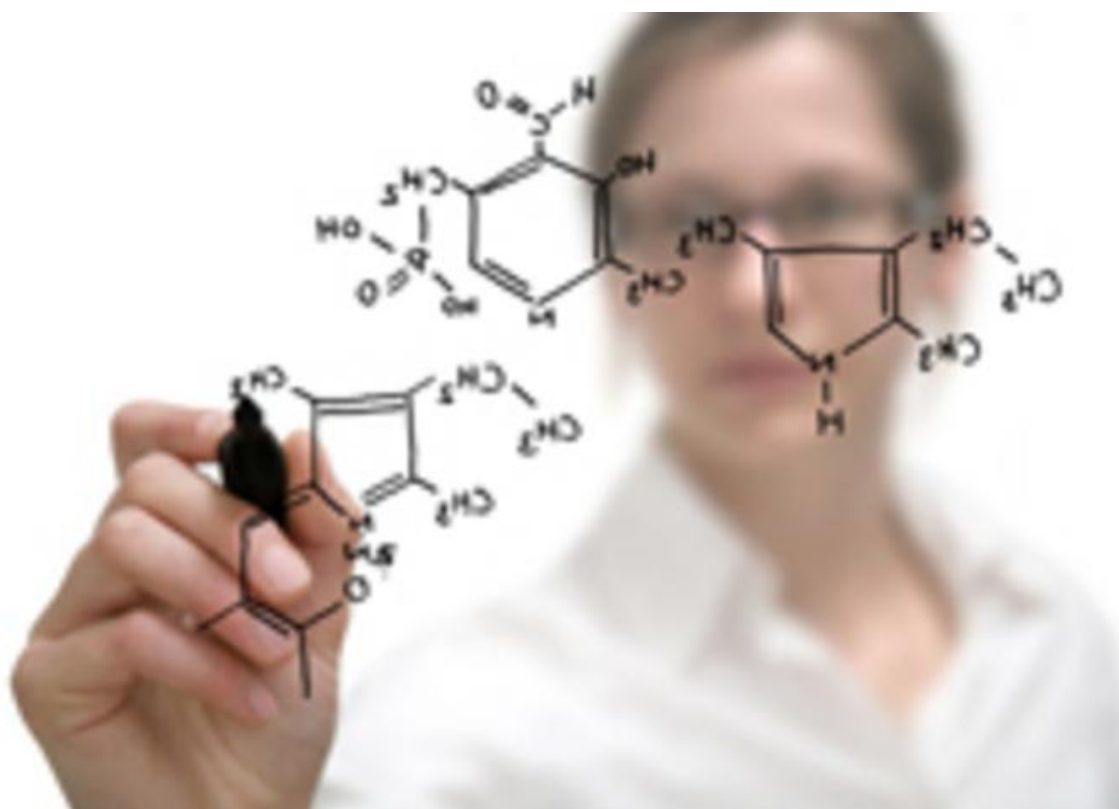


**Vinnytsia National Pirogov Memorial Medical University**  
Biological and General Chemistry Department  
Bioorganic chemistry course

**Test questions for preparation to module 3 from bioorganic chemistry**  
**“Biological importance of classes of bioorganic compounds.**  
**Bio-polymers and them structural components”**



A work sheet and methodical developments (Methodical of recommendation for practical classes from Bioorganic chemistry for 1-st year foreign students) are made by the employees of department of biological and general chemistry of VNMMU Pirogov in accordance with a curriculum, worked out on principles of the European credit-transfer system (ECTS) for higher medical establishments of Ukraine III - IV levels of accreditation for specialities of "Medical Affairs" direction of the preparation "Medicine" is in accordance with education qualification descriptions (EQD) and scientific professional programs (SPP) of the preparation of specialists, approved by an order MES Ukraine from 16.04.03 № 239.

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**BASES OF REACTIONARY ABILITY OF ORGANIC COMPOUNDS**

1. An atom of carbon in organic compounds is:
  - a) always quadrivalent;
  - b) trivalent;
  - c) bivalent.
2. An atom of carbon in organic compounds can be in the state of:
  - a)  $sp^3$ ,  $sp^2$ ,  $sp$  – hybridization;
  - b)  $sp^3$ ,  $sp^2$ ,  $sp$  – hybridization;
  - c)  $sp^2$ ,  $sd^3$ ,  $sp$  – hybridization.
3. What kind of alkane hybridization is present in a carbon atom
  - a)  $sp^2$
  - b)  $sp$ ,
  - c)  $sp^3$ .
4.  $Sp^3$  – hybrid orbitals are directed under a corner:
  - a)  $109^{\circ}28'$ ,
  - b)  $120^{\circ}$ ,
  - c)  $180^{\circ}$ .
5.  $sp^3$  – hybrid orbitals stipulate:
  - a) there is a location of molecule in plan;
  - b) there is a special configuration;
  - c) there is a linear configuration.
6. In alkene hybridization of atom of carbon is:
  - a)  $sp^3$ ,
  - b)  $sp$ ,
  - c)  $sp^2$ .
7.  $sp^2$  – hybrid orbitals are directed under a corner:
  - a)  $109^{\circ}28'$ ,
  - b)  $120^{\circ}$ ,
  - c)  $180^{\circ}$ .
8.  $sp^2$  – hybrid orbitals stipulate:
  - a) there is a location of molecule in plan;
  - b) there is a special configuration;
  - c) there is a linear configuration.
9. In alkynes hybridization of carbon atom:
  - a)  $sp^3$ ,
  - b)  $sp$ ,
  - c)  $sp^2$ .
10.  $sp$  – hybrid orbitals are directed under a corner:
  - a)  $109^{\circ}28'$ ,
  - b)  $120^{\circ}$ ,
  - c)  $180^{\circ}$ .

11. sp – hybrid orbitals stipulate:
  - a) there is a location of molecule in plan;
  - b) there is a special configuration;
  - c) there is a linear configuration.
  
12. Isomers are matters which have identical high-quality and quantitative composition, but different properties as a result of:
  - a) different structure;
  - b) different molar mass;
  - c) different concentration.
  
13. Cis – trans – an isomeric is conditioned by the different location of atomic groups relatively:
  - a) double connection;
  - b) triple connection;
  - c) simple connection.
  
14. By a classic example cis-trans isomerism are:
  - a) malic – succinic acids;
  - b) methylsuccinic(pyruvic) – milk acids;
  - c) fumaric – maleic acids.
  
15. Such configuration of vitamin A take part in the process of sight:
  - a) cis-;
  - b) D - ;
  - c) trans - .
  
16. Enantiomerism is the type of isomerization, conditioned by ability of matters to revolve:
  - a) light ray;
  - b) plan of polarization;
  - c) plan of symmetry.
  
17. To revolve ability of matters plan of polarization named:
  - a) by electric activity;
  - b) by osmotic activity.
  - c) by optical activity.
  
18. Chiral center is an atom of carbon, which is bonded by:
  - a) four different deputies;
  - b) three different deputies;
  - c) two different deputies.
  
19. Chiral is ability of matters to exist in a kind:
  - a) symmetric molecules;
  - b) two incompatible mirror reflections;
  - c) two compatible mirror reflections.
  
20. Enantiomers are isomers, which behave with each other as:
  - a) an object and trans is an isomer;
  - b) object and cis is a reflection.
  - c) object and his mirror

21. The formulas of enantiomers should be written down in a projection of:
- Fisher;
  - N'yumen;
  - Tolens.
22. Optical isomers are enantiomers which revolve:
- plan of molecule in different sides;
  - plan of polarization in a different side, but in an identical corner;
  - plan of polarization in a different corner.
23. Relative configuration of enantiomers is reflected:
- N- and M-;
  - R- and P-;
  - D- and L-.
24. Absolute configuration of enantiomers is reflected:
- «+» and «-»;
  - «±» and «≠»;
  - «<» and «>».
25. Diastereomeri are isomers that:
- behave with each other as an object and image is an isomer;
  - behave with each other as an object and is a reflection.
  - does not behave with each other as an object and mirror reflection.
26. Optical isomers is:
- D- and L-.milk acid;
  - fumaric – maleic acids;
  - methylsuccinic (pyruvic) – milk acids.
27. In the human organism optical isomer is:
- ascorbic acid;
  - an antigen is an antibody;
  - methylsuccinic (pyruvic) and L is succinic acid;
28. A conformation isomeric is a type of isomerization, which is conditioned ability of atoms revolved relatively:
- double connection;
  - carbon-hydrogen  $\sigma$  – bond;
  - carbon-carbon  $\sigma$  – bond.
29. Isomers which appear as a result of rotation of atomic groups relatively carbon-carbon  $\sigma$  – Bonds are called:
- conformers;
  - enantiomers;
  - diastereomers.
30. Conformers should be written down in a projection of:
- Fisher;
  - N'yumen;
  - Trommer.

31. If atoms in a molecule are located on minimum distance one from each other, such conformation is called:

- a) put on the brakes;
- b) optical;
- c) shaded.

32. If atoms in a molecule are located on maximal distance from each other, such conformation is called:

- a) put on the brakes;
- b) optical;
- c) shaded.

33. Surplus of energy is in the system, which is predefined shaded conformation, is called:

- a) by brakes tension;
- b) by torsionic tension;
- c) by internal tension.

34. Surplus of energy is in the system, which is predefined deviation of corner from a normal size is called:

- a) by brakes tension;
- b) by torsionic tension;
- c) by an angular tension.

35. It is arisen up in the molecule of cyclopropane:

- a) angular tension;
- b) torsionic tension;
- c) optical tension.

36. In the molecule of cyclopropane there is an angular tension as a result of size of corner between  $\sigma$  – bond:

- a)  $109^{\circ}28'$ ,
- b)  $60^{\circ}$ ,
- c)  $180^{\circ}$ .

37. In the molecule of hexamethylene there is an angular tension as a result of size of corner between  $\sigma$  – bond:

- a)  $109^{\circ}28'$ ,
- b)  $60^{\circ}$ ,
- c)  $120^{\circ}$ .

38. Cyclohexane a kernel acquires two conformations in space:

- a) bath and arm-chair;
- b) R- and P-;
- c) D- and L-.

39. By volume deputies in conformation armchairs are disposed:

- a) axial;
- b) equatorial;
- c) parallel.

40. Biologically active connections on the basis of cyclohexane kernel – is:

- a) acetophene;

- b) vitamin of A;
  - c) camphor, morphinum.
41. Biologically active connections on the basis of cyclohexane a kernel – is:
- a) mentholum, terpin hydrate;
  - b) vitamin C;
  - c) suckling acid.
42. An electronic effect is displacement of electronic closeness to:
- a) strongly electronegative atom;
  - b) less electronegative atom;
  - c) electronegative group.
43. An inductive electronic effect is displacement of electronic closeness to more electronegative atom:
- a) for  $\pi$  – bond;
  - b) for  $\sigma$  – bond;
  - c) for  $\rho$  – bond.
44. Displacement of electronic closeness to the strongly electronegative atom for  $\sigma$  – bond is called connection:
- a) by a mesomeric effect;
  - b) by an osmotic effect;
  - c) by an inductive effect.
45. A mesmeric electronic effect is displacement of electronic closeness to more electronegative atom:
- a) on the connected system;
  - b) for  $\sigma$  – bond;
  - c) for  $\rho$  – bond.
46. Displacement of electronic closeness to the strongly electronegative atom on the connected system is named:
- a) by a mesomeric effect;
  - b) by an osmotic effect;
  - c) by an inductive effect.
47. Electron donors deputies:
- a) diminish an electronic closeness in the system;
  - b) does not change an electronic closeness in the system;
  - c) increase an electronic closeness in the system.
48. Deputies, which increase an electronic closeness in the system, are named:
- a) electron similar;
  - b) electron acceptor;
  - c) proton donors.
49. Electron acceptor deputies:
- a) diminish an electronic closeness in the system;
  - b) does not change an electronic closeness in the system;
  - c) increase an electronic closeness in the system.

50. Deputies, which diminish an electronic closeness in the system, are named:
- electron donors;
  - electron acceptors;
  - proton acceptor.
51. Acids after Bronsted – is:
- proton acceptor;
  - electron donor;
  - proton donor.
52. Neutral molecules or ions, which are the donors of protons, named
- Bronsted acid;
  - L'yuis acids;
  - Bronsted bases.
53. Basic after Bronsted – is:
- proton acceptors;
  - electron donors;
  - proton donors.
54. Neutral molecules or ions, which are proton acceptors are called:
- Bronsted acids;
  - L'yuis acids;
  - Bronsted bases.
55. Acids L'yuis – is:
- acceptors of electronic pair;
  - donors of electrons;
  - proton acceptors.
56. The acids L'yuis belong to:
- NaCl, CaCl<sub>2</sub>, KCl;
  - FeCl<sub>3</sub>, ZnCl<sub>2</sub>, AlCl<sub>3</sub>;
  - MnSO<sub>4</sub>, K<sub>2</sub>SO<sub>4</sub>.
57. Bases after L'yuis are:
- acceptors of electronic pair;
  - donors of electronic pair;
  - proton acceptors.
58. Neutral molecules or ions, which are the donors of electronic pair, are called:
- Bronsted acids;
  - L'yuis acids;
  - L'yuis bases.
59. Two bases L'yuis belongs to:
- H<sup>-</sup>, Cl<sup>-</sup>, HÖH;
  - Cl<sup>+</sup>, H<sup>+</sup>, NaOH;
  - HNO<sub>2</sub>, H<sub>2</sub>SO<sub>3</sub>.
60. Alcohols are by comparison to phenols:
- prepotent acids;



- b) more weak acids;
  - c) identical acidity.
61. Salts of alcohols are called:
- a) thiols;
  - b) fenols;
  - c) alcoholates
62. Polyols are by comparison to monoatomic:
- a) prepotent acids;
  - b) more weak acids;
  - c) identical acidity
63. Polyols co-operate from:
- a)  $Zn(OH)_2$ ;
  - b)  $Cu(OH)_2$ ;
  - c)  $Fe(OH)_3$
64. Polyols from  $Cu(OH)_2$  give:
- a) carbonates;
  - b) carbides;
  - c) chelates.
65. Chelates which appear during co-operation of polyols from  $Cu(OH)_2$  is:
- a) blue solution;
  - b) blue sediment;
  - c) red sediment.
66. Formation of chelates is a high-quality reaction on:
- a) hydro carboxylic acids;
  - b) polyatomic;
  - c) aldehydes.
67. Phenols are by comparison to alcohols:
- a) prepotent acids;
  - b) more weak acids;
  - c) identical acidity.
68. Salts of phenols are called:
- a) thiols;
  - b) phenols;
  - c) alcoholates.
69. Phenol – is:
- a) carbonate acid;
  - b) hydro carboxylic acid;
  - c) carbolic acid.
70. Due to the acid properties a phenol is used as:
- a) antiseptic;
  - b) antipyretic;
  - c) acesodyne.

71. Thiols by comparison to alcohols:
- prepotent acids;
  - more weak acids;
  - identical acidity.
72. Salts of thiols are called:
- phenolts;
  - alcoholates;
  - thiols.
73. Heavy metals are named thiols poisons, because of the link:
- SH – group of albumens – enzymes;
  - SH are groups of nucleic acids;
  - SH are groups of fats.
74. Unithiols is an antidote in time of poisoning:
- by alkaline metals;
  - by heavy metals;
  - by acids.
75. Amines are organic bases as a result of the presence of:
- atoms hydrogen near nitrogen;
  - indivisible electronic pair of atom of carbon;
  - indivisible electronic pair of atom of nitrogen.
76. Medical matters-amines are used in types of:
- salts of mineral and organic acids;
  - colloid solutions;
  - water solutions.
77. To the medical matters-amines belong to:
- acetophene;
  - novo caine, adrenalin;
  - methionine.
78. Methods of breaking of chemical connections are in an organic compound of:
- homogeneous, heterogeneous;
  - gomostatic, geterostatic;
  - gomolitic, heterolytic.
79. During a gomolitic release what appears is:
- free radical;
  - electrophiles;
  - nucleophiles.
80. Free radicals are particles:
- with one or more by the uncoupled cations;
  - with one or more by the uncoupled electrons;
  - with one or more by the uncoupled anions.
81. During a heterolytic release what appear is:
- free radical;

- b) electrophiles and nucleophiles;  
c) electrophiles and free radical.
82. Electrophiles are particles from:  
a) surplus of electronic closeness;  
b) the uncoupled electron;  
c) the lack of electronic closeness;
83. Such particles belong to electrophiles:  
a)  $H^+$ ,  $Cl^+$ ,  $NO_2^+$ ,  $SO_3^+$ , carb-cation;  
b)  $H^+$ ,  $Cl^-$ ,  $H\ddot{O}H$ ;  
c)  $R-NH_2$ ,  $H_2SO_4$ .
84. Nucleophiles are particles from:  
a) surplus of electronic closeness;  
b) the uncoupled electron;  
c) the lack of electronic closeness;
85. Such particles belong to the nucleophiles:  
a)  $H^+$ ,  $Cl^+$ ,  $NO_2^+$ ,  $SO_3^+$ , carb-cation;  
b)  $H^-$ ,  $Cl^-$ ,  $H\ddot{O}H$ ,  $R-NH_2$ ,  $R-OH$ , carb-cation;  
c)  $R-NH_2$ ,  $H_2SO_4$ .
86. In alkane reactions a mechanism goes after:  
a) nucleophilic substitution;  
b) electrophilic substitution;  
c) radical substitution.
87. In the organism of man free radical appear under the action of such factors:  
a) radiation, ultraviolet, oxides of nitrogen;  
b) sodium chloride, temperature;  
c) ions of sodium and potassium.
88. Such free radicals appear in the organism of man:  
a)  $H^\cdot$ ,  $OH^\cdot$ ,  $O_2^\cdot$ ,  $HOO^\cdot$ ,  $RO^\cdot$ ,  $R^\cdot$ ;  
b)  $H^+$ ,  $Cl^+$ ,  $NO_2^+$ ,  $SO_3^+$ ;  
c)  $H^-$ ,  $Cl^-$ ,  $H\ddot{O}H$ ,  $R-NH_2$ ,  $R-OH$ .
89. Free radical in a normal human organism takes place in:  
a) the hydrolysis of albumens;  
b) peroxide oxidation of lipids of membranes;  
c) oxidation carbohydrates.
90. The toxic action of free radicals usually:  
a) slow the hydrolysis of fats;  
b) speed up the synthesis of hydro carboxylic acids;  
c) slow the synthesis ATP, albumins
91. The toxic action of free radicals usually:  
a) damage the structure of nucleic acids;  
b) speed the hydrolysis of fats;  
c) slow the hydrolysis of carbohydrates.

92. Matters, which link free radicals, are called:
- antiseptic;
  - antioxidants;
  - anticoagulants.
93. In the human organism antioxidants are:
- carbonhydrase, acetyl coenzyme A;
  - revertaza, ubihinon;
  - catalase, glutation peroxidase, superoxide dismutase.
94. Vitamins that belong to the antioxidants are:
- A, C, E;
  - C, D, K;
  - B, K, PP.
95. In alkene reactions mechanism goes after:
- nucleophilic joining;
  - electrophilic joining;
  - radical substitution.
96. The example of hydrogenation of alkene in a human organism is transformation of:
- propeonic acid  $\rightarrow$  propanoic acid;
  - ethen  $\rightarrow$  ethane;
  - crotonic acid  $\rightarrow$  oil acid.
97. A reaction of hydrogenation and alkene is joining:
- two hydrogen;
  - water;
  - two hydroxyl
98. Reaction of hydrogenation and alkene in vitro takes place in the presence of catalysts:
- Fe, Fe<sub>2</sub>O<sub>3</sub>, Al;
  - Pt, Ni, Pd;
  - Si, Ni, Cr.
99. Reaction of hydrogenation and alkene in vitro takes place in the presence of catalyst:
- hydroxyl – to the anion;
  - water;
  - to the proton.
100. The example of hydrogenation and alkene in the human organism is transformation of:
- crotonic acid  $\rightarrow$  is hopatenic acid;
  - propenoic acid  $\rightarrow$  is oxypropanic acid;
  - ethenoic acid  $\rightarrow$  ethanoic acid.
101. Bromiation of alkenes is used as a high-quality reaction on:
- high quality;
  - unsaturation;
  - homogeneity.

102. A high-quality reaction of unsaturation is discoloring to:
- cuprum hydroxide;
  - chloric water;
  - bromic water.
103. Hydroxide halogenation and hydration of alkenes takes place by rule of:
- Markovnikov;
  - Shrouds – Goff;
  - Edman.
104. In arenas reactions go after a mechanism:
- electrophilic joining;
  - electrophilic substitution;
  - radical substitution.
105. Electron Donor deputies in arenas send the second deputy in:
- purpose- or -ortho position;
  - para- or -meta position;
  - ortho- or -para position.
106. Electron-seeking deputies in arenas send the second deputy in:
- purpose of position;
  - para- or a purpose is position;
  - ortho- or a pair is position.
107. As a result halogenations of arenes such medications appear:
- salicylic acid, solution of lugol's;
  - biomicin, elenium, bromhexine;
  - vitamins A, C.
108. In the organism of man as a result of iodination of benzoic kernel appears:
- oxytocinum;
  - tirozin;
  - tyrosine.
109. As a result alkylation of benzoic kernel appears such medications:
- vitamins E, K;
  - acetophene;
  - vitamin A.
110. As a result of nitridation benzoic kernels appear such medications:
- novocain;
  - levomicetin;
  - vitamin A.
111. In halogen alkane reactions goes after a mechanism of:
- electrophilic joining;
  - electrophilic substitution;
  - nucleophilic substitution.
112. In alcohols reactions goes after a mechanism:
- nucleophilic substitution;

- b) electrophilic substitution;
- c) nucleophilic joining.

113. Elimination is a reaction by:

- a) slabbing;
- b) ioining;
- c) substitution.

114. As a result elimination oxy-compounds there is such transformation in the organism of Man:

- a) butenoic acid  $\rightarrow$  butane acid;
- b) malic acid  $\rightarrow$  fumarovic acid;
- c) citric acid  $\rightarrow$  isocitric acid.

### REACTIONARY ABILITY OF ALDEHYDES AND KETONES

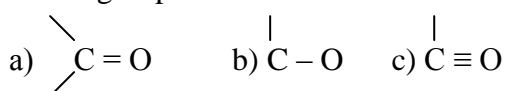
115. An electronic structure of oxo-groups and mechanism of the nucleophilic joining ( $A_N$ ) in aldehydes and ketones.

116. Co-operating of oxo-compound with alcohols and amines (mechanism of reaction), biological value of these reactions.

117. Aldehydes belong to:

- a) oxo-connections;
- b) oxy-connections;
- c) carboxyl-connections.

118. Oxo-a group has a structure such as:



119. Carbon in an aldehydic group is in the state of:

- a)  $sp$  – hybridization;
- b)  $sp^2$  – hybridization;
- c) to  $sp^3$  – hybridization.

120. In an aldehydic group there is displacement of electronic closeness to:

- a) carbon;
- b) hydrogen;
- c) oxygen.

121. In the aldehydic group of displacement of electronic closeness to oxygen place is taken for:

- a)  $\pi$  – copula;
- b)  $\sigma$  – copula;
- c) ionic connection.

122. Carbon in an aldehydic group has surplus of:

- a) negative charge;
- b) positive charge;
- c) zero charge.

123. Reactions in aldehydes follow after a mechanism of:
- nucleophilic substitution;
  - electrophilic joining;
  - nucleophilic joining.
124. Carbon in an aldehydic group is attacked only by:
- a nucleophile;
  - an electrophile;
  - a radical.
125. Co-operating of aldehydes with hydrogen follows after a mechanism of:
- nucleophilic substitution;
  - nucleophilic joining;
  - electrophilic joining.
126. As a result of joining of hydrogen aldehydes are in:
- oxidation;
  - fall out in sediment;
  - recommence.
127. Aldehydes recommence to:
- primary alcohols;
  - second alcohols;
  - tertiary alcohols.
128. The example of renewal of aldehydes hydrogen in the organism of man is:
- proceeding in acetate to ethanol;
  - proceeding in glycerol aldehyde to glycerin;
  - proceeding to succinate.
129. The example of renewal hydrogen of ketones in the organism of man is:
- glycerol aldehydes → glycerin;
  - tartrate → acetate;
  - pyruvate → lactate.
130. Proceeding in organic compounds in the organism of man takes place for:
- conferment of NAD H<sub>2</sub>, ubikhinon;
  - albumens;
  - monosaccharaides
131. Co-operating of aldehydes with alcohols follows after a mechanism:
- nucleophilic substitution;
  - nucleophilic joining;
  - electrophilic joining.
132. A catalyst during co-operating of aldehydes with alcohols is:
- meadow;
  - proton;
  - L'yuis acid.
133. The product of co-operation of aldehydes with alcohols is:
- acetals;

- b) acetates;
  - c) semiacetals.
134. Semiacetals in the organism of man are:
- a) monosaccharaides;
  - b) amino acid;
  - c) fats.
135. Co-operating of aldehydes with amines follows after a mechanism:
- a) nucleophilic joining;
  - b) nucleophilic substitution;
  - c) electrophilic joining.
136. The product of co-operation of aldehydes with amines is:
- a) amides;
  - b) nitrates;
  - c) imines.
137. In the human organism imines, appear in a process:
- a) transubstitution;
  - b) desubstitution;
  - c) amination.
138. The reaction of aldol condensation takes place between:
- a) alcohols;
  - b) aldehydes;
  - c) acids.
139. As a result of the use of alkaline catalysis in the reaction of aldol condensation as intermediate particles appear:
- a) radical;
  - b) carb cation;
  - c) carb anion.
140. After the reaction of aldol condensation in the human being is synthesized by:
- a) citric acid;
  - b) acetic acid;
  - c) benzoic acid.
141. After the reaction of aldol condensation in the organism of man synthesized:
- a) acetic acid;
  - b) neuraminic acid;
  - c) salicylic acid.
142. High-quality reaction on aldehydes is:
- a) Edman's reaction;
  - b) Fisher's reaction;
  - c) Trommer's reaction;
143. Composition of Trommer's reagent is:
- a)  $\text{CuSO}_4 + \text{NaOH}$ ;
  - b)  $\text{CuSO}_4 + \text{Cu(OH)}_2$ ;



- c)  $\text{CuSO}_4 + \text{H}_2\text{SO}_4$ .
144. During co-operating of aldehydes with the Trommer's reagent there are aldehydes:  
a) recommence;  
b) oxidize;  
c) exchanged.
145. By the product of oxidation of aldehydes the Trommer's reagent is:  
a) alcohol;  
b) ketone;  
c) acid.
146. During co-operating of aldehydes with the Trommer's reagent appears brick red Sediment of:  
a)  $\text{Cu}_2\text{O}$ ;  
b)  $\text{CuO}$  ;  
c)  $\text{Cu}(\text{OH})_2$ .
147. High-quality reaction on aldehydes is:  
a) Edman's reaction;  
b) Fisher's reaction;  
c) Feling 's reaction;
148. Composition of Felinga reagent:  
a)  $\text{CuSO}_4 + \text{NaOH} + \text{NaOOC-CH}(\text{OH}) - \text{CH}(\text{OH}) - \text{COOK}$ ;  
b)  $\text{CuSO}_4 + \text{NaOH} + \text{HOOC-CH}(\text{OH}) - \text{CH}(\text{OH}) - \text{COOH}$ ;  
c)  $\text{CuSO}_4 + \text{NaOH} + \text{CH}_3\text{COOH}$ .
149. During co-operating of aldehydes with the Feling's reagent there are aldehydes:  
a) recommence;  
b) oxidize;  
c) exchanged.
150. By the product of oxidation of aldehydes the Fehling's reagent is:  
a) acid an alcohol;  
b) ketone;  
c) alcohol.
151. During co-operating of aldehydes with the the Fehling's reagent appears brick red sediment of:  
a)  $\text{CuO}$ ;  
b)  $\text{Cu}_2\text{O}$ ;  
c)  $\text{Cu}(\text{OH})_2$ .
152. High-quality reaction on aldehydes is:  
a) Edman's reaction;  
b) Fisher's reaction;  
c) Tollen's reaction;
153. Composition of Tollen's reagent:  
a)  $\text{Ag}_2\text{O} + \text{NH}_4\text{OH}$ ;  
b)  $\text{Ag}_2\text{O} + \text{NaOH}$ ;

c)  $\text{AgNO}_3 + \text{NaOH}$ .

154. During co-operating of aldehydes with the Tollen's reagent there are aldehydes:

- a) recommence;
- b) oxidize;
- c) exchanged.

155. By the product of oxidize of aldehydes the Tollen's reagent is:

- a) acid;
- b) ketone;
- c) alcohol.

156. During co-operating of aldehydes sediment appears with the Tollen's reagent:

- a) ammonium hydroxide;
- b) free silver;
- c) acid.

157. The high-quality reaction of Tollens on aldehydes is called a reaction of:

- a) copper mirror;
- b) silver mirror;
- c) ferrous mirror.

158. In a clinical analysis for the exposure of monosaccharide in biological liquids, use:

- a) test of Butlerov;
- b) test of Fisher;
- c) test of Trommer.

159. The example of oxidation of aldehydes in the human being is from:

- a) oxidizing amber aldehyde to succinic acid;
- b) oxidizing acetal aldehyde to alcohol;
- c) oxidizing acetone to acetate.

160. The example of oxidation of ketones in the human being is:

- a) oxidize  $\beta$  - propylformic acids to two molecules of aldehyde;
- b) oxidize  $\beta$ - propylformic acids to two molecules of acetate;
- c) oxidize  $\beta$ - propylformic acids to two molecules of formate.

161. As a result of haloform reactions it is possible to get:

- a) trifluoromethane, benzoform;
- b) phenol, tetraform;
- c) iodoform, chloroform.

162. By the simplest reaction for the exposure of acetone in patients urine with saccharine diabetes is:

- a) iodoform test;
- b) bromoform test;
- c) test of Trommer.

163. As a result of haloform reactions it is possible to get:

- a) diuretic matters;
- b) tear matters;

c) sudorific matters.

## HYDROCARBOXYLIC ACIDS

1. An electronic structure of carboxyl-group and mechanism of nucleophilic substitution is in hydro carboxylic acids. A mechanism of co-operation of hydro carboxylic acids is with alcohols (formation of esters - difficult ethers); a hydrolysis of esters is in sour and alkaline environments; co-operating of halogen anhydrides with an ammonia (formation of amides). Esters and amides are in the organism of man.
2. Tioefires, their role in the organism of man. Reactions of acetylating after participation acetyl-CoA, chart of formation of acetylcholine.
3. Acetophene: its properties, determinations of its high quality.
4. A functional group in hydro carboxylic acids is:
  - a) hydroxy group;
  - b) carboxyl group;
  - c) oxo group.
5. A structure of carboxyl groups is such:
  - a) ...
  - b) – C
  - c) ...
6. Carboxyl – a group consists of:
  - a) hydroxy- and carboxyl – groups;
  - b) keto- and oxo – groups;
  - c) oxo- and oxy – groups.
7. Carbon in a carboxyl – is a group in the state:
  - a)  $sp^2$ ,
  - b)  $sp$ ,
  - c)  $sp^3$ .
8. In a carboxyl – there is displacement of electronic closeness a group to:
  - a) oxygene oxi are groups;
  - b) oxygene with double connection;
  - c) to carbone.
9. In a carboxyl group of displacement of electronic closeness to oxygene oxo are groups place is taken for:
  - a)  $\sigma$  – copula;
  - b)  $\pi$  - copula;
  - c) To ionic connection.
10. As a result of electronic effect on the atom of Carbon there is partial in a carboxyl- group:
  - a) negative charge;
  - b) zero charge;
  - c) positive charge.

11. Atom of carbon in a carboxyl – attacked a group only by:
  - a) nucleophile;
  - b) electrophile;
  - c) radical.
  
12. Reactions in hydro carboxylic acids and their derivatives follow after a mechanism of:
  - a) nucleophilic joining;
  - b) nucleophilic substitution;
  - c) electrophilic substitution.
  
13. Co-operating of acids with alcohols follows after mechanism of:
  - a) nucleophilic joining;
  - b) electrophilic substitution;
  - c) nucleophilic substitution.
  
14. Co-operating of acids with alcohols is a reaction of:
  - a) esterification;
  - b) hydrolysis;
  - c) acetylation.
  
15. The reaction of esterification is possible in the presence of catalyst:
  - a)  $\text{OH}^-$ ;
  - b)  $\text{H}^+$ ;
  - c)  $\text{Cl}^-$ .
  
16. A type of bond is in esterase is:
  - a) hard– ether;
  - b) glycoside;
  - c) peptide.
  
17. Structure difficultly – ether connection:
  - a) .....
  
18. Formation of water as a by-product in the reaction of esterification goes as a result of slabbing:
  - a) oxo – group;
  - b)  $\text{H}^+$  from acid and  $\text{OH}^-$  from an alcohol;
  - c)  $\text{H}^+$  from an alcohol and  $\text{OH}^-$  from acid.
  
19. Reaction of reverse esterification is called:
  - a) hydrolysis;
  - b) hydration;
  - c) hydrogenation.
  
20. The hydrolysis of esters goes in environments of:
  - a) brome water;
  - b) sour and alkaline;
  - c) chloric water.
  
21. The products of acid hydrolysis of esters is:
  - a) aldehyde and alcohol;
  - b) acid and basis;

- c) acid and alcohol.
22. The products of alkaline hydrolysis of esters are:  
 a) alcohol and salt;  
 b) acid and basis;  
 c) acid and salt.
23. In human body esters beings from:  
 a) polysaccharides;  
 b) protein;  
 c) fats.
24. In human beings difficultly – ether connection appears between:  
 a) amino acid;  
 b) monosaccharaides;  
 c) amino acid and t –RNA.
25. In human body beings hard– ether connection appears from  $H_2SO_4$ :  
 a) in a heparin;  
 b) in amylase;  
 c) in proteins.
26. General formula of tioefires:  
 a).....
27. Tioefirs in the organism of man is:  
 a) acetyl coenzyme A;  
 b) ethyl coenzyme A;  
 c) metal coenzyme A.
28. Tioefirs in the organism of man is:  
 a) .....
29. Tioefirs in the organism of man carry out a role of:  
 a) acyclic agent;  
 b) alkyl agent;  
 c) metallic agent.
30. A reaction of acetylating is introduction to:  
 a) alkyl  
 b) acyl  
 c) methyl
31. Acyl is the remain of hydro carboxylic acid without:  
 a) oxy groups  
 b) carboxyl groups  
 c) oxo groups
32. Formula of acetyl is:  
 a)

33. After the reaction of acetylating in the organism of man synthesized:
- adrenaline
  - acetylcholin
  - acetylserine
34. Halogen anhydride is derivatives of hydro carboxylic acids, in which:
- oxo – substituted for a group a halogen;
  - oxy – substituted for a group a halogen;
  - carboxyl – substituted for a group a halogen.
35. General formula of chloranhydride:
- .....
36. Halogen anhydride is used in vitro as:
- acyl agent;
  - alkylic agent;
  - metallic agent.
37. Halogen anhydride by comparison to hydro carboxylic acids is:
- less reaction capable;
  - more reaction capable;
  - same reaction ability.
38. For halogen anhydrides characteristic reactions:
- nucleophilic joining;
  - electrophilic substitution;
  - nucleophilic substitution.
39. Halogen anhydride co-operate with ammonia after a mechanism:
- nucleophilic substitution;
  - nucleophilic joining;
  - electrophilic substitution.
40. The products of co-operation of halogen anhydride with ammonia are:
- amines;
  - amides;
  - imines.
41. Amides are derivatives of hydro carboxylic acids, in which:
- oxo- substituted for a group of  $\text{NH}_2$ -group
  - carboxyl – substituted for a group on  $\text{NH}_2$ -group
  - OH deputized on  $\text{NH}_2$ -group.
42. General formula of amides:
- .....
43. Formation of amides in an organism is a way of leading out:
- amino acid
  - ammonia;
  - amines.

44. Acetophene is derivative of:
- alkane;
  - alkenes
  - benzoyl
45. For proof of high quality of acetophene conduct, a reaction from:
- iron (III) chloride;
  - cuprum (II) hydroxide;
  - brome water.
46. High quality preparation of acetophene:
- gives the violet coloring from  $\text{FeCl}_3$ ;
  - does not give violet coloring from  $\text{FeCl}_3$ ;
  - gives violet coloring with bromic water.
47. Poor quality preparation of acetophene gives from  $\text{FeCl}_3$ :
- red coloring;
  - dark blue coloring;
  - violet coloring.

**CARBOHYDRATES.  
MONOSACCHARIDES.**

48. Monosaccharides: glucose, lactoglucose, fructose, mannose, ribose, desoxyribose. Structure, isomers, and chemical properties: formation of O<sup>-</sup> and N<sup>-</sup> glycosides, alkylation, acylation oxygroup; high-quality reactions.
49. Monosaccharides are polyatomic:
- aldehyde – or hydroxyl-ketones;
  - aldehyde– or acid alcohol;
  - aldehyde – or alkaamines.
50. Two monosaccharides belong to:
- saccharose, lactose;
  - glucose, fructose;
  - mannose and maltose.
51. Glucose is:
- hydroxyl-ketone;
  - acid alcohol;
  - aldehyde alcohol.
52. Functional groups in the molecule of glucose is:
- aldehydic and alcoholic oxygroup;
  - carboxyl- and alcoholic oxogroup;
  - keto- and alcoholic oxygroup.
53. The acyclic form of glucose has:
- D – configuration;
  - L – configuration;
  - N – configuration.

54. The cyclic form of glucose has:
- $\lambda$ - and  $\mu$  - configuration;
  - $\gamma$ - and  $\delta$  - configuration;
  - $\alpha$  - and  $\beta$  - configuration.
55. The cyclic form of glucose is named:
- geptanose;
  - tetra nose;
  - pyranose.
56. Pyranose the cycle of glucose has configuration of:
- arm-chairs;
  - baths;
  - linear.
57. The isomer of glucose is:
- saccharose;
  - lactose;
  - lacto glucose.
58. Specify the correct pair of isomers:
- glucose is mannose;
  - glucose is maltose;
  - glucose is saccharose.
59. A high-quality reaction on the aldehydic group of glucose is a reaction of:
- Kucherov;
  - Trommer;
  - Friedel-Crafts.
60. A high-quality reaction on polyatomic of glucose is education in:
- chelates;
  - red sediment;
  - CO<sub>2</sub>.
61. Glucose gives chelates to:
- FeCl<sub>3</sub>;
  - Cu (OH)<sub>2</sub>;
  - brome water.
62. Glucose forms O creates are glycosides during co-operation with:
- aldehydes;
  - acids;
  - alcohols.
63. Cardiac glycosides get medicinal preparations from:
- foxgloves;
  - chamomiles;
  - tricycles.



64. Glucose forms N glycosides during co-operation with:
- amides;
  - by amines;
  - imines.
65. N is glycosides of ribose and deoxyribose included in composition of:
- albumens;
  - fats;
  - RNA and DNA.
66. Alkalization of monosaccharide conduct with:
- halogen alkanes;
  - halogen anhydrides;
  - free radicals'.
67. The product of alkylation glucose has such copulas:
- O create are glycosides and difficult ether copulas;
  - O create are glycosides and simple ether copulas;
  - O create are glycosides and anhydride copulas.
68. As a result of hydrolysis fully alkyles glucose collapses only:
- OH – glycoside and simple ether copulas;
  - simple ether copulas;
  - OH – glycoside connection.
69. Acidylatings of monosaccharides conduct for help from:
- halogen alkanes;
  - halogen acid;
  - halogen anhydres.
70. Acidilate glucose has such copulas:
- hard ether;
  - OH – glycoside and simple ether;
  - OH – glycoside and difficult ether.
71. As a result of hydrolysis fully acilation glucose collapses only when:
- OH – glycoside and hard efires copulas;
  - simple ether copulas;
  - all hard efires copulas.
72. Human glucosein is a source:
- entropies;
  - energies;
  - internal energy.
73. As a result of non-fermentative glycolization of collagen in the human body accelerate the:
- process of thrombus formation;
  - laying of salts;
  - decline of arteriotony.
74. Fructose is polyatomic:
- aldehyde alcohol;

- b) hydroxyl-ketone;
  - c) alcohol.
75. Functional groups are in the molecule of fructose:
- a) aldehydic;
  - b) carboxyl- and oxy groups
  - c) oxo- and oxi- groups.
76. The cyclic form of fructose is called:
- a) furanozic;
  - b) piranose;
  - c) tiazolic.
77. The cyclic form of fructose has:
- a)  $\lambda$  – and  $\mu$ – configuration;
  - b)  $\alpha$ – but  $\beta$  – configuration;
  - c)  $\gamma$ – but  $\delta$  – configuration.
78. Semiacetic hydroxyl in the molecule of fructose is located near the:
- a) second atom of carbon;
  - b) first atom of carbon;
  - c) sixth atom of carbon.
79. Fructose is distinguished from glucose by a reaction of:
- a) Kucherov;
  - b) Selivanov;
  - c) Feling.
80. In the molecule of deoxyribose oxy-group there's absence of:
- a) second atom of carbon;
  - b) first atom of carbon;
  - c) fifth atom of carbon.

### OLIGOSACCHARIDES

81. Oligosaccharides: saccharose, lactose, maltose, celobioze. Composition, structure, types of connections, special structure, chemical properties: formation of O- and N-glycosides, alkylation, acylation ox group; biological value.
82. Oligosaccharides are hard carbohydrates which contain:
- a) from 2 to 10 monosaccharide tailings
  - b) from 5 to 20 monosaccharide tailings
  - c) from 1 to 5 monosaccharide tailings
83. Disaccharides are hard carbohydrates which contain:
- a) to 10 monosaccharide tailings
  - b) to 2 monosaccharide;
  - c) to 5 monosaccharide tailings.

84. To disaccharides belong
- glucose, lactoglucose
  - saccharose, lactose
  - fructose, mannose.
85. A saccharose consists of tailings such:
- $\alpha$ - mannose and  $\beta$ - glucose;
  - $\alpha$ - lactoglucose and  $\beta$  - fructose;
  - $\alpha$  - glucose and  $\beta$  - fructose.
86. A type of connection between a saccharose and monosaccharide tailings is:
- $\alpha$  - 1, 2 - glycoside;
  - $\alpha$  - 1, 4- glycoside;
  - $\beta$  - 1, 2 - glycoside.
87. Saccharose is:
- recuperative sugar;
  - unrecuperative sugar;
  - insoluble sugar.
88. A saccharose is unrecuperative sugar, because of absence:
- of ionic connection;
  - of piranoic cycle;
  - of semiacetal hydroxyl.
89. A saccharose can form such derivatives:
- chelates;
  - glycoside;
  - amides.
90. Saccharose from  $\text{Cu}(\text{OH})_2$  gives:
- esters;
  - chelates;
  - salts.
91. A saccharose and lactose belongs to oxygroup because of:
- acylation and alkalizations;
  - forms aldehydes;
  - forms amides.
92. During a hydrolysis a saccharose gives:
- lactose and lacto glucose;
  - glucose and fructose;
  - maltose and fructose.
93. The products of hydrolysis of saccharose are called:
- leaden sugar;
  - artificial sugar;
  - invert sugar.

94. In the organism of man saccharose fissions:
- enzyme of saccharose in an intestine;
  - enzyme by a lactase in a stomach;
  - enzyme by a glucose in an oral cavity.
95. Lactose is a disaccharide, which consists of tailings:
- $\alpha$ - mannose and  $\beta$ - glucose;
  - $\beta$ - lacto glucose and  $\alpha$ - glucose;
  - $\alpha$ - glucose and  $\beta$  - fructose.
96. A type of connection between lactose and monosaccharide tailings:
- $\alpha$  -1,2 - glycoside;
  - $\alpha$  - 1,4 - glycoside;
  - $\beta$  - 1,4 - glycoside.
97. Lactose has:
- linear configuration;
  - located in a plane;
  - a piranoic cycle has conformation of bath.
98. Lactose is:
- recuperative sugar;
  - un-recuperative sugar;
  - insoluble sugar.
99. Lactose is a recuperative sugar, because there's presence of:
- ionic connection;
  - pyranoic cycle;
  - semiacetal hydroxyl.
100. Lactose can renew:
- $\text{Cu}^{+2}$  and  $\text{Ag}^{+1}$ ;
  - $\text{Fe}^{+3}$  and  $\text{Al}^{+3}$ ;
  - $\text{Cu}^{+1}$  and  $\text{Cl}^{+1}$ .
101. During co-operation of lactose from  $\text{Cu}(\text{OH})_2$  appears for temperatures:
- dark blue sediment of  $\text{Cu}(\text{OH})_2$ ;
  - brick red sediment of  $\text{Cu}_2\text{O}$ ;
  - yellow sediment of  $\text{Cu}_2\text{O}$ .
102. Lactose gives:
- O<sup>-</sup> and N<sup>-</sup> forms glycosides;
  - forms only N<sup>-</sup> glycosides;
  - forms only O form glycosides.
103. During a hydrolysis lactose gives:
- $\alpha$  - mannose and  $\beta$  - glucose;
  - $\beta$  - lactoglucose and  $\alpha$  - glucose;
  - $\alpha$  - glucose and  $\beta$  - fructose.

104. In human beings lactose is contained in the free and CPLD state:
- in a woman milk;
  - in a stomach;
  - in a brain.
105. In human beings lactose fissions in stomach – intestinal highway under the action of ferment is:
- glucose;
  - sucrose;
  - lactase.
106. In the organism of man there is the inherited immunity to:
- cellobiose;
  - lactose;
  - saccharoses.
107. A maltose is disaccharide, which consists of:
- two tailings  $\beta$ - glucose;
  - two tailings  $\beta$  – lactoglucose;
  - two tailings  $\alpha$  – glucose.
108. A type of connection between maltose and monosaccharide tailings:
- $\alpha$  – 1, 2 – glycoside;
  - $\alpha$  – 1, 4– glycoside;
  - $\beta$  – 1, 4 – galactoside.
109.  $\alpha$  – 1, 4-glycoside connection has in maltose:
- linear configuration;
  - located in a plane;
  - angular configuration.
110. Maltose is a:
- recuperative sugar;
  - un-recuperative sugar;
  - insoluble sugar.
111. A maltose it recuperative sugar, because presence of:
- ionic connection;
  - pyranic cycle;
  - semiacetal hydroxyl.
112. A maltose can renew:
- $\text{Cu}^{+2}$  and  $\text{Ag}^{+1}$ ;
  - $\text{Fe}^{+3}$  and  $\text{Al}^{+3}$ ;
  - $\text{Cu}^{+1}$  and  $\text{Cl}^{+1}$ .
113. During co-operation of maltose from  $\text{Cu}(\text{OH})_2$  appears:
- dark blue sediment of  $\text{Cu}(\text{OH})_2$ ;
  - brick red sediment of  $\text{Cu}_2\text{O}$ ;
  - yellow sediment of  $\text{Cu}_2\text{O}$ .

114. Maltose can:
- O- and N- forms glycosides;
  - forms only N- glycosides;
  - forms only OH are glycosides.
115. During a hydrolysis a maltose gives:
- 2 molecules  $\alpha$ - mannose
  - 2 molecules  $\alpha$  – glucose
  - 2 molecules  $\beta$  – fructose
116. A maltose is intermediate connection during hydrolysis:
- hyaluronic acid;
  - dextranes;
  - starch.

### POLYSACCHARIDES

117. Polysaccharides: starch (amylase, amylopectin)heparin, dextranes, cellulose.  
Composition structure, types of connections, special structures, chemical properties and biological value.
118. Polysaccharides are:
- polyoxycarbonyl connections with general formula  $C_m(H_2O)_n$ ;
  - polyoxycarbonyl connections with general formula  $C_n(H_2O)_n$ ;
  - polyoxycarbonyl connections with general formula  $C_nH_2nO_n$ .
119. Molecular formula of homo-polysaccharides is:
- $C_6H_{10}O_6$
  - $C_6H_{10}O_5$
  - $C_6H_{12}O_6$
120. Starch is a product of:
- photosynthesis
  - polymerization
  - catabolism
121. Starch is a homo- polysaccharide which consists of tailings:
- $\alpha$ -mannose;
  - $\alpha$ -glucose;
  - $\beta$ -fructose.
123. Starch consists of two functions:
- dextranes and cellulose
  - cellulose and glucose
  - amylase and to the amylopectin
123. A type of connection between monosaccharide tailings in amylase is:
- $\alpha$ -1, 2- forms only N-glycosides
  - $\alpha$ -1, 4-glycosides

- c)  $\beta$ -1, 4- galactose
124. Primary structure of amylase is:  
a) polypeptide sequence  
b) poly nucleic sequence  
c) poly glycosides sequence
125. Second structure of amylase is:  
a) spiral  
b) ramified chain  
c) bunch of polyglycosides chains
126. What structure amylopectin has unlike amylase:  
a) linear polyglycosides chain  
b) a polyglycosides chain is ramified  
c) a polypeptide chain is ramified
129. A type of connection between monosaccharide tailings in amylopectin is:  
a)  $\alpha$ -1, 2-glycosides connection in points a fork  
b)  $\alpha$ -1, 4-glycosides connection mainly to the chain  
c)  $\alpha$ -1, 4-mainly to the chain and  $\alpha$  – 1,6 is glycosides connection in points a fork
128. Intermediate connections of hydrolysis of starch are:  
a) dextrin and maltose  
b) dextrans and lactose  
c) cellulose and glucose
129. The last product of hydrolysis of starch is:  
a)  $\beta$ -fructose  
b)  $\alpha$ -glucose  
c)  $\beta$ -glucose
130. A high quality reaction of starch is:  
a) discoloring of brome water  
b) the violet coloring with iron (III) chloride  
c) the dark blue coloring with iodine.
131. Starch is used in pharmacy for preparations of:  
a) pastes, powders and pills  
b) suspensions  
c) emulsions
132. Starch is used as nourishing compound receipt for:  
a) enzymes  
b) vitamins and antibiotics  
c) hormones
133. Reserve power carbohydrate for animals is:  
a) cellulose  
b) dextrin  
c) glycogen

134. Glycogen is homopolysaccharide which consists of tailings:
- $\alpha$ -mannose
  - $\alpha$ -glucose
  - $\beta$ -fructose
135. A type of connection between monosaccharide tailings in a glycogen is:
- $\alpha$ -1,2-glycoside connection in points a fork
  - $\alpha$ -1,4-glycoside connection mainly to the chain
  - $\alpha$ -1,4-mainly to the chain and  $\alpha$ -1,6 is glycoside connection in points a fork
136. Cellulose is homo polysaccharide which consists of tailings:
- $\alpha$ -mannose
  - $\alpha$ -glucose
  - $\beta$ -glucose
137. A type of connection between monosaccharide tailings in cellulose is:
- $\beta$ -1,4-glycosides
  - $\alpha$ -1,4-glycosides
  - $\beta$ -1,4-galactose
138. Primary structure of cellulose is:
- spiral
  - linear polyglycoside chain
  - polyglycoside chain is ramified
139. Second structure of cellulose is:
- linear polyglycoside chain
  - polyglycoside chain is ramified
  - bunch of parallel polyglycoside chains
140. Cellulose dissolves in:
- the reagent of Schweitzer  $\text{H}_2\text{SO}_4$  conc.
  - water, benzole
  - the reagent of Trommer  $\text{HCl}$  conc.
141. Mono- and dinitro cell is used as bactericidal tape and named as:
- collagen
  - colluding
  - glue of  $\text{BF}_3$
142. Hydrate cellulose which is used as a material of guy-sutures is called:
- catgut
  - silk
  - ocelon
143. Connection does not have fission in the organism of man is:
- $\beta$ -1,4-glycoside;
  - $\alpha$ -1,4-glycoside;
  - $\beta$ -1,4-galactoside.



144. Cellulose which is contained in bread, sprouts, fruit, and green vegetables is called:
- artificial fibers
  - food fibers
  - synfiles
145. The food fibers of fruit and green vegetables stimulate working of:
- brain
  - cages of CNS
  - intestine
146. The food fibers of fruit and green vegetables absorb:
- toxic matters
  - haemoglobin
  - phosphates
147. Decline of calories content of food use is:
- acetyl cellulose
  - methyl cellulose
  - nitro cellulose
148. The polysaccharides of bacterial origin is:
- starch
  - dextrin
  - detrains
149. Dextranes consist of tailings:
- $\alpha$ -glucose
  - $\beta$ -lactoglucose
  - $\alpha$ -fructose
150. From dextranes get blood substitutions under the name of:
- poly glucine
  - polyhybrid
  - polyglucose
151. Dextranes promote in an oral cavity the:
- fall of teeth
  - development of caries
  - loosening of gums

### AMINO ACID

152. Amino acid as morphons of peptides and albumens. Composition structure, isometry and chemical properties for carboxy- and amino group. Acid-basic properties IES, IET, high quality and quantitative analysis. Reactions of amino acid are in the organism of man (decarboxylation, oxidation and inwardly molecular delamination). Transformation of serine tryptophane is in the organism of man.

153. Amino acid is heterofunctional derivatives of hydro carboxylic acids in which:
- one or substituted for more atoms hydrogen amino group

- b) one or substituted for the more atoms of carbon amino groups
- c) one or substituted for more atoms hydrogen amides

154. In the complement of albumens of living organism enter only:

- a)  $\beta$ -amino acid;
- b)  $\alpha$ -amino acid;
- c)  $\gamma$ -amino acid.

155. For amino acid such types of isomers are characteristic of:

- a) lactim-laktam;
- b) cis-tranc
- c) structural and enantiomerism

156. Structural isomers of amino acids are:

- a) leucine-isoleucine;
- b) serine-treonin;
- c) valine-alanine.

157. The example of structural isomers of amino acid is:

- a)  $\alpha$ -alanine- $\gamma$ -aminobutyric acid
- b)  $\alpha$ -alanine- $\beta$ -alanine
- c)  $\beta$ -alanine- $\beta$ -aminobutyric acid.

158. The example of enantiomers of amino acid is:

- a)  $\alpha$ -alanine- $\beta$ -alanine
- b) L-alanine-D-valine
- c) L-methionine-D-methionine

159. The natural amino acid has only:

- a) L-configuration
- b) D-configuration
- c) cis-configuration

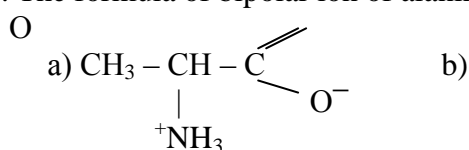
160. Amino acid show:

- a) only acid properties
- b) amphoteric properties
- c) only basic properties

161. It exists in water of amino acid in the form of:

- a) cation
- b) anion
- c) bipolar ion

162. The formula of bipolar ion of alanine is such:



163. The isoelectric state of amino acid exists in the form of:

- a) anion

- b) bipolar ion
  - c) cation
164. Amino acid is in the isoelectric state at a certain size of:
- a) temperatures
  - b) pressure
  - c) pH
165. Isoelectric point of pH for which the amino acid is in:
- a) isoelectric state
  - b) cation
  - c) anion.
166. After the size of isoelectric point the amino acid are classified on:
- a) soluble or insoluble
  - b) neutral, sour or basic
  - c) volatile or non-flying.
167. Neutral amino acids are:
- a) alanine and valine
  - b) serine and tyrosine
  - c) aspartic
168. The example of sour amino acid is:
- a) phenylalanine, tryptophane
  - b) cystein, methionine
  - c) aspartic, glutamine amino acid
169. The example of basic amino acid is:
- a) leucine, isoleucine
  - b) methionine, valine
  - c) lysine, arginine
170. Amino acid for a carboxy is given a group of:
- a) esters
  - b) ethers
  - c) amines
171. Formation of esters amino acid is used during the synthesis of peptides and albumens for:
- a) defense of amino groups
  - b) defense of carboxy-groups
  - c) activating of carboxy-groups
172. Amino acid for a carboxy is given a group by:
- a) esters
  - b) ethers
  - c) halogen anhydrides
173. Formation of halogen anhydrides amino acid is used during the synthesis of peptides and albumens for:
- a) activating of carboxy- groups
  - b) defense of carboxy-groups

c) defense of amino groups

174. Amino acid for amino is given a group by:

- a) amides
- b) N-acyl derivatives
- c) N-glycoside derivatives

175. Formation of N-acyl of derivative amino acid is used during the synthesis of peptides and albumens for:

- a) activating amino groups
- b) defense of carboxy-groups
- c) defense of amino groups

176. Interaction amino acid with nitrate acid used for the quantitative analysis of amino acid in a method of:

- a) Van-Slayk
- b) Boyle-Mariotte
- c) Shrouds-Goff

177. In the method of Van-Slayk is used co-operation of amino acid from:

- a) nitrate acid
- b) cyanic acid
- c) nitrite acid.

178. The amino acid co-operate for  $\text{NH}_2$  to the group from:

- a) alcohol
- b) halogens
- c) formaldehyde

179. Co-operating of amino acid with formaldehyde is used for the quantitative analysis of amino acid in a method of:

- a) Zerensen
- b) Boyle-Mariotte
- c) Shrouds-Goff

178. In a method of Zerensen use co-operation of amino acid from:

- a) formaldehyde
- b) metanol
- c) brome water

181. Amino acid co-operate for amino to the group of:

- a) phenyl thiocarbodiazon
- b) phenyl thiocyanate
- c) phenyl thiocarboyanine

182. Co-operation of amino acid from phenyl thiocyanate is used for determination of amino acid sequence in squirrel method of:

- a) Zerensen
- b) Boyle-Mariotte
- c) Edman

183. In the method of Edman co-operation of amino acid is used from:

- a) phenyl thio carbodiazon
- b) phenyl thiocyanate
- c) phenyl carbocyanate

184. For quantitative determination of amino acid use methods of:

- a) Van-Slayk and Zerensen
- b) Kucherov and Zelinskiy
- c) Edman and Sendzher.

185. All amino acid give the violet coloring from:

- a) brome water
- b) ninhydrin
- c) ferum(III) chloride

186. Ksanta Protein reaction on amino acid is an origin of:

- a) violet color from  $H_2SO_4$
- b) red color
- c) yellow color from  $HNO_3$

187. The aromatic amino acid gives with the reagent of Millona:

- a) red color
- b) violet color
- c) sine color

188. Heterocycle amino acid give with the reagent of Adam Kevich:

- a) red color
- b) violet color
- c) yellow color

189. In the containing of amino acid give with the reagent of Folya:

- a) red color
- b) violet color
- c) black color

190. In result of decarboxylation serine in the organism of man appears:

- a) colamine
- b) kholin
- c) thiaminum

191. As a result oxidation of delamination of amino acid in the organism of man takes place transformation is:

- a) valine → acetic acid
- b) alanine → pyruvic acid
- c) aspartic → oil acid

192. As a result of intermolecular delamination of amino acid there is transformation in the organism of man:

- a) amino acid → oxo acid
- b) amino acid → oxo acid
- c) amino acid → hydro carboxylic acid is unsaturated

193. Glutamate of sodium has a taste of:
- meat
  - milk
  - citric
194. From amino acid a serine as a result of chain of transformations to the organism of man appears:
- serotonin
  - acetylcholin
  - histamine
195. Redox system in the organism of man is amino acid of:
- $\alpha$ -alanine  $\beta$ -alanine
  - phenylalanine tyrosine
  - cysteine of cistin
196. A methionine in a human being is a source of:
- sulphure and metyl groups
  - acetyl group
  - amino group and alkyl
197. From amino acid of tyrosine as a result of chain of transformations in a human being appears:
- serotonin
  - noradrenalin and adrenalin
  - histamine
198. In result of decarboxylation tryptophan a toxic biogenic amine appears in human beings is:
- thiamine
  - cholin
  - tryptophan
199. In result of decarboxylation histamines of human being's biogenic amine appear:
- histamine
  - cholin
  - tryptophan
200. Irreplaceable amino acid is such as:
- synthesized in the organism of man
  - not synthesized in the organism of man
  - not very much necessary the organism of man

## PROTEINS

201. Peptides and proteins: methods of selection, division, cleaning and determination of homogeneity of albumens. Analysis of amino acid sequence (primary structure of albumen) of peptides and albumens (basic stages) determination of N- and C- eventual amino acid. Synthesis of peptides and albumens (basic stages). Formation of peptides bonds, its properties and high quality reaction.

202. Proteins that are high in molecular natural connections are:
- condensate  $\alpha$ -amino acid
  - polymers  $\alpha$ -amino acid
  - condensate of monosaccharide's
203. Squirrel is biopolymers which consist of:
- $\beta$ -amino acid
  - $\alpha$ -amino acid
  - monosaccharide's
204. Simple squirrel consist of tailings that are only:
- $\alpha$ -amino acid and monosaccharide's
  - $\beta$ -amino acid
  - $\alpha$ -amino acid
205. To the simple albumens belong:
- albumins and globulins
  - glycoprotein's
  - glycolipid
206. The products of hydrolysis of difficult albumens can be:
- $\beta$ -and  $\alpha$ -amino acid
  - $\alpha$ -amino acid and monosaccharaides
  - Only  $\alpha$ -amino acid
207. Which one belongs to the difficult albumens:
- albumins
  - globulins
  - nucleoproteins
208. After configuration of molecule squirrel are classified on:
- fibrous and globular
  - L-and D- of proteins
  - cis-proteins of trance
209. Fibrous albumens belong to:
- albumen
  - myosin and keratin
  - haemoglobin
210. Which one of these belonged to the sphere proteins:
- keratin
  - albumen
  - haemoglobin
211. Squirrel select from biological material by:
- evaporation
  - condensations
  - extractions or besieging

212. Mixture of albumens is divided for help by:
- gel filtrations
  - extraction
  - evaporation
213. In a method gel filtrations for the division of albumens as an adsorbent is used as:
- starch
  - sephadex
  - an aluminum oxide.
214. Mixture of albumens is divided for help of:
- extractions
  - electrophoresis
  - evaporation
215. Mixture of albumens is divided for help of:
- extractions
  - evaporation
  - affinity chromatography
216. The high-specific method of division of mixture of albumens is:
- affine chromatography
  - paper graphy
  - adsorption chromatography
217. For determination of homogeneity of albumens use:
- electrophoresis
  - immune phoresis
  - cation phoresis
218. Albumens polymers have molar mass of:
- 2000 – 10000
  - 500 – 1500
  - 6000
219. Specify the following free properties of solutions of albumens:
- high viscosity and small speed of diffusion
  - pass through a semi-permeable membrane
  - does not denaturize
220. Specify free properties of solutions of albumens:
- high speed of diffusion
  - does not pass through a semi-permeable membrane without being cut
  - does not denaturize.
221. Specify free properties of solutions of albumens:
- high speed of diffusion
  - pass through a semi-permeable membrane without being cut
  - adsorb other matters and denaturize.
222. Denaturizing of albumens is caused by such factors:
- radiation and ultraviolet
  - 0,9% solution of NaCl



- c) brome water
223. Denaturizing of albumens is caused by such factors:
- a) 0,9% solution of NaCl
  - b) concentrated solutions of acids and meadows
  - c) brome water
224. Squirrels show:
- a) properties of acids only
  - b) properties of bases only
  - c) amphoteric properties
225. General formula of albumens:
- a)
226. During dissolution in water of squirrel they form:
- a) cation
  - b) zwitterions
  - c) anion
227. In a sour environment squirrel have:
- a) negative charge
  - b) zero charge
  - c) positive charge
228. In an alkaline environment squirrel have:
- a) negative charge
  - b) zero charge
  - c) positive charge
229. The isoelectric state of albumens existence is:
- a) cation
  - b) zwitter ions
  - c) anion
230. Isoelectric point of albumens is:
- a) pressure of solution in which squirrel are in the isoelectric state
  - b) pH solution in which squirrel are in the isoelectric state
  - c) temperature of solution in which squirrel are in the isoelectric state
231. The size of isoelectric point of albumens depends on:
- a) amino acid composition
  - b) pH albumens
  - c) molar mass of albumens
232. High-quality reactions on albumens are:
- a) with brome water
  - b) biuret, ksanthoproteic
  - c) with a ferrum (III) chloride
233. High-quality reactions are on albumens:
- a) with brome water

- b) by sulfate acid
- c) Millon and Folya

234. The all-amino acid gives ningidrin a:

- a) violet color
- b) red color
- c) yellow color

235. A wattle-fence of connection between amino acid in squirrel is:

- a) glycoside
- b) peptide
- c) pard efires

236. Peptide connection between amino acid appears for an account of:

- a) carboxyl group of first amino acid and amino group of second amino acid
- b) amino group of first amino acid and carboxyl group of second amino acid
- c) between carboxyl group of two amino acid.

237. Structure of peptide connection:

- a)
  - b)  $-C-N-$
  - c)  $-C-N-$
- $$\begin{array}{c} \parallel \quad | \\ O \quad H \end{array}$$

238. An atom of carbon in peptide connection is in the state of:

- a)  $sp^2$ -to hybridization
- b)  $sp^3$ -to hybridization
- c)  $sp$ - to hybridization

239. For peptide connection characteristic is a:

- a) cycle chain tautomerism
- b) cys-trans isomeres
- c) enantiomerism

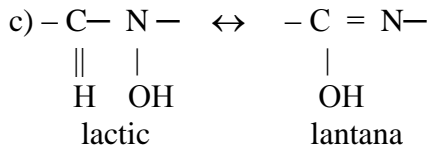
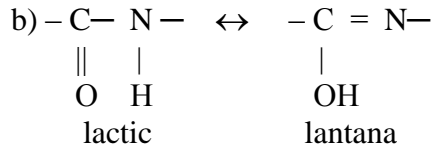
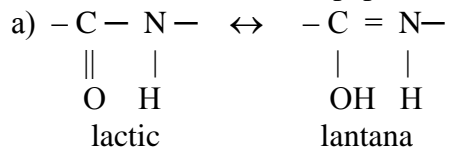
240. The cys-trans configuration of peptide connection looks like:

- a)
  - b)  $-C-N-$
- $$\begin{array}{c} H \\ | \\ -C-N- \\ \parallel \\ O \end{array}$$

241. For peptide connection characteristic is:

- a) lactic lantana tautomerism
- b) cycle chain tautomerism
- c) enantiomerism

242. Lactic is lantana form of peptide connection looks like:



243. A high-quality reaction on peptide connection is:

- a) xanthoproteinic
- b) permanganation
- c) biuret

244. A biuret reaction on albumens is conducted from:

- a)  $\text{CuSO}_4 + \text{NaOH}$
- b)  $\text{FeCl}_3$
- c)  $\text{Cu}_2\text{O}$

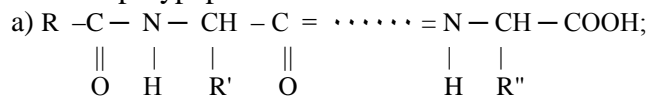
245. The result of biuret reaction is:

- a) yellow color
- b) violet color
- c) red color

246. Primary structure of albumen is:

- a) polyglycoside sequence
- b) polynucleotide sequence
- c) amino acid sequence

247. Chart of polypeptide chain is:



b)

248. Amino acid sequence is:

- a) primary structure of albumen
- b) second structure of albumen
- c) tertiary structure of albumen

249. The primary structure of albumen is supported:

- a) by ionic copulas
- b) by peptide copulas
- c) by forces of Van der Waal's

A polypeptide chain has:

- a) N- and S- eventual amino acid
- b) R- and F- eventual amino acid
- c) M- and N- eventual amino acid

250. The polypeptide chain of N- eventual amino acid is numbered:

- a) last
- b) first
- c) middle

251. The polypeptide chain of S- eventual amino acid is numbered:

- a) last
- b) first
- c) middle

252. For establishment of primary structure of albumen conduct is:

- a) a complete hydrolysis of albumen separate amino acid
- b) partial hydrolysis of albumen to the short peptides and set the amino acid sequence
- c) chromatographic divide squirrel into amino acid

253. N - the eventual amino acid in peptides is determined after a method of:

- a) Kucherov
- b) Edman
- c) Markovnikov

254. First albumen structure of which was deciphered is:

- a) insulin
- b) albumen
- c) haemoglobin

255. The structure of insulin was deciphered by the American scientist is:

- a) Krik;
- b) Senher
- c) Watson

256. Insulin is a hormone of the:

- a) thyroid
- b) liver
- c) pancreas

257. For the synthesis of peptide defense of  $\text{NH}_2$  groups conduct is:

- a) acidylating
- b) alkylation
- c) bromation

258. During the synthesis of peptide for activating of  $\text{COOH}$  groups it translate it to:

- a) amid
- b) halogen anhydride or anhydride
- c) salt

259. During the synthesis of peptide for defiance of COON it translates it to:
- amid
  - halogen anhydride
  - esters
260. First synthesized hormones of peptide nature are:
- oxytocin and vazopresin
  - thyroxine and tyrosine
  - somatotropin and adrenalin
261. For the acceleration of synthesis of albumens use:
- synthesis is in solutions;
  - solid phase synthesis by Merifild;
  - synthesis is in a gas phase.
262. For the acceleration synthesis of albumens the following is used:
- synthesis in solutions
  - synthesis in a gas phase
  - liquid synthesis by Shemyakin
263. Second structure of protein is:
- a well-organized location in space of polypeptide chain
  - a linear location in space of polypeptide chain
  - well-organized location in plan polypeptide chain
264. The second structure of albumen is supported mainly by:
- ionic copulas
  - hydrogen connections
  - peptide copulas
265. One of types of the second structure:
- $\beta$ -spiral
  - $\gamma$ -spiral
  - $\alpha$ -spiral
266. A basic type of connection in the tertiary structure of albumen is:
- disulfide
  - peptide
  - glycoside
267. A quaternary structure is supported by:
- peptide bond
  - hydrogen connections and forces of Van der Waal's
  - ionic copulas
268. Substituting in haemoglobin of glutaminic acid by a valine causes a disease of:
- iron deficiency anemia
  - sodium scarce anemia
  - sulfur similar anemia

## Nucleic acids.

269. Structural components of nucleic acids, their structure and chemical properties.  
 Nucleoside: composition, structure, type of connection and nomenclature.  
 Mononucleotides: composition, structure, types of connections and nomenclature.
270. RNA and DNA, composition, types of connections.  
 Features of the second structure of DNA and tRNA. Biological value of nucleic acids
271. ATP, composition, types of chemical connections; structure and biological meaning
272. Nucleic acids are called biopolymers morphons of which are:  
 a) mononucleotides connected between itself and phosphorus copulas  
 b) mononucleotides connected between itself and glycoside copulas  
 c) mononucleotides connected between itself anhydride copulas
273. Composition of nucleic acids is:  
 a) glucose and amino acid  
 b) nitrous bases, carbohydrate and phosphate acid  
 c) sulfate acid, phosphate acid and bases
274. Nucleic acids are shown by acid properties due to a presence of:  
 a) carbohydrates  
 b) nitrous bases  
 c) phosphatic acid
275. Nitrous bases of row enter in the compliment of nucleic acids:  
 a) to metadiazine and purine  
 b) to imidazole and tiffany  
 c) to pyridine and piazzolla
276. Metadiazine nitrous bases which enter in the compliment of nucleic acids are:  
 a) uracil, thymine and cytosine  
 b) adenine and guanozin  
 c) thymidine and guanine.
277. Purinoic nitrous bases which enter in the compliment of nucleic acids are:  
 a) uracil, thymine and cytosine  
 b) adenine and guanine  
 c) thumidine and uridine
278. Nitrous bases in hydrolysate of nucleic acids it's possible to discover:  
 a) Dragendorf reagent  
 b) Feling reagent  
 c) Millon reagent
279. Nitrous bases in nucleic acids are in:  
 a) laktime form  
 b) laktame form  
 c) cis-to the form

280. Such carbohydrates enter in the compliment of nucleic acids are:
- lacto glucose and mannose
  - ribose and deoxyribose
  - deoxyglucose and fructose
281. Deoxyribose can be distinguished from ribose by the absence of oxy group near:
- first carbon
  - third carbon
  - second carbon
282. Ribose and deoxyribose is polyatomic:
- aldehydoalcohol
  - hydroxy-ketones
  - acid alcohol
283. Ribose and deoxyribose in hydrolizate of nucleic acids are discovered for help by:
- Dragendorf reagent
  - Feling reagent
  - Millon reagent
284. Phosphatic acid in hydrolysate of nucleic acids are discovered for help by:
- tungsten test
  - chromic test
  - molybdenic test
285. Nucleoside is:
- OH glycosides which aglykonom of nitrous bases are
  - N glycosides which aglykonom of nitrous bases are
  - N is glycosides which aglykonom of phosphatic acid is.
286. In the complement of nucleoside enter:
- nitrous basis and phosphatic acid;
  - nitrous basis and glucose;
  - nitrous basis and carbohydrate.
287. Type nucleoside connection between nitrous basis and carbohydrate is:
- N-glycoside
  - OH-glycoside
  - hard efires
288. The products of hydrolysis of nucleoside is:
- phosphate acid
  - nitrous basis and carbohydrates
  - nitrous basis and phosphate acid
289. Nucleoside which consist of uracil and ribose are called:
- ureic acid
  - uridine
  - ribose
290. The compliment of citadines enters are called:
- cytosine and phosphoric acid

- b) amid and ribose
  - c) cytosine and ribose
291. Nucleoside which consists of adenine and ribose enters are called:
- a) adenosine
  - b) ribose
292. In the compliment of guanosine enters is called:
- a) guano sine
  - b) guanylic acid
  - c) guanine and ribose
293. Nucleoside which consist of thymine and desoxyribose enters is called:
- a) desoxyribose
  - b) deoxythymidine
  - c) deoxidized
294. Mononucleotides is:
- a) phosphates of nucleotides
  - b) phosphates of carbohydrates
  - c) phosphates of nucleosides
295. Mononucleotides are:
- a) nucleoside-5'-phosphates
  - b) nucleoside- 3'-phosphates
  - c) nucleotide -5' phosphates
296. In the compliment of mononucleotides enters:
- a) nitrous basis, carbohydrate and phosphate acid
  - b) amine, glucose and phosphate acid
  - c) nitrous acid, ribose and phosphate acid
297. In nucleotides a type of connection between components is:
- a) hard efires
  - b) N-glycosides and hard efires
  - c) OH-glycosides and hard efires
298. In nucleotides a type of connection between a carbohydrate and phosphatic acid is:
- a) OH-glycosides
  - b) N-glycoside
  - c) hard efires
299. In nucleotides a type of connection between nitrous basis and carbohydrate:
- a) N-glycosides
  - b) hard efires
  - c) OH-glycosides
300. Tailings enters in the compliment of timidile acid:
- a) thumine, ribose, to the phosphate of sodium
  - b) thumine, ribose, phosphate acid
  - c) thumine, desoxyribose, phosphatic acid



301. Tailings enters in the compliment of guanile acid:
- guanozine, ribose and phosphate acid
  - guanine, ribose and phosphate acid
  - guanine, ribose
302. Deoxyadenozine - 5'- a phosphate is called:
- adenine acid
  - adenosine acid
  - deoxyadenil acid
303. Deoxyuridine -5'-a phosphate is called:
- deoxyuridine acid
  - uridine acid
  - deoxyuridine acid
304. The products of hydrolysis of mononucleotides for a hard efires copula is:
- nitrous base and phosphoric acid
  - nucleoside and phosphoric acid
  - nitrous base and carbohydrate
305. The products of hydrolysis of adenylic acid for a hard efires copula is:
- ribose and phosphate acid
  - adenine and phosphate acid
  - adenosine and phosphate acid
306. The products of hydrolysis of uridil acid for a hard efires copula is:
- ribose and phosphate acid
  - uridine and phosphate acid
  - uridine and phosphate of sodium
307. Composition ATP tailings enters:
- adenine, ribose, and two molecules of phosphate acid
  - adenine, ribose and phosphate acid
  - adenine, ribose and three molecules of phosphate acid
308. Type of connection between tailings of nitrous basis and carbohydrate in a molecule ATP is:
- N-glycoside
  - hard efires
  - OH-glycoside
309. Type of connection between tailings of carbohydrate and phosphate acid in a molecule ATP is:
- N-glycoside
  - Hard efires
  - OH-glycoside
310. Type of connection between tailings of phosphate acid in a molecule ATP is:
- N-glycoside
  - hard efires
  - anhydride

311. Molecule ATP in the human organism is:
- macroergic system
  - microergic system
  - power system
312. In a molecule of ATP energy provided in oneself is:
- hard efires bonds
  - anhydride copulas
  - glycoside copulas
313. ATP takes part in activating:
- amino acid
  - alcohols
  - fats
314. Amino acyl adenylate complex appears between:
- amino acid and ATP
  - an alcohol and ATP
  - fat and ATP
315. Chart of polynucleotide chain are:
- $$\begin{array}{cccc}
 \text{U} - \text{P} - \text{U} - \text{P} - \text{U} - \text{P} & \dots\dots\dots & & \\
 | & & | & & | \\
 \text{AO} & & \text{AO} & & \text{AO}
 \end{array}$$
  - $$\begin{array}{cccc}
 \text{U} - \text{P} - \text{U} - \text{P} - \text{U} - \text{P} & \dots\dots\dots & & \\
 | & & | & & | \\
 \text{AO} & & \text{AO} & & \text{AO}
 \end{array}$$
  - $$\text{U} - \text{P} - \text{AO} - \text{U} - \text{AO} - \text{P} - \text{U} - \text{AO} - \text{P}$$
316. Tailings enters in the compliment of RNA:
- amino acid and nitrous bases
  - phosphate acid and nitrous bases
  - nitrous bases ribose and phosphate acid
317. Tailings of such nitrous bases enter in the compliment of RNA:
- A, G, C, U
  - A, G, T, F
  - A, G, C, F
318. A type of connection between mononucleotides in the molecule of RNA is:
- 1' - 2'
  - 3' - 5'
  - 2' - 5'
319. A type of connection between mononucleotides in the molecule of RNA is:
- glycoside
  - simple ether
  - difficultly -ether

320. The structural components of DNA tailings are:
- nitrous bases, deoxyribose and phosphate acids
  - amino acid and nitrous bases
  - phosphate acid and nitrous bases
321. Tailings of such nitrogenous bases enter in the compliment of DNA is:
- A, G, C, T
  - A, G, T, F
  - A, G, C, F
322. A type of connection between mononucleotides in the molecule of DNA is:
- 1'-2'
  - 3'-5'
  - 2'-5'
323. A type of connection between mononucleotides in the molecule of DNA is:
- glycoside
  - simple ether
  - hard – ether
324. Primary structure of DNA is:
- polynucleotide sequence
  - consistent of amino acid
  - polyglycoside sequence
325. Polynucleotide sequence is:
- second structure of DNA
  - primary structure of DNA
  - spiral of DNA
326. Second structure of DNA is:
- a double spiral involutes on the right
  - a spiral involutes to the left
  - linear chain of mononucleotides
327. Double spiral of DNA was set by scientists:
- Watson and Krik
  - Boyl and Mariot
  - Shrouds-Goff and Pasters
328. The structure of the DNA duplex is supported:
- by hard efires copulas between complementary bases
  - by hydrogen connections between complementary bases
  - by glycoside copulas between complementary bases
329. Complementary bases in the molecule of DNA are such pairs of bases:
- A–G
  - U–C
  - A–T
330. Complementary bases in the molecule of DNA are such pair of bases:
- G–C

- b) U–C
- c) A–G

331. The molecules of DNA have:

- a) amphoteric structure
- b) liquid-crystalline structure
- c) structure of liquid gas

## LIPIDS

332. Fats. Higher fat acids: saturated and unsaturated, special structure of the unsaturated acids and chemical properties.

Tree acyl glycerides (fats) composition, structure, chemical properties (hydrolysis, ionic number, peroxide oxidization and hydrogenation.

Phosphatide acid: composition, structure, and types of connections

Phosphate glyceride: structure of phosphate dylcholine, phosphate dykolamine, phosphate dylserine, and types of connections, biological value.

333. Fats-esterys:

- a) tree atom alcohol of glycerin and higher fat acids
- b) diatomic alcohol a glycol and higher fat acids
- c) tree atom alcohol of glycerin and low of fat acids

334. Tailings enter in the complement of fats

- a) diatomic alcohol a glycol and higher fat acids
- b) tree atom alcohol of glycerin and higher fat acids
- c) tree atom alcohol of glycerin and low of fat acids

335. A type of connection is in fats

- a) peptide
- b) glycoside
- c) hard efires

336. The most widespread saturated higher fat acids in composition of fats are:

- a) palmitic and stearic
- b) olein and elaidinoic
- c) linoleic and palmitic

337. The most widespread unsaturated higher fat acids in composition of fats are:

- a) palmitic and stearin
- b) olein, linoleic and linolenic
- c) linoleic and palmitic

338. A high-quality reaction on the unsaturated higher fat acids in composition of fats is:

- a) discoloring of copper (II) hydroxide
- b) discoloring of iron (III) chloride
- c) discoloring of bromic water

339. Higher fat acids that are unsaturated in composition of fats differ:

- a) by the structure of carbon al structure
- b) by the number of double connections

- c) by the type of isomer
340. Higher fat acids that are unsaturated in composition of fats have:
- trans-configuration
  - L-configuration
  - cis-configuration
341. The cis is a configuration of unsaturated higher fat acids in fats matters for:
- forming of structure of cellular membrane
  - forming of bone fabric
  - composition to blood
342. Hard fats contained by tailings:
- unsaturated higher fat acids
  - saturated higher fat acids
  - saturated low of fat acids
343. Liquid fats contained by tailings:
- saturated higher fat acids
  - unsaturated higher fat acids
  - saturated low of fat acids
344. Fats is:
- alkyl gliceride
  - anhydride gliceride
  - acylgliceride.
345. Fats are better added to hydrolysis in:
- sour and alkaline environments
  - neutral environment
  - environment of brome water
346. The products of acid hydrolysis of fats is:
- ethylene glycol and higher fat acids
  - glycerine and higher fat acids
  - glycerine and salts of higher fat acids
347. The products of alkaline hydrolysis of fats is
- ethylene glycol and higher fat acids
  - glycerine and higher fat acids
  - glycerine and salts of higher fat acids
348. Ion number is:
- amount of grams of ion that joins in with 100g fat
  - amount of ion that joins in with 100g fat
  - an amount of grams is potassium of ion that joins in with 100g fat
349. Ion number is characterized by a degree:
- of the saturation of fat
  - of isomerization of fat
  - of the unsaturation of fat

350. Ion number more than that is:
- less biological value of fat
  - greater biological value of fat
  - an ion number does not influence on the biological value of fat
351. The greater the degree of unsaturation of fat the:
- less biological value of fat
  - ion number does not influence on the biological value of fat
  - greater biological value of fat
352. Heating of fats is a result:
- peroxyde oxidation fats
  - proceeding in fats
  - besieging of fats
353. Hydrogenation fats is:
- converting of hard fat into liquid
  - converting of liquid fat into hard
  - converting of desi into butter
354. Hydrogenation fats is a reaction:
- hydrogenising
  - hydratations
  - dehydrogenization
355. In the organism of man fats are added to hydrolysis:
- in a stomach of a sour environment
  - in intestines in an alkaline environment
  - in oral cavity in an alkaline environment
356. The products of hydrolysis of fats in the organism of man is:
- glycol and soap
  - HFA and alcohol
  - glycerin and soap
357. Medicinal preparations of fats is:
- linetol and arakhiden
  - protargolum and palmitic acid
  - soap stearin acid
358. Phospho glicerides are derivatives of
- phosphate acid
  - phosphate acids
  - pyro phosphate acids
359. Phosphate acid consists of tailings:
- saturated HFA, glycerin and phosphate acid
  - unsaturated HFA, glycerin and phosphate acid
  - unsaturated HFA, glycol and phosphate acid
360. A type of connection between the components of phosphate is:
- glycoside

- b) peptide
- c) hard efires

361. Phosphate acid has:

- a) L-configuration
- b) D-configuration
- c) cis-configuration

362. The remain of choline which is connected with a remain of enters in the compliment of phosphate dicholine:

- a) phosphate acids
- b) phosphate acid
- c) glycerin

363. Phosphate glycerides in biological membranes form:

- a) lipids bach
- b) lipids monolayer
- c) micelles

