1. What method of analysis can be used by an analytical chemist to determine the aluminum content in Alumag (Maalox) drug by means of indirect titration?

A. Complexonometry
B. Dichromatometry
C. Argentometry
D. Mercurometry
E. Iodometry

2. A system is in a state of isobaric-isothermal equilibrium. What function must be used to describe the process in this case?

A. Gibbs energy
B. Helmholtz energy
C. Internal energy
D. Enthalpy
E. Entropy

3. In what plant organelles does the synthesis of secondary reserve starch take place?

A. Amyloplasts
B. Chloroplasts
C. Chromoplasts
D. Elaioplasts
E. Proteinoplasts

4. Biopotentials caused by various physiological processes are the result of the following forming at the phase interface:

A. Electrical double layer
B. Adhesive layer
C. Absorption layer
D. Diffuse layer
E. –

5. A child developed hemic hypoxia after eating vegetables that were saturated with nitrites. This medical condition was caused by accumulation of a certain substance in the body. Name this substance.

A. Methemoglobin
B. Oxyhemoglobin
C. Deoxyhemoglobin
D. Carboxyhemoglobin
E. Carbhemoglobin

6. A case of hepatitis A was registered at a school. What must be given for specific prevention to the children who were in contact with a sick classmate?

A. Immunoglobulin
B. Live vaccine
C. Inactivated vaccine
D. Interferon
E. Ribavirin

7. Gravimetry was used to analyze sodium sulfate crystalline hydrate by precipitating sulfate ions with a barium chloride solution. After its maturation, the barium sulfate precipitate must be washed using decantation. What is used as a washing liquid for this purpose?

A. Dilute solution of sulfuric acid
B. Distilled water
C. Barium chloride solution
D. Sodium sulfate solution
E. Ammonium sulfate solution

8. A woman came to a doctor with complaints of tachycardia, insomnia, weight loss, irritability, and excessive sweating. Objectively, she has goiter and slight exophthalmos. What gland is affected in this case, and what functional disorder is it?

A. Hyperthyroidism
B. Hypothyroidism
C. Hyperparathyroidism
D. Hypoparathyroidism
E. Adrenomedullary hyperfunction

9. What method is used for quantification of magnesium sulfate solution for injections?

A. Complexonometry
B. Acid-base titration
C. Cerimetry
D. Iodine monochloride titration
E. Nitritometry

10. Potentiometry is widely used in the analysis of medicinal products. What type of galvanic cell has the electromotive force that does not depend on the value of the standard electrode potential?

A. Concentration galvanic cell
B. Chemical galvanic cell
C. Galvanic cell with ion transfer
D. Galvanic cell without ion transfer
E. Reversible galvanic cell

11. What characteristic is used in titrimetric methods of analysis, when choosing the indicator?

A. Transition interval
B. Indicator constant
C. Titration jump
D. Titration index
E. Neutralization point

12. Amperometric titration is used in analysis of some pharmaceutical preparations. The amperometric titration method is based on the following:

A. Determining the equivalence point by a sharp change in the diffusion current during the titration process
B. Measuring the potential difference of the electrodes during the titration process
C. Measuring the cell voltage during the titration
D. Ion exchange between the analyte solution and cationite
E. Ion exchange between the anionite and analyte solution

13. What conditions are necessary for the formation of crystalline precipitates?

A. Slow precipitation in hot dilute solutions
B. Rapid precipitation in hot dilute solutions
C. Slow precipitation in cold dilute solutions
D. Rapid precipitation in hot concentrated solutions
E. Slow precipitation in cold concentrated solutions

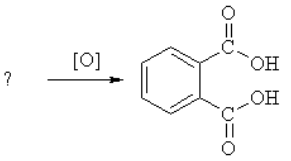
14. What substance is a unique accumulator, donor, and transformer of energy within the body?

A. Adenosine triphosphate
B. Phosphoenolpyruvate
C. Creatine phosphate
D. Acetyl-CoA
E. Succinyl-CoA

15. Microscopy of an axial organ shows that between the secondary phloem and xylem there is a layer of live, thin-walled, tightly packed, slightly elongated cells. What structure is formed by these cells?

A. Cambium
B. Procambium
C. Phellogen
D. Pericycle
E. Periderm

16. What compound produces phthalic acid during oxidation?



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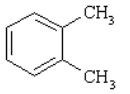

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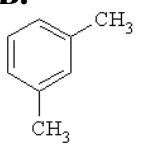

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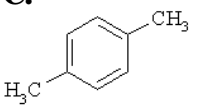

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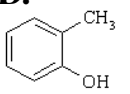

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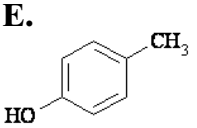


17. What method can be used to determine the moisture content in thermally unstable preparations?

A. Non-aqueous titration using the Fischer's method
B. Bromatometric method
C. Permanganatometric method
D. Nitritometric method
E. Iodometric method

18. Foams belong to the following type of dispersion system:

A. Bound dispersion systems
B. Colloidal dispersion systems
C. Iono-molecular systems
D. Hydrosols
E. Aerosols

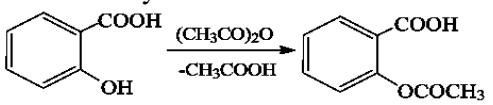
19. What optical phenomenon is most intensive in suspensions?

A. Light reflection
B. Light absorption
C. Light scattering
D. Light transmission
E. Light refraction

20. Smears prepared from the cerebrospinal fluid sediment and stained using the Gram technique are studied in diagnostics of meningitis. What finding confirms the diagnosis of meningococcal infection?

A. Gram-negative diplococci located inside leukocytes and outside of them
B. Gram-positive diplococci located inside leukocytes
C. Gram-negative coccobacteria located inside leukocytes
D. Lancet-shaped Gram-positive diplococci
E. Diplococci enclosed within a capsule

21. What drug will be produced as a result of reaction between salicylic acid and acetic anhydride?



A. Aspirin
B. Salicylamide
C. Phenyl salicylate
D. Benzyl salicylate
E. Sodium salicylate

22. Chromatographic methods can be classified by the mechanism of the separation process. What type of chromatography includes the gas-liquid chromatographic method?

A. Distribution chromatography
B. Adsorption chromatography
C. Ion exchange chromatography
D. Gel chromatography
E. Affinity chromatography

23. What fluid has the highest surface tension?

A. Water
B. Ethanol
C. Benzene
D. Acetone
E. Chloroform

24. What method of microspecimen staining is used to detect *Mycobacterium tuberculosis*?

A. Ziehl-Nielsen stain
B. Gram stain
C. Burri-Gins stain
D. Romanowsky-Giemsa stain
E. Neisser stain

25. What specific reagent is used in the qualitative analysis for Fe^{2+} cations?

A. $K_3[Fe(CN)_6]$
B. $K_2Na[Co(NO_2)_6]$
C. $NaOH$
D. $K_4[Fe(CN)_6]$
E. NH_4OH

26. A patient developed anaphylactic shock after administration of lidocaine. What antibodies cause the development of this allergic reaction?

A. IgE
B. $Ig\mathrm{A}$
C. IgD
D. $Ig\mathrm{M}$
E. IgG

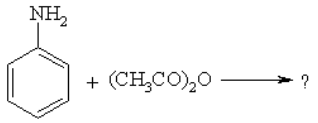
27. Thiocyanatometric method uses the secondary standard solution of potassium thiocyanate that can be standardized with the standard solution of:

A. Silver nitrate
B. Hydrochloric acid
C. Sulfuric acid
D. Iron(II) sulfate
E. Copper(II) nitrate

28. What indicator is used in the Fajans-Khodakov method, when determining sodium iodide?

A. Eosin
B. Methyl orange
C. Diphenylcarbazone
D. Potassium chromate
E. Ammonium iron(III) sulfate

29. What product is formed in the reaction between aniline and acetic anhydride:



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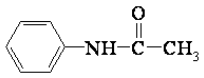

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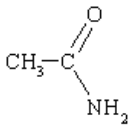

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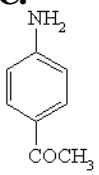

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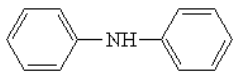

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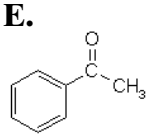

30. What compound is formed by an azo dye during its reaction with benzenediazonium chloride?

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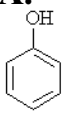

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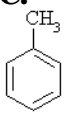

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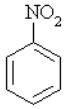

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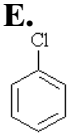


31. What method of redox titration uses specific pH indicators for fixation of the titration endpoint?

A. Bromatometry
B. Permanganatometry
C. Nitritometry
D. Cerimetry
E. Iodometry

32. A patient provisionally diagnosed with tularemia received tularine subcutaneously to confirm this diagnosis. What testing method was used by the doctor in this case?

A. Allergy testing
B. Microscopy
C. Serology
D. Biological method
E. Microbiological method

33. In systematic analysis of group IV cations, hydrogen peroxide must be added along with the group reagent. Why must this substance be added?

A. For formation of hydroxo- and oxoanions of these elements at the highest oxidation degrees
B. For formation of hydroxo- and oxoanions of these elements at the lowest oxidation degrees
C. For more complete precipitation of these cations
D. For formation of peroxide compounds of these cations
E. For destruction of hydrate complexes

34. A Gram-stained smear shows large oval violet cells that form pseudomycelium. Name these microorganisms.

A. *Candida* fungi
B. *Mucor* fungi
C. Malaria emphPlasmodium
D. *Actinomycetales*
E. *Penicillium* fungi

35. Throughout the last year, a 2-year-old child had frequent infectious diseases of a bacterial genesis with a protracted course. Study of the patient's immunogram detected hypogammaglobulinemia. What cells are most likey to be dysfunctional in this case, causing these clinical presentation and laboratory findings?

A. B lymphocytes
B. Phagocytes
C. Macrophages
D. Killer T cells
E. NK cells

36. What enzyme catalyzes the reaction of activation of amino acids and their attachment to a specific tRNA?

A. Aminoacyl-tRNA synthetase
B. Ribonuclease
C. DNA ligase
D. Nucleotidase
E. Deoxyribonuclease

37. A certain structure of the bacterial cell provides microbes with increased resistance to the environmental factors, can remain for a long time, and can be detected by staining a smear according to the Ozheshko technique. What is this structure called?

A. Spore
B. Capsule
C. Flagella
D. Plasmid
E. Pilus

38. Gluconeogenesis activates during starvation. What vitamin takes active part in the process of pyruvic acid carboxylation?

A. Biotin
B. Retinol
C. Calciferol
D. Nicotinamide
E. Folacin

39. Hormone-like substances from the group of eicosanoids can be used to stimulate labor activity during childbirth and as contraceptives. What substances have this effect?

A. Prostaglandins
B. Interleukins
C. Endorphins
D. Angiotensins
E. Enkephalins

40. A patient with myxedema was recommended substitution therapy. What hormones are used for this purpose?

A. Thyroid hormones
B. Mineralocorticoids
C. Glucocorticoids
D. Estrogens
E. Androgens

41. Liquid dosage forms that contain camphor and chloral hydrate are used in dental practice. What phases are in the state of equilibrium at the eutectic point of the melting point diagram of the camphor-chloral hydrate mixture?

A. Eutectic melt, camphor crystals, chloral hydrate crystals
B. Eutectic melt
C. Eutectic melt, camphor crystals
D. Eutectic melt, chloral hydrate crystals
E. Camphor crystals, chloral hydrate crystals

42. What swamp plant has sword-shaped leaves, spadix (ear) inflorescences with a spathe, and thick, light, and fragrant rhizomes that are pink on section and have accessory roots and well-defined scars located close to each other?

A. *Acorus calamus*
B. *Ledum palustre*
C. *Bidens tripartita*
D. *Valeriana officinalis*
E. *Sanguisorba officinalis*

43. According to the Smoluchowski theory of rapid coagulation, the coagulation process can be described using the following type of kinetic equation:

A. Second-order equation
B. Zero-order equation
C. First-order equation
D. Fractional-order equation
E. Third-order equation

44. What integumentary tissue of roots consists of cells with thin cellulose membranes and outgrowths — root hairs?

A. Rhizoderm (epiblem)
B. Periderm
C. Pleroma
D. Phelloderm
E. Periblem

45. What changes occur with the entropy of an isolated system, when it spontaneously approaches the equilibrium state?

A. Reaches its maximum
B. Reaches its minimum
C. Does not change
D. Tends to infinity
E. Decreases linearly

46. Phosphate anions and arsenate anions form similar precipitates insoluble in an ammonia solution during their reaction with:

A. Magnesia mixture (a solution containing $MgCl_2$, NH_4Cl, NH_3)
B. Sodium hydroxide solution
C. Cobalt sulfate solution
D. Lead acetate solution
E. Nessler's reagent

47. According to the Bancroft's rule, the dispersion medium of an emulsion will be the liquid, with which the emulsifier:

A. Has affinity
B. Chemically interacts
C. Forms a precipitate
D. Forms a colored compound
E. Forms an insoluble compound

48. A patient has icteric skin and high blood levels of unconjugated bilirubin. Conjugated bilirubin was not detected in the patient's urine. The patient has a significant amount of urobilin in urine and stercobilin in feces. These signs are characteristic of the following pathology:

A. Hemolytic jaundice
B. Obstructive jaundice
C. Neonatal jaundice
D. Parenchymatous jaundice
E. Atherosclerosis

49. What group of broncholytics is used for treatment of patients with bronchial asthma?

A. β_2-adrenergic agonists
B. β-adrenergic blockers
C. Muscarinic agonists
D. Nicotinic agonists
E. Anticholinesterase drugs

50. Non-aqueous acid-base titration is used for the substances that have low solubility in water and weak basic or weak acidic properties. Choose the titrant and medium for titration of substances with weak basic properties.

A. $HClO_4$ solution in anhydrous acetic acid
B. HCl solution in anhydrous acetic acid
C. $HClO$ solution in anhydrous acetic acid
D. HCl solution in dioxane
E. HCl solution in methanol

51. What is the name of the lower expanded hollow part of the pistil that contains ovules in a flower?

A. Ovary
B. Stigma
C. Style
D. Gynoecium
E. Receptacle

52. What type of gynoecium has several or many free carpels?

A. Apocarpous
B. Monocarpous
C. Cenocarpous
D. Syncarpous
E. Paracarpous

53. Name the state of colloidal particles that has zero electrokinetic potential and can be characterized by the absence of directed movement of the granules in the electric field.

A. Isoelectric
B. Electroneutral
C. Neutral
D. Neutralized
E. Compensated

54. A 54-year-old man asked a pharmacist's advice on drug prescription. He has a 4-year-long history of chronic glomerulonephritis and a 2-year-long history of persistent arterial hypertension. What substance synthesized in the kidneys has an important role in the development of arterial hypertension?

A. Renin
B. Nitric oxide
C. Aldosterone
D. Histamine
E. Catecholamines

55. What feature is characteristic of mycoplasma?

A. Have no cellular wall
B. Die in the presence of oxygen
C. Form spores
D. Do not grow on nutrient media
E. Have one flagellum

56. In hypoxia, lactic acid accumulates in the blood. Name the end product of anaerobic glycolysis.

A. Lactate
B. CO_2 and H_2O
C. Oxaloacetate
D. Malate
E. Alanine

57. Coagulation of sols under the effect of electrolytes can be determined by a general rule. Name this rule.

A. Schulze-Hardy rule
B. Arrhenius law
C. Duclos-Traube rule
D. Van't Hoff rule
E. Gibbs rule

58. Isoniazid is a drug with antitubercular activity. It is an antivitamin to a certain vitamin. Name this vitamin.

A. Nicotinic acid
B. Pantothenic acid
C. Ascorbic acid
D. Riboflavin
E. Tocopherol

59. What reaction is the common reaction for detection of arsenic(III) and arsenic(V) compounds?

A. Reaction of reduction to arsine
B. Reaction with sodium nitrate
C. Reaction with ammonium molybdate
D. Reaction with iodine
E. Reaction with potassium iodide

60. Uric acid is the end product of the metabolism of certain substances. Name these substances.

A. Purine bases
B. Triglycerides
C. Albumins
D. Globulins
E. Fatty acids

61. What thermodynamic parameter does not allow measuring its absolute value?

A. Internal energy
B. Thermal effect
C. Work
D. Heat capacity
E. Heat

62. What feature of a leaf is characteristic of *Poaceae*?

A. Leaf sheath
B. Leaf blade
C. Petiole
D. Stipules
E. Ochrea

63. Potentiometric methods of analysis are based on the use of:

A. Dependence of the electromotive force (EMF) of a galvanic cell on the concentration of the analyte
B. Dependence of the volume of the titrant on the concentration of the analyte
C. Dependence of the electric current strength on the concentration of the analyte
D. Dependence of the mass of the precipitate on the concentration of the analyte
E. Dependence of the volume of the produced gas on the concentration of the analyte

64. Because of suberization, the cell membranes do not become moistened with water, are impermeable to water and gases, and are resistant to decay. What tissue can contain suberized cells?

A. Periderm
B. Cambium
C. Epidermis
D. Phloem
E. Phelloderm

65. Nut shells, cherry pits, and wood are hard because of deposition of a certain substance in the cell membrane. What substance is it?

A. Lignin
B. Silicon dioxide
C. Chitin
D. Suberin
E. Calcium carbonate

66. A man with a headache came to a pharmacy for an advise. He was prescribed a cyclooxygenase inhibitor that is an aminophenol derivative. What drug was he prescribed?

A. Paracetamol
B. Acetylsalicylic acid
C. Diclofenac
D. Ketorolac
E. Ibuprofen

67. What NSAID can be characterized by the least harmful effect on the mucosa of the gastrointestinal tract?

A. Celecoxib
B. Diclofenac
C. Acetylsalicylic acid
D. Naproxen
E. Butadion (Phenylbutazone)

68. A 30-year-old woman complains of frequent nosebleeds. Objectively, she has skin pallor, dystrophic changes in her nails, and dry hair with split ends. Complete

blood count: erythrocytes — $2.9 \cdot 10^{12}$/L, hemoglobin — 70 g/L, color index — 0.5, serum iron — 5 mcmol/L, leukocytes — $6.0 \cdot 10^{9}$/L, annulocytes (codocytes) are present, poikilocytosis and microcytosis are observed. What type of anemia is observed in the patient?

A. Iron deficiency anemia
B. Sickle cell anaemia
C. B_{12} and folic acid deficiency anemia
D. Hemolytic anemia
E. Minkowski–Chauffard syndrome

69. Biological fluids (sera, enzyme solutions, vitamins, etc.) cannot withstand high temperatures, which is why their sterilization must be carried out at the temperature of 56–58^oC and be performed 5–6 times with a 24-hour interval. What method of sterilization is it?

A. Tyndallization
B. Pasteurization
C. Autoclaving
D. Flame sterilization
E. Moist heat sterilization

70. Enzymes accelerate biochemical reactions, making them occur more than 10^8 times faster. What equation describes the rate of enzyme catalysis?

A. Michaelis-Menten equation
B. Van't Hoff equation
C. Arrhenius equation
D. Law of mass action
E. Van't Hoff reaction isotherm

71. Duodenal administration of a certain drug causes reflex contraction of the gallbladder and relaxation of the Oddi's sphincter. Depending on its route of administration it can have sedative, anticonvulsant, antispasmodic, and laxative effect. Name this drug.

A. Magnesium sulfate
B. Gidazepam
C. Cholosas
D. Ursofalk (ursodeoxycholic acid)
E. Atropine sulfate

72. Allopurinol is used to reduce the formation of uric acid in the treatment of gout. What enzyme does this compound inhibit?

A. Xanthine oxidase
B. Lactate dehydrogenase
C. Catalase
D. Arginase
E. Amylase

73. What groups of antibiotics can be classified as β-lactam antibiotics?

A. Penicillins, cephalosporins, monobactams, carbapenems
B. Cephalosporins, monobactams, aminoglycosides
C. Penicillins, cephalosporins, macrolides, carbapenems
D. Penicillins, cephalosporins, tetracyclines
E. Cephalosporins, macrolides, aminoglycosides

74. An analytical chemist conducts qualitative analysis of phosphate ions, using a pharmacopoeial reaction that produced a yellow precipitate as a result. What reagent was used by the chemist in this case?

A. Silver nitrate
B. Sodium nitrate
C. Potassium chloride
D. Potassium nitrate
E. Hydrochloric acid

75. A colloidal system can be purified using filtration under excess pressure through a semipermeable membrane. Name this purification method.

A. Ultrafiltration
B. Filtration
C. Dialysis
D. Diffusion
E. Electrodialysis

76. What indicator is used in determination of primary aromatic amines using the nitritometric method?

A. Tropeolin 00
B. Methyl orange
C. Phenolphthalein
D. Potassium chromate
E. Eosin

77. A laboratory has received a sample of copper(II) sulfate pentahydrate. Choose the method for quantification of copper(II) in copper sulfate.

A. Iodometry
B. Alkalimetry
C. Permanganatometry
D. Acidimetry
E. Argentometry

78. Tissue respiration is accompanied by formation of carbon dioxide and water. What component of the mitochondrial respiratory chain ensures the reduction of oxygen and formation of water?

A. Cytochrome oxidase
B. Ubiquinone
C. Cytochrome C
D. ATP / ADP translocase
E. Acylcarnitine transferase

79. The synthesis of thyroid hormones is carried out from tyrosine within a special protein of the thyroid gland. Name this protein.

A. Thyroglobulin
B. Albumin
C. Histone
D. Interferon
E. Immunoglobulin

80. The study of home-made canned vegetables revealed growth of microorganisms with the shape that resembled a tennis racket after inoculation on the Kitt-Tarozzi medium. What disease can be caused by these pathogens?

A. Botulism
B. Salmonellosis
C. Escherichiosis
D. Shigellosis
E. Cholera

81. High-molecular substances can be isolated from the solution using electrolytes. Name this process.

A. Salting out
B. Swelling
C. Sedimentation
D. Aggregation
E. Coagulation

82. A patient presents with intestinal obstruction and a decrease in the bactericidal effect of gastric juice, which contributes to the growth of putrefactive microflora. In this case, increased excretion of a certain substance can be observed in urine. Name this substance.

A. Indican
B. Glucose
C. Protein
D. Lactic acid
E. Creatine

83. Some leaf cells have lignified membranes. Name these cells.

A. Sclereids
B. Collenchyma
C. Sieve tubes
D. Trichomes
E. Companion cells

84. What hormone can cause hypernatremia and hypokalemia, if its secretion becomes increased?

A. Aldosterone
B. Adrenaline
C. Glucagon
D. Parathormone
E. Atrial natriuretic hormone (peptide)

85. What drug must be prescribed to treat a patient with malaria?

A. Chingamine (Chloroquine)
B. Ceftriaxone
C. Sulfamethoxazole
D. Tetracycline
E. Chloramine

86. A 30-year-old patient has been hospitalized with complaints of increased body temperature, jaundice, and hemorrhagic rash on the skin and mucosa. A few days later, the patient developed acute renal failure. Microscopy of smears stained using the Romanowsky-Giemsa technique revealed twisting bacteria with secondary coils shaped like letters S and C. What bacteria are the most likely cause of the patient's disease?

A. Leptospira
B. Treponema
C. Bordetella
D. Borrelia
E. Salmonella

87. Cytochrome oxidase enzyme blockade occurred in a patient as a result of cyanide poisoning. What type of hypoxia develops in such cases?

A. Tissue hypoxia
B. Hemic hypoxia
C. Circulatory hypoxia
D. Respiratory hypoxia
E. Stagnant hypoxia

88. What drug selectively suppresses the secretion of the gastric glands by blocking H_2-histamine receptors?

A. Famotidine
B. Omeprazole
C. Loratadine
D. Ipratropium bromide
E. Atropine sulfate

89. What forms of erythrocytes will be observed in a case of B_{12} deficiency anemia?

A. Megalocytes
B. Annulocytes (Codocytes)
C. Microcytes
D. Normocytes
E. Ovalocytes

90. What inflammatory mediator contributes to an increase in body temperature?

A. Interleukin-1
B. Histamine
C. Serotonin
D. Thromboxane
E. Bradykinin

91. In the postoperative period, the patient was receiving an antibiotic. Over time, the patient started complaining of impaired hearing and vestibular disorders. What group of antibiotics has such side effects?

A. Aminoglycosides
B. Penicillins
C. Tetracyclines
D. Macrolides
E. Cephalosporins

92. Against the background of treatment with antihypertensive drugs, a woman developed a dry cough. What drugs have caused this side effect?

A. ACE inhibitors
B. Diuretics
C. Ganglioblockers
D. α-blockers
E. Calcium channel blockers

93. How is the radial type of leaf blade different from the dorsiventral type?

A. It has hypodermis
B. It has stomata
C. It has trichomes
D. It has a vascular bundle
E. It has spongy parenchyma

94. A patient has pulmonary edema. What drug must be prescribed in this case to reduce the volume of circulating blood?

A. Furosemide
B. Magnesium sulfate
C. Nitroglycerin
D. Metoprolol
E. Aminazine (Chlorpromazine)

95. Helmholtz energy is a direction criterion of a spontaneous process at the constant:

A. Temperature and volume
B. Temperature and pressure
C. Entropy and volume
D. Internal energy and volume
E. Entropy and pressure

96. During the microbiological diagnostics of syphilis, it became necessary to study the nature and degree of mobility of the causative agent. What type of microscopy is used for this purpose at a bacteriological laboratory?

A. Dark-field microscopy
B. Light-field microscopy
C. Fluorescent microscopy
D. Electron microscopy
E. X-ray microscopy

97. Select a nucleophile among the listed particles and molecules.

A. $\ddot{N}H_3$
B. CH_3Cl
C. NO_2^+
D. H^+
E. $AlCl_3$

98. What is the mechanism of Br_2 attaching to propene?

A. $\mathrm{A_E}$
B. S_E
C. S_R
D. A_N
E. S_N

99. An HIV-infected patient presents with suppression of the immune system activity. What cells are affected in this case, causing the state of immunodeficiency in the patient?

A. Helper T cells
B. Suppressor T cells
C. Macrophages
D. B lymphocytes
E. Killer T cells

100. Albinism can be characterized by disturbed metabolism of a certain amino acid. Name this amino acid.

A. Phenylalanine
B. Glutamine
C. Histidine
D. Methionine
E. Tryptophan

101. Friedel-Crafts alkylation takes place in the presence of catalysts — Lewis acids.

What compounds are included in the list of Lewis acids?

A. $AlCl_3$, $FeBr_3$
B. KOH, CaO
C. H_2SO_4, HNO_3
D. H_2O, H_2O_2
E. $KMnO_4$, $Na_2S_2O_3$

102. A patient has been diagnosed with ischemic heart disease with high cholesterol levels. What drug should be included into the patient's treatment regimen?

A. Atorvastatin
B. Hydrochlorothiazide
C. Diclofenac sodium
D. Celecoxib
E. Fentanyl

103. What nutrient medium is used for obtaining a fungal culture?

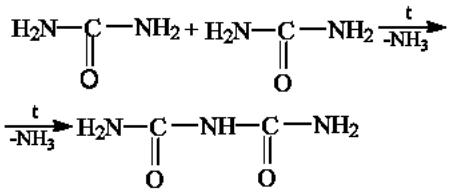
A. Sabouraud medium
B. Endo medium
C. Ploskirev medium
D. Kitt-Tarozzi medium
E. Casein-carbon agar

104. What vitamin supplement is typically prescribed along with folic acid in cases of hyperchromic anemia?

A. Cyanocobalamin
B. Fercoven
C. Thiamine
D. Pyridoxine
E. Retinol

105. Select the biuret formation scheme among the reactions given below.

A.



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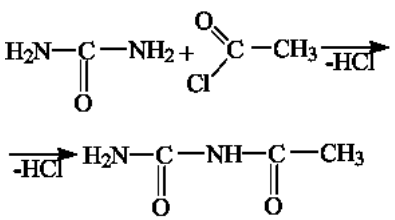

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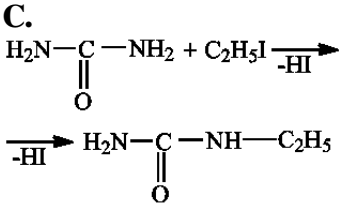

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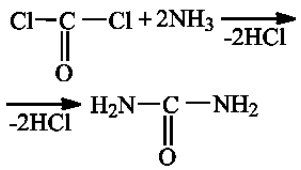

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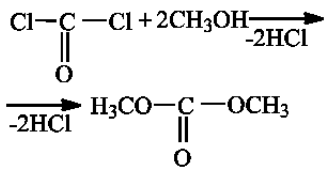
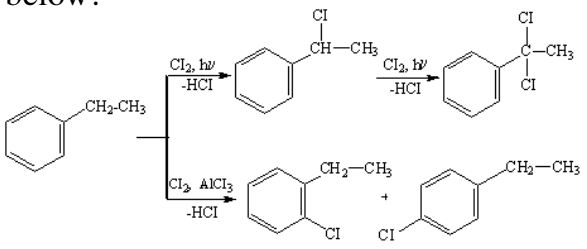


106. At what stage does the esterification reaction occur in the scheme of transformations given below?

A. 3
B. 1
C. 2
D. 4
E. 5

107. What reaction products are formed using the mechanism of radical substitution in the scheme of transformations given

below?



A. 1-Phenyl-1-chloroethane, 1-phenyl-1,1-dichloroethane
B. Ortho-chloroethylbenzene, para-chloroethylbenzene
C. Ortho-chloroethylbenzene, meta-chloroethylbenzene
D. Benzyl chloride, benzylidene chloride
E. 1-Phenyl-1-chloropropane, 1-phenyl-1,1-dichloropropane

108. During absolute starvation, the body uses endogenous water. What substance is the source of endogenous water in the human body?

A. Fats
B. Proteins
C. Glycogen
D. Proteoglycans
E. Cellulose

109. What component of a plant cell determines the water content in the plant's internal environment, regulates water-salt metabolism, maintains turgor, and accumulates substances?

A. Vacuoles
B. Endoplasmic reticulum
C. Golgi complex
D. Mitochondria
E. Chloroplasts

110. For a humoral immune response to form, a number of cells of the immune system must interact with the antigen. What cells are the first to encounter the antigen?

A. Macrophages
B. Helper T cells
C. B lymphocytes
D. NK cells
E. Suppressor T cells

111. Microscopy of the patient's vaginal smear detected trichomonads. What antimicrobial drug must be prescribed for treatment in this case?

A. Metronidazole
B. Clotrimazole
C. Ethambutol
D. Biseptol (Co-trimoxazole)
E. Fluconazole

112. In recent decades, the etiological role of viruses in the occurrence of cervical cancer has been proven. Name these viruses.

A. Human papillomaviruses
B. Herpes simplex virus type 2
C. HTLV-1 and HTLV-2
D. Cytomegalovirus
E. Adenoviruses

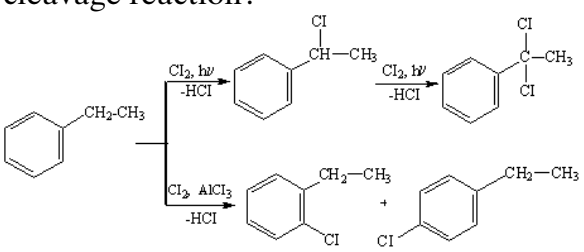
113. A pregnant woman develops leg edemas in the evening. In the morning, the edemas disappear. What pathogenetic factor contributes to the development of edema in this case?

A. Increase of hydrostatic blood pressure
B. Decrease of hydrostatic blood pressure
C. Increase of oncotic blood pressure
D. Decrease of oncotic blood pressure
E. Hyperglycemia

114. Alkaptonuria is caused by a hereditary disorder of the metabolism of a certain amino acid. Name this amino acid.

A. Tyrosine
B. Alanine
C. Tryptophan
D. Phenol
E. Arginine

115. What rule is observed during the cleavage reaction?



A. Zaitsev's rule
B. Popov's rule
C. Markovnikov's rule
D. Eltekov's rule
E. Menshutkin's rule

116. Amino acids can participate in a large number of metabolic processes. What amino acid functions as a donor of methyl groups ($-CH_3$)?

A. Methionine
B. Tryptophan
C. Leucine
D. Isoleucine
E. Valine

117. What drug can be classified as an angiotensin-converting enzyme blocker based on its mechanism of action?

A. Lisinopril
B. Valsartan
C. Furosemide
D. Verapamil
E. Benzohexonium

118. Polarimetry is used to determine the compounds that contain an asymmetric carbon atom. What compound can be determined, using this method?

A. Glucose
B. Sodium chloride
C. Calcium nitrate
D. Copper(II) sulfate
E. Potassium iodide

119. A patient with a cranial trauma has regularly recurring epileptiform seizures. In this case, disturbed metabolism of a certain biogenic amine can be observed. Name this biogenic amine.

A. GABA
B. Putrescine
C. Adrenaline
D. Cadaverine
E. Indole

120. What substance is deposited in the proteoplasts of seed cells of higher plants in the form of crystals and simple and complex aleurone grains?

A. Protein
B. Starch
C. Inulin
D. Glycogen
E. Fatty oil

121. What broad-spectrum antibiotic is contraindicated for children under 14 years of age because it disrupts the formation of the skeleton?

A. Doxycycline
B. Ampicillin
C. Azithromycin
D. Ceftriaxone
E. Acyclovir

122. Antidepressants can increase catecholamine levels in the synaptic cleft. What is the mechanism of action of these drugs?

A. Monoamine oxidase inhibition
B. Aminotransferase activation
C. Xanthine oxidase inhibition
D. Decarboxylase activation
E. Aminotransferase inhibition

123. A woman with chronic heart failure developed an edematous syndrome. Increased aldosterone levels were detected in her blood. What drug must be prescribed in this case?

A. Spironolactone
B. Ketamine
C. Aceclidine
D. Metoprolol
E. Proserine (Neostigmine)

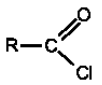
124. What is the generative reproductive organ of gymnosperms and angiosperms?

A. Seed
B. Flower
C. Macro- and microspores
D. Fruit
E. Strobilus

125. What unstratified (or, less often, stratified) tissue in plant stems, roots, and needles has a protective integumentary function and a water-storing function?

A. Hypodermis
B. Epidermis
C. Epiblem
D. Periderm
E. Exodermis

126. Select the most active acylating reagent from the list.

A.


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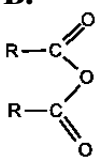

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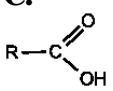

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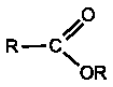
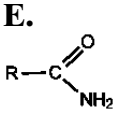


E.


127. What reaction can be used to distinguish propyne from propene?

A. Formation of acetylenides
B. Decoloration of $KMnO_4$ solution
C. Decoloration of bromine water solution
D. Polymerization
E. Wurtz's reaction

128. Phosphorylation reactions in the cell are catalyzed by enzymes that have the trivial name of "kinases". What class of enzymes do they belong to?

A. Transferases
B. Oxidoreductases
C. Lyases
D. Ligases
E. Isomerases

129. A diagnostic features of which family is the presence of giants or a flower tube?

A. Rose
B. Solanaceae
C. Celery
D. Heather
E. Beech trees

130. Enzyme activity is measured to diagnose diseases of the pancreas. What enzyme must be used in acute pancreatitis?

A. Amylase
B. Deoxyribonuclease
C. Ribonuclease
D. Aldolase
E. Alanine aminotransferase

131. What local anesthetic is used to treat ventricular arrhythmia?

A. Lidocaine hydrochloride
B. Anesthesin (Benzocaine)
C. Bupivacaine
D. Ultracaine
E. Ropivacaine

132. A patient has thyrotoxicosis. What drug should be prescribed to this patient to suppress the synthesis of thyroid hormones?

A. Mercazolil (Thiamazole)
B. L-thyroxine
C. Antistrumin (Potassium iodide)
D. Thyroidin
E. Parathyroidin

133. Treatment of withdrawal syndrome in cases of morphine discontinuation requires the use of a drug that is an opiate receptor antagonist. Select this drug from the list.

A. Naloxone hydrochloride
B. Ketorolac
C. Omnopon
D. Codeine phosphate
E. Riboflavin

134. A patient has been hospitalized into the infectious diseases department of a regional hospital with the provisional diagnosis of typhoid fever. What serological reaction must be carried out to confirm the diagnosis?

A. Widal test
B. Wright reaction
C. Huddleson reaction
D. Wassermann reaction
E. Elek test

135. Which one of the listed drugs can be used to treat candidiasis?

A. Nystatin
B. Ceftriaxone
C. Doxycycline
D. Azithromycin
E. Clindamycin

136. A doctor prescribed nitrazepam to a patient complaining of insomnia. This drug has a hypnotic effect, because it

interacts with certain receptors. Name these receptors.

A. Benzodiazepine receptors
B. Adrenoceptors
C. Cholinergic receptors
D. Histamine receptors
E. Serotonin receptors

137. A woman with candidomycosis was prescribed a drug that is used in cases of fungal pathology of any localization and can cause diarrhea and toxic liver damage. What drug did the doctor prescribe in this case?

A. Fluconazole
B. Amoxicillin
C. Chingamine (Chloroquine)
D. Bicillin-5
E. Mebendazole

138. Examination of a patient detects excessive growth of bones and soft tissues of the face, enlarged tongue and internal organs, and widened interdental spaces. The patient's condition could have been caused by increased secretion of a certain hormone. Name this hormone.

A. Somatotropin
B. Adrenaline
C. Thyroxine
D. Prolactin
E. Vasopressin

139. After acute nitrite poisoning, the patient was diagnosed with acquired toxic hemolytic anemia. A large amount of regenerative forms of erythrocytes were detected in the patient's blood smear. Name these cells.

A. Reticulocytes
B. Annulocytes (Codocytes)
C. Microcytes
D. Schistocytes
E. Drepanocytes

140. Blood test of a patient, who had been taking non-steroidal anti-inflammatory drugs for a long time, detected a sharp decrease in the amount of neutrophilic granulocytes, basophils, and eosinophils against the background of leukopenia. What pathological condition has developed in the patient?

A. Agranulocytosis
B. Aleukia
C. Leukocytosis
D. Anemia
E. Leukemia

141. A patient with neuritis takes diazepam. To relieve joint pain, he was prescribed an analgesic in a dose lower than the average therapeutic dose. What phenomenon did the doctor take into account when reducing the dose of the analgesic?

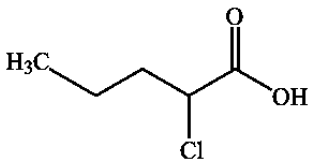
A. Potentiation
B. Summation
C. Material cumulation
D. Drug addiction
E. Tolerance

142. Bacterioscopy of smears stained according to the Romanowsky-Giemsa technique revealed violet cocci-like microorganisms in the cytoplasm of epithelial cells. What pathogen can be characterized by its intracellular location?

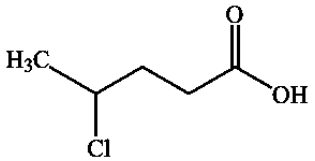
A. Chlamydia
B. Staphylococci
C. Salmonella
D. Shigella
E. Streptococci

143. What compound exhibits the strongest acidic properties?

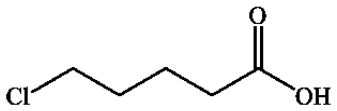
A.



B.



C.



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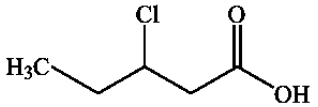
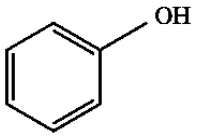
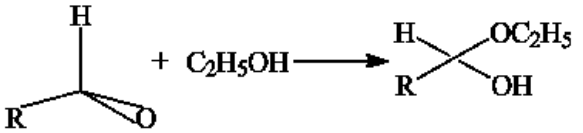


E.

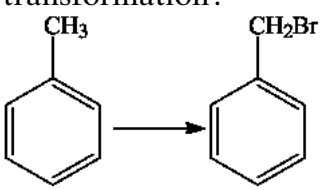


144. What is the mechanism of the reaction given below?



A. Nucleophilic addition
B. Electrophilic substitution
C. Nucleophilic substitution
D. Elimination
E. Free radical substitution

145. What reaction is used to transform toluene into bromomethylbenzene and what is the mechanism of this transformation?

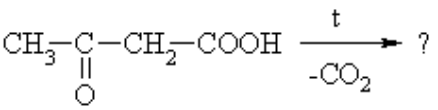


A. Reaction with bromine, SR (radical substitution)
B. HBr with ultraviolet irradiation, SR (radical substitution)
C. Br_2 in the presence of Fe, SR (radical substitution)
D. Br_2 in the presence of Fe, SE (electrophilic substitution)
E. Br_2 in the presence of $FeBr_3$, SE (electrophilic substitution)

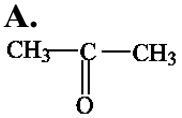
146. What reaction is used to obtain butane $CH_3 - CH_2 - CH_2 - CH_3$ from chloroethane $CH_3 - CH_2 - Cl$?

A. Wurtz reaction
B. Kucherov reaction
C. Konovalov reaction
D. Zinin reaction
E. Finkelstein reaction

147. What does β-oxobutyric acid transform into in the process of decarboxylation:



A.



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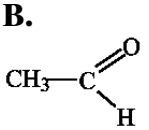

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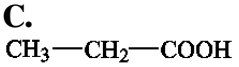

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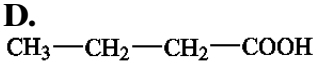
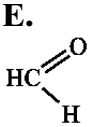
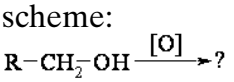
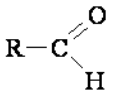


E.



148. Name the compounds that form in the process of oxidation of primary alcohols according to the following scheme:



A.


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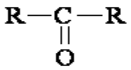

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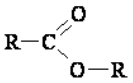
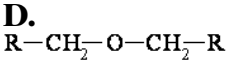
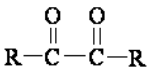
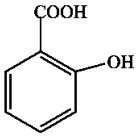


D.


E.


149. Specify the main position that is involved in the reaction of salicylic acid nitration.


A. 5
B. 2
C. 4
D. 6
E. 3 and 6

150. Which one of the listed compounds is a complex ether (ester)?

A. CH_3COOCH_3
B. C_2H_5OH
C. $CH_3 - O - CH_3$
D. $CH_3 - O - C_2H_5$
E. $C_{15}H_{31}COOH$