autolysis. These drugs inhibit the following type of enzymes:

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

**e. Proteases**

39. 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. Absorption of carbohydrates

**c. Digestion of fats**

- d. Digestion of proteins
- e. Absorption of proteins

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

- a. Redox indicators
- b. Chemiluminescent indicators
- c. Metallochromic indicators

**d. pH indicators**

- e. Adsorption indicators

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

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

42. 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. Bisacodyl
- e. Atropine sulfate

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

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

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

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

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

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

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

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

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

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

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

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

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

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

51. 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. Desorption
- b. Recuperation
- c. Cohesion
- d. Adsorption
- e. Adhesion

52. Яким методом здійснюють кількісне визначення вісмуту в препараті?

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

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

- a. Primary
- b. Active
- c. Physiological

- d. Passive
- e. Pathologic

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

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

55. 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. 0.85-0.90% solution of NaCl
- c. 0.9% solution of  $MgCl_2$
- d. 4.5-5.0% glucose solution
- e. 10% solution of  $CaCl_2$

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

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

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

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

58. 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. Diphtheria
- d. Influenza
- e. Tuberculosis

59. How many stereoisomeric aldohexoses exist?

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

60. 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. Vector-borne
- e. Airborne-droplet



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

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

62. 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. Butamirate
- d. Glaucine
- e. Prenoxdiazine

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

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

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

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

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

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

66. Який механізм інгібіторної дії неостигміну (прозерину)?

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

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

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

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

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

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

71. 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 substrate
- e. Inhibitor is a structural analogue of the enzyme

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

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

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

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

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

75. Early-flowering rhizomatous ephemerals include: *Tussilago farfara*, *Convallaria majalis*, and:

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