

1. 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. Succinate
- c. Acetyl-CoA
- d. Malate
- e. Glucose

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

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

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

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

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

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

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

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

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

7. 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. NaOH
- b. ---
- c. Urea
- d. HCl
- e. Valeric acid

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

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

9. 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. Diadelphous
- c. Polyadelphous**
- d. Didynamous
- e. Monadelphous

10. 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. Colloid protection**
- c. Coagulation
- d. Sedimentation
- e. Coacervation

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

12. What drug inhibits cholesterol synthesis in the liver?

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

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

14. How many stereoisomeric aldohexoses exist?

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

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

- a. Essential hypertension**
- b. Hypotension

- c. Migraine
- d. Depression of nervous activity
- e. Addiction

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

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

17. 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 termination
- b. Replication initiation
- c. Transcription termination
- d. Transcription initiation
- e. Translation initiation**

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

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

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

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

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

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

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

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

23. Який механізм передачі захворювання епідемічного висипного тифу?

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

24. 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. Naloxone
- c. Proserin
- d. Calcium chloride
- e. Atropine sulfate

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

26. 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. Dichlothiazide (Hydrochlorothiazide)
- d. Nifedipine
- e. Furosemide

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

28. 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. Uremia**
- c. Renal colic
- d. Acute renal failure
- e. Nephrotic syndrome

29. In E. coli cells, the synthesis of pyrimidine nucleotides occurs according to the scheme of the metabolic pathway: $\text{CO}_2 + \text{NH}_3 + 2\text{ATP} \rightarrow \text{S1} \rightarrow \text{S2} \rightarrow \text{UTP} \rightarrow \text{CTP}$. When CTP concentration in the cell increases, the synthesis of pyrimidine nucleotides stops. What type of regulation is described here?

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

30. 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. Wire inoculating loops
- b. Physiological solution
- c. Glass test tubes**
- d. Rubber gloves
- e. Simple nutrient medium

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

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

32. 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. Конкуренція з ацетилхоліном за активний центр фермента**
- e. Ковалентне зв'язування з субстратом ферменту

33. 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. Blocks virus protein synthesis**
- d. Inhibits virion exit from cells
- e. Blocks virus stripping

34. Select ketose from the monosaccharides listed below:

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

35. Який препарат належить до групи антихолінестеразних засобів?

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

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

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

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

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

e. Helmholtz energy

38. 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. Parenteral
- d. Fecal-oral

e. Vector-borne

39. 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. Streptococcus faecalis
- c. Pseudomonas aeruginosa
- d. Escherichia coli
- e. Salmonella enteritidis

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

a. Papaver somniferum

b. Plantago major

- c. Convallaria majalis
- d. Mentha piperita
- e. Salvia officinalis

41. Яким методом здійснюють кількісне визначення вісмуту в препараті?

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

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

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

43. 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. Vertical transmission
- d. Fecal-oral transmission
- e. Vector-borne transmission

44. Від якого показника залежить коагулююча здатність електроліту?

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

45. 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. $\text{CH}_3 - \text{CH}_3 + \text{O}_2$
- e. $\text{CH}_3\text{CH}_2\text{OH} + \text{HCl}$

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

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

48. 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. RNA processing
- d. Protein biosynthesis
- e. DNA repair

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

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

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

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

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

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

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

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

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

54. 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

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

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

56. До якого виду хроматографії відносять метод газорідинної хроматографії?

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

57. 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. Viroids
- b. Protozoa
- c. Mycoplasma
- d. Microfungi
- e. Viruses

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

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

59. За яким механізмом відбувається приєднання Br₂ до пропену?

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

60. 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. Monoecious
- b. Polyecious
- c. Monandrous
- d. Dioecious

e. Unisexual

61. 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. Sn(IV) ions
- d. As(III) ions
- e. Cr(III) ions

62. 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. Alcohols
- d. Nitrofurans
- e. Oxidants

63. Який збудник викликає захворювання сифіліс?

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

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

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

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

66. 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