

**FEDERAL STATE BUDGET EDUCATIONAL
HIGHER EDUCATION INSTITUTION
"ROSTOV STATE MEDICAL UNIVERSITY"
MINISTRY OF HEALTH OF THE RUSSIAN FEDERATION**

FACULTY OF TREATMENT AND PREVENTION

Evaluation materials

by discipline "**Chemistry**"

speciality 05/31/01 General medicine

2023

1. List of competencies formed by the discipline (in whole or in part)*

general professional (OPK):

Code and name general professional competence	Indicator(s) of achieving general professional competence
OPK-4 Able to use medical devices provided for in the procedure for providing medical care, as well as conduct examinations of the patient in order to establish a diagnosis.	ID-1 OPK-4 Able to use medical devices in diagnostic studies provided for in the procedures for providing medical care ID-2 OPK-4 Able to apply diagnostic methods, including the use of instrumental methods, when examining a patient in order to establish a diagnosis

2. Types of assessment materials in accordance with the competencies being developed

Name competencies	Types of assessment materials	number of tasks for 1 competency
OPK-4	Closed tasks	25 with sample answers
	Open type tasks: Situational tasks Interview Questions	75 with sample answers

OPK-4:

Closed type task.

Task 1. Instructions: Choose one correct answer. Optical isomerism is possible if the molecule contains: 1) one carbon atom

2) one oxygen atom

3) chiral center

4) one nitrogen atom

Sample answer: 3) chiral center

Task 2. Instructions: Choose one correct answer. By chemical nature, surfactants belong to:

1) triacylglycerides

2) phospholipids

3) carbohydrates

4) nucleotides

Response standard: 2) phospholipids

Task 3. Instructions: Choose one correct answer. When proteins are hydrolyzed, the following are formed:

1) amino acids

2) nitrogenous bases

3) ketone bodies

4) higher fatty acids *Response*

standard: 1) amino acids

Task 4. Instructions: Choose one correct answer. By chemical nature, sucrose belongs to:

1) monosaccharides

2) disaccharides

3) homopolysaccharides

4) heteropolysaccharides

Response standard: 2) disaccharides

Task 5. Instructions: Choose one correct answer.

Lactose is a disaccharide, the molecule of which includes residues of galactose and: 1) fructose

2) ribose

3) glucose

4) mannose

Response standard: 3) glucose

Task 6. Instructions: Choose one correct answer.

Sucrose is a disaccharide, the molecule of which includes residues of glucose and: 1) fructose

2) ribose

3) galactose

4) mannose

Response standard: 1) fructose

Task 7. Instructions: Choose one correct answer. When glucose is reduced, polyhydric alcohol 1) glycerol is formed

- 2) sorbitol
- 3) ethylene glycol
- 4) sphingosine

*Sample answer:*2) sorbitol

Task 8. Instructions: Choose one correct answer. Bile acids are formed during the oxidation of: 1) glycerol

- 2) sphingosine
- 3) cholesterol
- 4) ethylene glycol

*Sample answer:*3) cholesterol

Task 9. Instructions: Choose one correct answer.

Carbohydrates consisting of a large number (more than 10) residues of identical monosaccharides are called:

- 1) disaccharides
- 2) oligosaccharides
- 3) homopolysaccharides
- 4) heteropolysaccharides

*Sample answer:*3) homopolysaccharides

Task 10. Instructions: Choose one correct answer.

Carbohydrates consisting of a large number (more than 10) residues of different monosaccharides are called:

- 1) disaccharides
- 2) oligosaccharides
- 3) homopolysaccharides
- 4) heteropolysaccharides

*Sample answer:*4) heteropolysaccharides

Task 11. Instructions: Choose one correct answer. Lecithin (phosphatidylcholine) by its chemical nature belongs to: 1) nucleotides

2) triacylglycerols

3) sphingolipids

4) phospholipids

Sample answer: 4) phospholipids

Task 12. Instructions: Choose one correct answer. When glucose is oxidized by the aldehyde group, an acid is formed: 1) gluconic

2) glutamine

3) dicarbonic

4) sugar

Sample answer: 1) gluconic

Task 13. Instructions: Choose one correct answer. When monosaccharides are reduced, the following are formed:

1) acids

2) monohydric alcohols

3) polyhydric alcohols

4) aldehydes

Response standard: 3) polyhydric alcohols

Task 14. Instructions: Choose one correct answer. Higher fatty acids are included in:

1) proteins

2) carbohydrates

3) lipids

4) nucleic acids

Response standard: 3) lipids

Task 15. Instructions: Choose one correct answer.

The reaction of glucose with phosphoric acid refers to the following reactions: 1) addition

2) oxidation

- 3) recovery
- 4) esterification

Response standard: 4) esterification

Task 16. Instructions: Choose one correct answer. The ATP molecule contains a bond:

- 1) hydrophobic
- 2) macroergic
- 3) disulfide
- 4) ionic

Response standard: 2) macroergic

Task 17. Instructions: Choose one correct answer. Nucleic acids are polymers of residues:

- 1) mononucleotides
- 2) amino acids
- 3) glucose
- 4) galactose

Response standard: 1) mononucleotides

Task 18. Instructions: Choose one correct answer.

Thioalcohol - CoASH reacts with esterification with: 1) amines

- 2) glucose
- 3) fructose
- 4) carboxylic acids

Response standard: 4) carboxylic acids

Task 19. Instructions: Choose one correct answer. Nicotinamide adenine dinucleotide (NAD⁺) takes part in the reactions: 1)

- phosphorylation
- 2) redox
- 3) hydrolysis
- 4) transfer

Response standard: 2) redox

Task 20. Instructions: Choose one correct answer. Flavin adenine dinucleotide (FAD) takes part in the reactions of: 1) phosphorylation

2) redox

3) hydrolysis

4) transfer

Response standard: 2) redox

Task 21. Instructions: Choose two correct answers.

Monoaminodicarboxylic amino acids include: 1) alanine

2) glutamic acid

3) valine

4) aspartic acid

5) serine

Response standard: 2) glutamic acid 4) aspartic acid

Task 22. Instructions: Choose two correct answers.

Diaminomonocarboxylic amino acids include: 1) tyrosine

2) lysine

3) phenylalanine

4) serine

5) arginine

Response standard: 2) lysine 5) arginine

Task 23. Instructions: Choose two correct answers.

When decarboxylation of monoaminomonocarboxylic amino acids is formed: 1) ammonia

2) carbon dioxide

3) amines

4) keto acids

5) arenas

Response standard: 2) carbon dioxide

3) amines

Task 24. Instructions: Choose two correct answers.

The hydrolysis of sucrose produces:

- 1) lactose
- 2) glucose
- 3) alanine
- 4) glutamine
- 5) fructose

Response standard: 2) glucose 5) fructose

Task 25. Instructions: Choose two correct answers. The hydrolysis of lactose produces:

- 1) fructose
- 2) glucose
- 3) galactose
- 4) arabinose
- 5) ribose

Response standard: 2) glucose 3) galactose

Open type tasks:

Exercise 1.

Given a compound whose formula is: $C_{15}H_{31}$

COOH. A) Name this connection;

B) indicate the name of the compound with which it reacts to form triacylglycerol.

Response standard:

A) palmitic acid; B) with glycerin.

Task 2.

Given a compound whose formula is: $C_{17}H_{35}$

COOH. A) Name this connection;

B) indicate the name of the compound with which it reacts to form triacylglycerol.

Response standard:

A) stearic acid; B) with glycerin.

Task 3.

Given a compound whose formula is: $C_{17}H_{33}$

COOH. A) Name this connection;

B) indicate the name of the compound with which it reacts to form triacylglycerol.

Response standard:

- A) oleic acid;
- B) with glycerin.

Task 4.



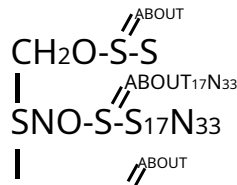
Given a compound whose formula is: $\begin{array}{c} | & | & | \\ \text{H} & \text{E} & \text{H} \end{array}$. A)

name this connection;

B) by interacting with which compounds can a simple lipid be obtained?

Response standard:

- A) glycerin;
- B) with higher fatty acids. Task 5.



Given a compound whose formula is: $\text{CH}_2\text{O-S-S}_{17}\text{N}_{33}$.

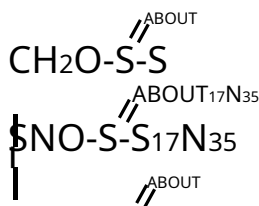
A) Determine the class to which it belongs;

B) Indicate the classes of compounds whose residues are included in its composition.

Response standard:

- A) lipid, simple, triacylglycerol (TAG). | | |
- B) Consists of polyhydric alcohol residues - glycerol and higher fatty acids.

Task 6.



Given a compound whose formula is: $\text{CH}_2\text{O-S-S}_{17}\text{N}_{35}$.

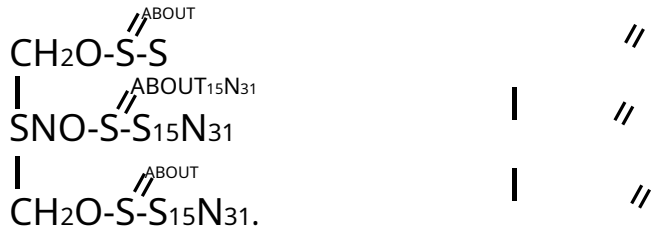
A) Determine the class to which it belongs;

B) Indicate the classes of compounds that are part of it.

Response standard:

- A) lipid, simple, triacylglycerol (TAG).
- B) Consists of polyhydric alcohol residues - glycerol and higher fatty acids.

Task 7.



Given a compound whose formula is:

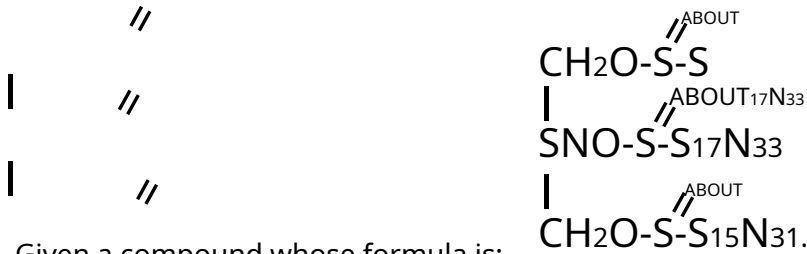
- A) Determine the class to which it belongs;
- B) Indicate the classes of compounds that are part of it.

Response standard:

A) lipid, simple, triacylglycerol (TAG).

B) Consists of polyhydric alcohol residues - glycerol and higher fatty acids.

Task 8.



Given a compound whose formula is:

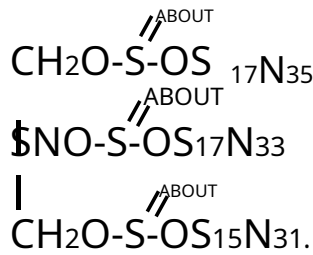
- A) Determine the class to which it belongs;
- B) Indicate the classes of compounds that are part of it.

Response standard:

A) lipid, simple, triacylglycerol (TAG).

B) Consists of polyhydric alcohol residues - glycerol and higher fatty acids.

Task 9.



Given a compound whose formula is:

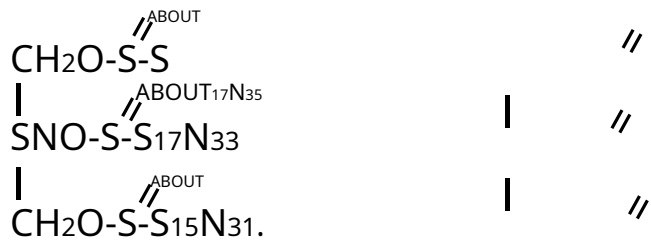
- A) Determine the class to which it belongs;
- B) Indicate the classes of compounds that are part of it.

Response standard:

A) lipid, simple, triacylglycerol (TAG).

B) It consists of polyhydric alcohol residues - glycerol and higher fatty acids.

Task 10.



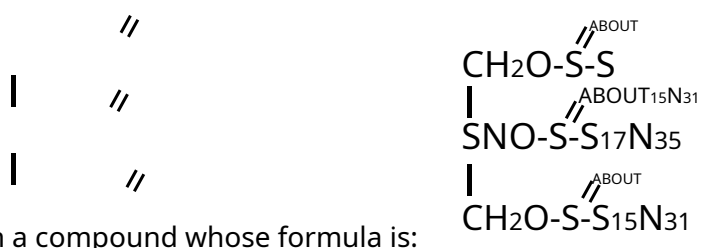
Given a compound whose formula is:

- A) Determine the class to which it belongs; //
- B) Indicate the classes of compounds whose residues are included in its composition. //

Response standard:

- A) lipid, simple, triacylglycerol (TAG). | //
- B) Consists of polyhydric alcohol residues - glycerol and higher fatty acids.

Task 11.



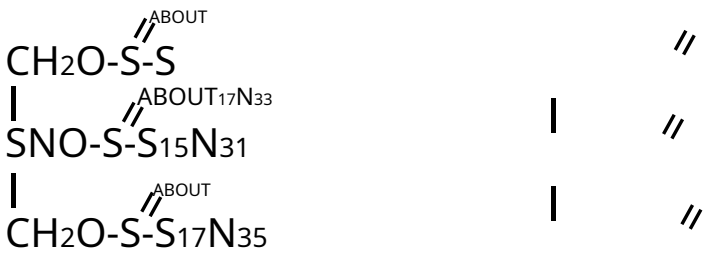
Given a compound whose formula is:

- A) Determine the class to which it belongs;
- B) Indicate the classes of compounds whose residues are included in its composition.

Response standard:

- A) lipid, simple, triacylglycerol (TAG).
- B) Consists of polyhydric alcohol residues - glycerol and higher fatty acids.

Task 12.



Given a compound whose formula is:

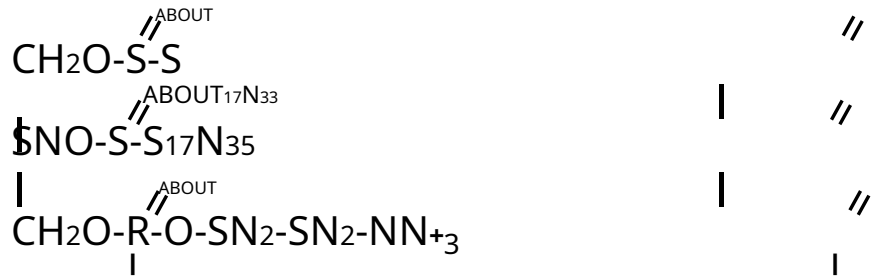
- A) Determine the class to which it belongs;
- B) Indicate the classes of compounds whose residues are included in its composition.

Response standard:

- A) lipid, simple, triacylglycerol (TAG). // //
- B) Consists of polyhydric alcohol residues - glycerol and higher fatty acids. | //

Task 13.





Given a compound whose formula is:

A) determine the class to which it belongs;

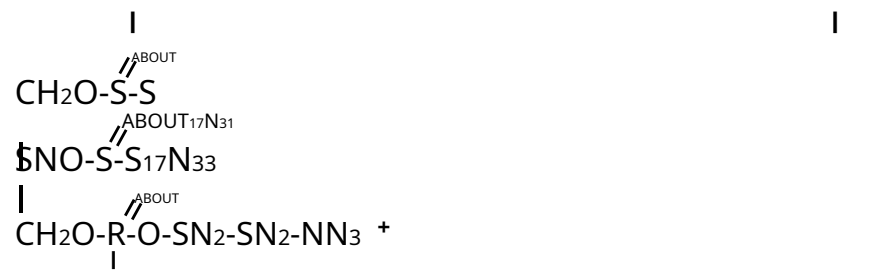
B) Indicate the classes of compounds whose residues are included in its composition.

Response standard:

A) phospholipid

B) Consists of polyhydric alcohol residues - glycerol, higher fatty acids, amino alcohol (ethanolamine), mineral acid - phosphoric.

Task 14.



Given a compound whose formula is:

A) determine the class to which it belongs;

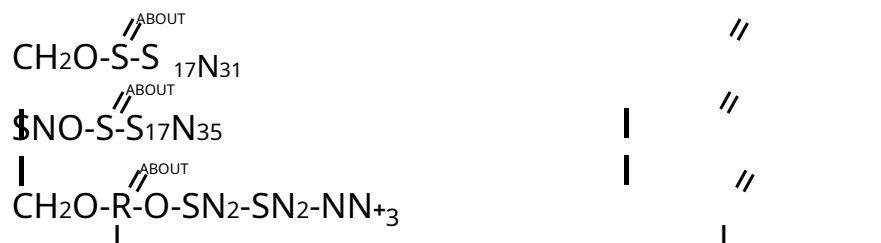
B) indicate the classes of compounds whose residues are included in its composition.

Response standard:

A) phospholipid

B) Consists of polyhydric alcohol residues - glycerol, higher fatty acids, amino alcohol (ethanolamine), mineral acid - phosphoric.

Task 15.



Given a compound whose formula is:

A) determine the class to which it belongs;

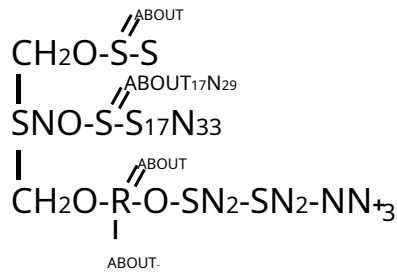
B) Indicate the classes of compounds whose residues are included in its composition.

Response standard:

A) phospholipid

B) Consists of polyhydric alcohol residues - glycerol, higher fatty acids, amino alcohol (ethanolamine), mineral acid - phosphoric.

Task 16.



Given a compound whose formula is:

A) determine the class to which it belongs;

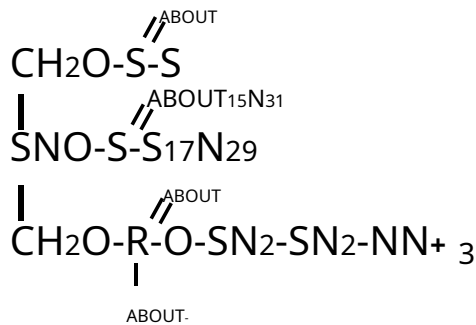
B) Indicate the classes of compounds whose residues are included in its composition.

Response standard:

A) phospholipid

B) Consists of polyhydric alcohol residues - glycerol, higher fatty acids, amino alcohol (ethanolamine), mineral acid - phosphoric.

Task 17.



Given a compound whose formula is:

A) determine the class to which it belongs;

B) Indicate the classes of compounds whose residues are included in its composition.

Response standard:

A) phospholipid

B) Consists of polyhydric alcohol residues - glycerol, higher fatty acids, amino alcohol (ethanolamine), mineral acid - phosphoric.

Task 18.

The reaction equation is given: $(\text{C}_6\text{N}_{10}\text{O}_5)_{n+} + (n-1)\text{H}_2\text{O} \rightarrow n\text{C}_6\text{N}_{12}\text{O}_6$: A) determine the class to which the original compound belongs; B) name the final product of the reaction.

Response standard:

A) polysaccharide

B) glucose

Task 19.

The reaction scheme is given: $\text{glucose} + \text{H}_3\text{RO}_4 \rightarrow \text{glucose-6-phosphate} + \text{H}_2\text{O}$. Determine:

A) the class to which the original compound belongs;

B) type of reaction.

Response standard:

A) monosaccharide

B) phosphorylation (esterification)

Task 20.

The reaction scheme is given: $\text{fructose} + \text{H}_3\text{RO}_4 \rightarrow \text{fructose-6-phosphate} + \text{H}_2\text{O}$. Determine:

A) the class to which the original compound belongs;

B) type of reaction.

Response standard:

A) monosaccharide

B) phosphorylation (esterification)

Task 21.

The reaction scheme is given: $\text{galactose} + \text{H}_3\text{RO}_4 \rightarrow \text{galactose-6-phosphate} + \text{H}_2\text{O}$.

Determine: A) the class to which the original compound belongs;

B) type of reaction.

Response standard:

A) monosaccharide

B) phosphorylation (esterification)

Task 22.

The reaction scheme is given: $\text{ribose} + \text{H}_3\text{RO}_4 \rightarrow \text{ribose-5-phosphate} + \text{H}_2\text{O}$.

Determine: A) the class to which the original compound belongs;

B) type of reaction.

Response standard:

A) monosaccharide

B) phosphorylation (esterification)

Task 23.

The reaction scheme is given: $\text{deoxyribose} + \text{H}_3\text{RO}_4 \rightarrow \text{deoxyribose-5-phosphate} + \text{H}_2\text{O}$. Determine: A)

the class to which the original compound belongs;

B) type of reaction.

Response standard:

A) monosaccharide

B) phosphorylation (esterification)

Task 24.

The reaction scheme is given: $\text{glucose} + \text{H}_2 \rightarrow \text{sorbitol}$;

Define:

A) classes to which organic compounds of this reaction belong; B) type of reaction.

Response standard:

A) glucose - carbohydrate, monosaccharide, sorbitol - polyhydric alcohol B) hydrogenation (reduction).

Task 25.

The reaction scheme is given: galactose + H₂ →

galactite; Define:

A) classes to which organic compounds of this reaction belong; B) type of reaction.

Response standard:

A) galactose - carbohydrate, monosaccharide, galactitol - polyhydric alcohol B) hydrogenation (reduction).

Task 26.

The reaction scheme is given: fructose + H₂ → sorbitol +

mannitol; Define:

A) classes to which organic compounds of this reaction belong; B) type of reaction.

Response standard:

A) fructose - monosaccharide, sorbitol, mannitol - polyhydric alcohols B) hydrogenation (reduction).

Task 27.

The reaction scheme is given: ribose + H₂ →

ribitol; Define:

A) classes to which organic compounds of this reaction belong; B) type of reaction.

Response standard:

A) ribose is a monosaccharide, ribitol is a polyhydric alcohol B) hydrogenation (reduction).

Task 28.

The reaction scheme is given: glucose + 1/2 O₂ → gluconic acid;

Define:

A) the class to which the original compound belongs; B) type of reaction.

Response standard:

A) monosaccharide

B) oxidation.

Task 29.

The reaction scheme is given: galactose + 1/2O₂ → galactonic acid; Define:

A) the class to which the original compound belongs; B) type of reaction.

Response standard:

A) monosaccharide

B) oxidation.

Task 30.

The reaction scheme is given: histidine → histamine + CO₂; Define:

A) the class to which the original compound belongs; B) type of reaction.

Response standard:

A) amino acid

B) decarboxylation (cleavage)

Task 31.

For the amino acid glycine, whose formula is: H₃N⁺-CH₂COO⁻.

A) write down the equation for the reaction with HCl; B)

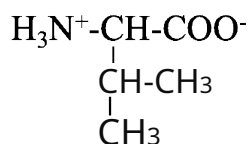
indicate the charge of the acid in an acidic medium.

Response standard:

A) Reaction equation:

H₃N⁺-CH₂COO⁻ + HCl ⇒ [H₃N⁺-CH₂COOH]Cl; B) In an acidic environment, the acid is positively charged.

Task 32.



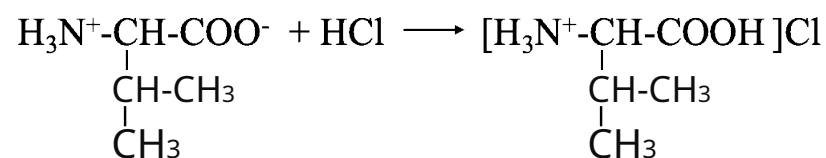
For the amino acid valine, the formula of which is: A)

write the equation for the reaction with HCl;

B) indicate the charge of the acid in an acidic medium.

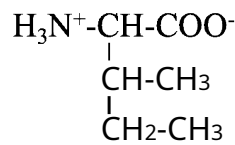
Response standard:

A) Reaction equation:



B) In an acidic environment, the acid is positively charged.

Task 33.



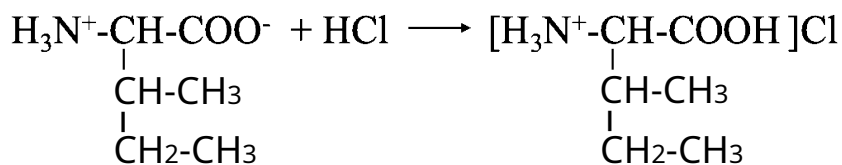
For the amino acid isoleucine, the formula of which is: A)

write the equation for the reaction with HCl;

B) indicate the charge of the acid in an acidic medium.

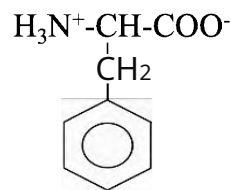
Response standard:

A) Reaction equation:



B) In an acidic environment, the acid is positively charged.

Task 34.



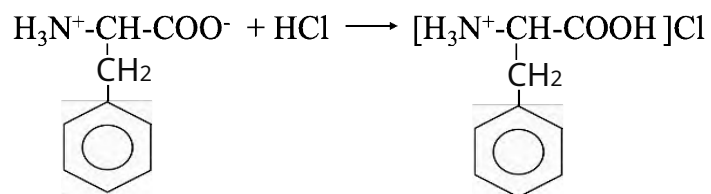
For the amino acid phenylalanine, the formula of which is: A)

write the equation for the reaction with HCl;

B) indicate the charge of the acid in an acidic medium.

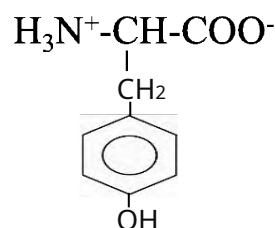
Response standard:

A) Reaction equation:



B) In an acidic environment, the acid is positively charged.

Task 35.



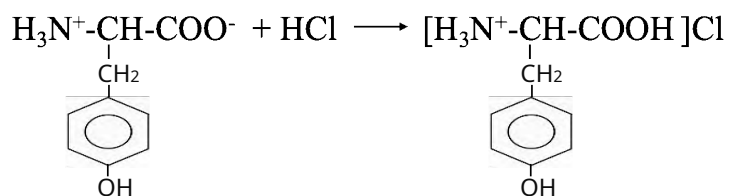
For the amino acid tyrosine, the formula of which is: A)

write the equation for the reaction with HCl;

B) indicate the charge of the acid in an acidic medium.

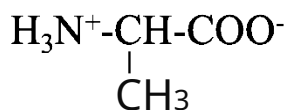
Response standard:

A) Reaction equation:



B) In an acidic environment, the acid is positively charged.

Task 36.



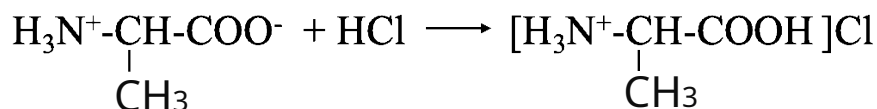
For the amino acid alanine, the formula of which is: A)

write the equation for the reaction with HCl;

B) indicate the charge of the acid in an acidic medium.

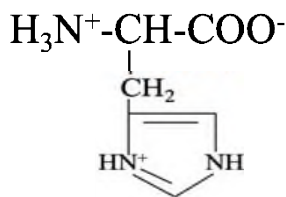
Response standard:

A) Reaction equation:



B) In an acidic environment, the acid is positively charged.

Task 37.



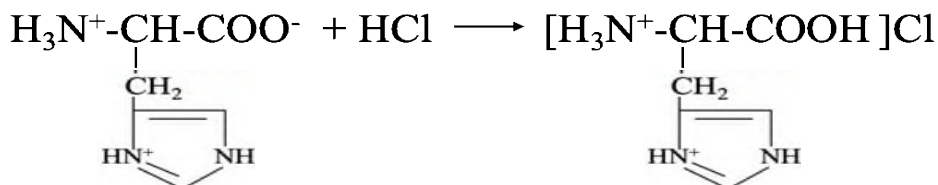
For the amino acid histidine, the formula of which is: A)

write the equation for the reaction with HCl;

B) indicate the charge of the acid in an acidic medium.

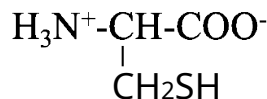
Response standard:

A) Reaction equation:



B) In an acidic environment, the acid is positively charged.

Task 38.



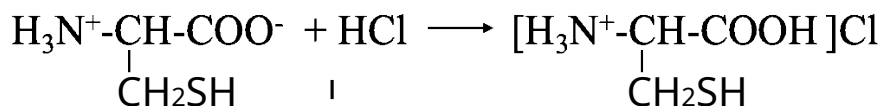
For the amino acid cysteine, the formula of which is: A)

write the equation for the reaction with HCl;

B) indicate the charge of the acid in an acidic medium.

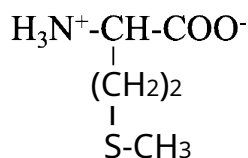
Response standard:

A) Reaction equation:



B) In an acidic environment, the acid is positively charged.

Task 39.



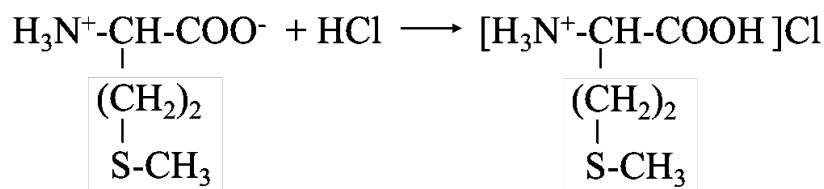
For the amino acid methionine, the formula of which is: A)

write the equation for the reaction with HCl;

B) indicate the charge of the acid in an acidic medium.

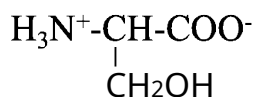
Response standard:

A) Reaction equation:



B) In an acidic environment, the acid is positively charged.

Task 40.



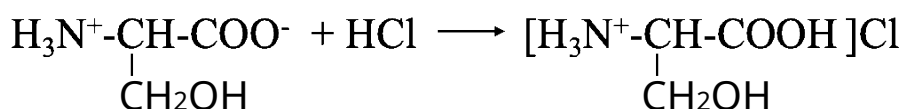
For the amino acid serine, the formula of which is: A)

write the equation for the reaction with HCl;

B) indicate the charge of the acid in an acidic medium.

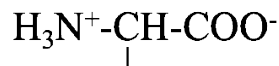
Response standard:

A) Reaction equation:



B) In an acidic environment, the acid is positively charged.

Task 41.



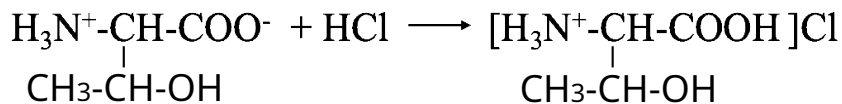
For the amino acid threonine, the formula of which is: $\text{CH}_3-\text{CH}-\text{OH}$

A) write down the equation for the reaction with HCl; B)

indicate the charge of the acid in an acidic medium.

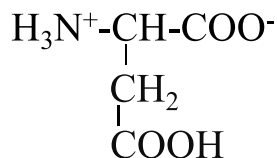
Response standard:

A) Reaction equation:



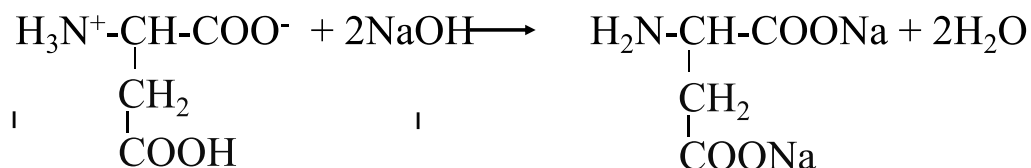
B) In an acidic environment, the acid is positively charged.

Task 42.



For an aspartic amino acid, the formula of which is: A)

write the equation for the reaction with NaOH;



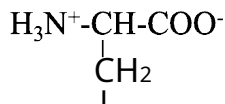
B) indicate the charge of the acid in an alkaline medium.

Response standard:

A) Reaction equation:

B) In an alkaline environment, an acid is negatively charged.

Task 43.



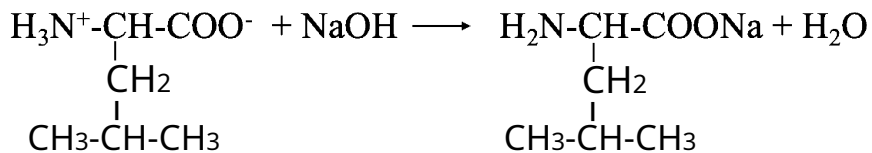
For the amino acid leucine, whose formula is: $\text{CH}_3-\text{CH}-\text{CH}_3$

A) write down the equation for the reaction with NaOH; B)

indicate the charge of the acid in an alkaline medium.

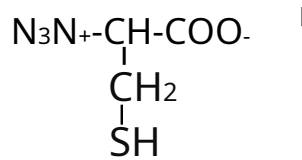
Response standard:

A) Reaction equation:



B) In an alkaline environment, an acid is negatively charged.

Task 44.



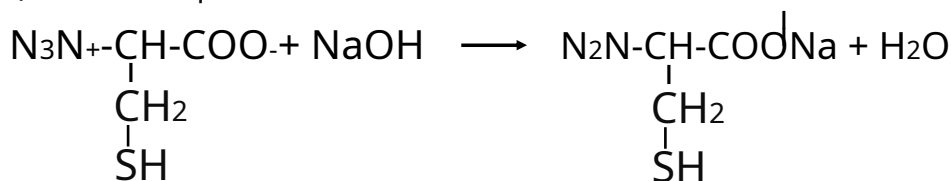
For the amino acid cysteine, the formula of which is: A)

write the equation for the reaction with NaOH;

B) indicate the charge of the acid in an alkaline medium.

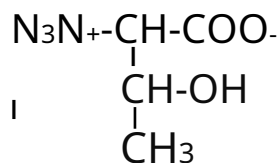
Response standard:

A) Reaction equation:



B) In an alkaline environment, an acid is negatively charged.

Task 45.



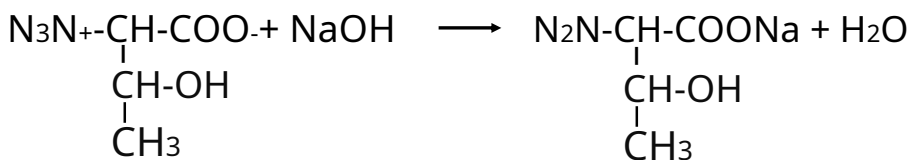
For the amino acid threonine, the formula of which is: A)

write the equation for the reaction with NaOH;

B) indicate the charge of the acid in an alkaline medium.

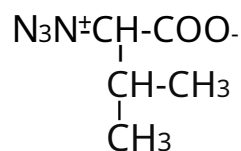
Response standard:

A) Reaction equation:



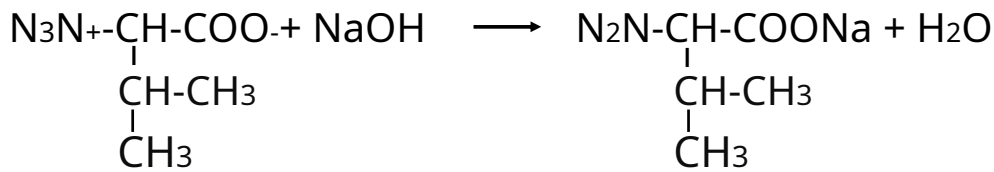
B) In an alkaline environment, an acid is negatively charged.

Task 46.



For the amino acid valine, the formula of which is:

A) write down the equation for the reaction with NaOH;



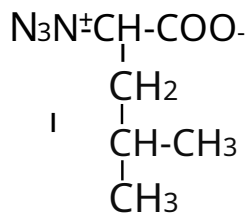
B) indicate the charge of the acid in an alkaline medium.

Response standard:

A) Reaction equation:

B) In an alkaline environment, an acid is negatively charged.

Task 47.



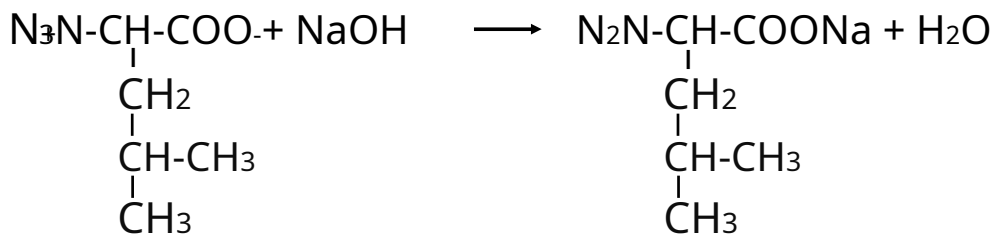
For the amino acid leucine, the formula of which is: A)

write the equation for the reaction with NaOH;

B) indicate the charge of the acid in an alkaline medium.

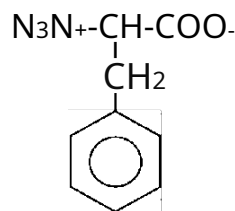
Response standard:

A) Reaction equation:



B) In an alkaline environment, an acid is negatively charged.

Task 48.



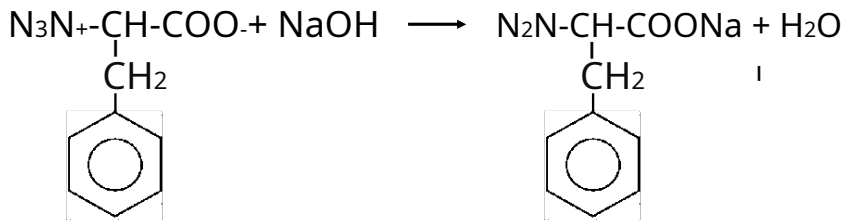
For the amino acid phenylalanine, the formula of which is: A)

write the equation for the reaction with NaOH;

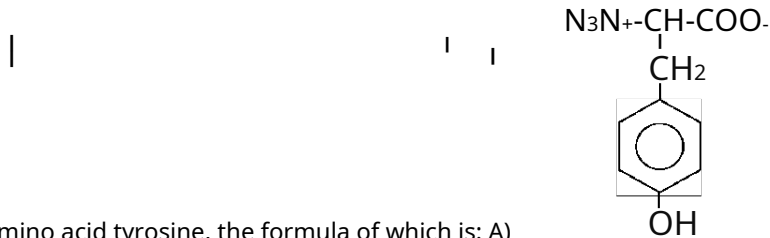
B) indicate the charge of the acid in an alkaline medium.

Response standard:

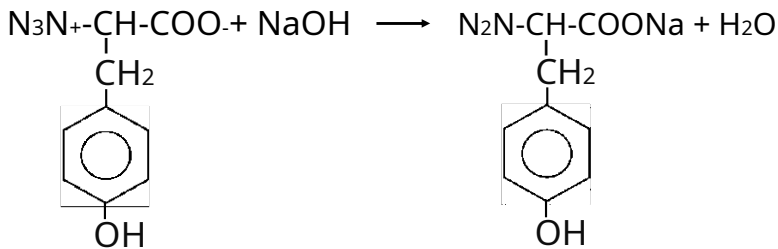
A) Reaction equation:



B) In an alkaline environment, an acid is negatively charged. Task 49.



For the amino acid tyrosine, the formula of which is: A) write the equation for the reaction with NaOH;

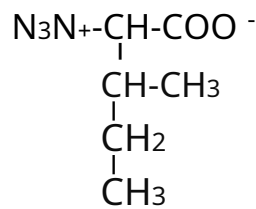


B) indicate the charge of the acid in an alkaline medium.

Response standard:

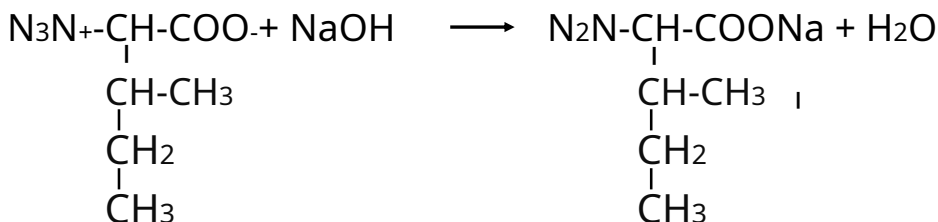
A) Reaction equation:

B) In an alkaline environment, an acid is negatively charged. Task 50.



For the amino acid isoleucine, the formula of which is: A)

write the equation for the reaction with NaOH;



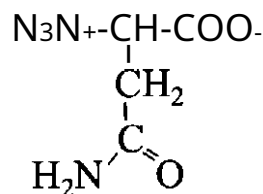
B) indicate the charge of the acid in an alkaline medium.

Response standard:

A) Reaction equation:

B) In an alkaline environment, an acid is negatively charged.

Task 51.



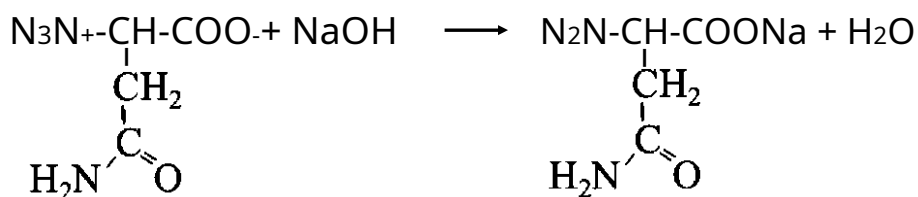
For the amino acid asparagine, the formula of which is: A)

write the equation for the reaction with NaOH;

B) indicate the charge of the acid in an alkaline medium.

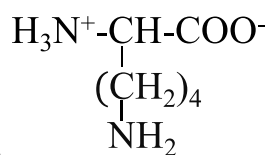
Response standard:

A) Reaction equation:



B) In an alkaline environment, an acid is negatively charged.

Task 52.



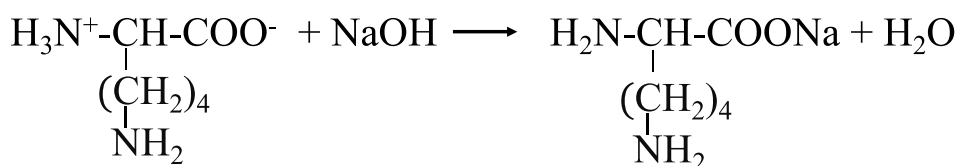
For the amino acid lysine, the formula of which is: A) write

the equation for the reaction with NaOH; B) indicate the

charge of the acid in an alkaline medium. *Response*

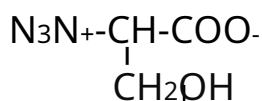
standard:

A) Reaction equation:



B) In an alkaline environment, an acid is negatively charged.

Task 53.



For the amino acid – serine, the formula of which is:

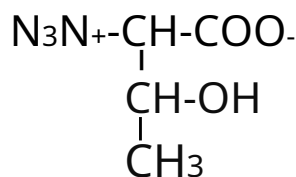
A) indicate the number (or numbers) of the asymmetric carbon atom (chiral center), B)

determine the number of possible stereoisomers. *Response standard:*

A) chiral center - the second carbon atom; B)

2 stereoisomers.

Task 54.

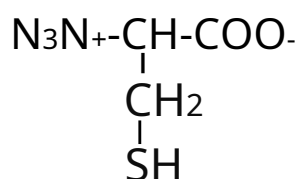


For the amino acid – threonine, the formula of which is:

A) indicate the number (or numbers) of the asymmetric carbon atom (chiral center), B) determine the number of possible stereoisomers. *Response standard:*

A) chiral center - the second and third carbon atoms; B) 4 stereoisomers.

Task 55.

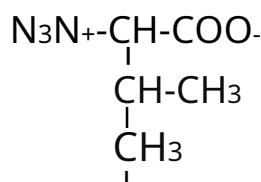


For the amino acid – cysteine, the formula of which is:

A) indicate the number (or numbers) of the asymmetric carbon atom (chiral center), B) determine the number of possible stereoisomers. *Response standard:*

A) chiral center - the second carbon atom; B) 2 stereoisomers.

Task 56.

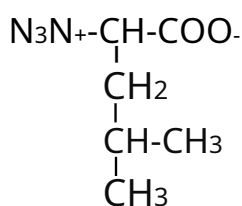


For the amino acid – valine, the formula of which is:

A) indicate the number (or numbers) of the asymmetric carbon atom (chiral center), B) determine the number of possible stereoisomers. *Response standard:*

A) chiral center - the second carbon atom; B) 2 stereoisomers.

Task 57.

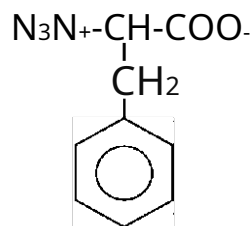


For the amino acid – leucine, the formula of which is:

A) indicate the number (or numbers) of the asymmetric carbon atom (chiral center), B) determine the number of possible stereoisomers. *Response standard:*

A) chiral center - the second carbon atom; B)
2 stereoisomers.

Task 58.

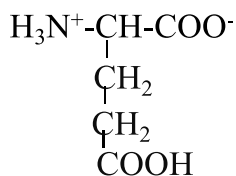


For the amino acid - phenylalanine, the formula of which is:

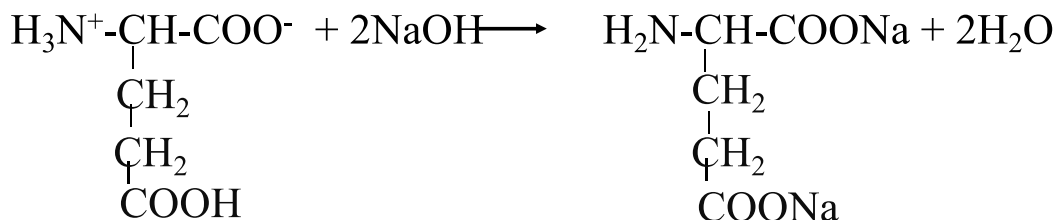
A) indicate the number (or numbers) of the asymmetric carbon atom (chiral center), B)
determine the number of possible stereoisomers. *Response standard:*

A) chiral center - the second carbon atom; B)
2 stereoisomers.

Task 59.



For glutamic acid, the formula of which is: A) write
the equation for the reaction with NaOH;



B) indicate the charge of the acid in an alkaline medium.

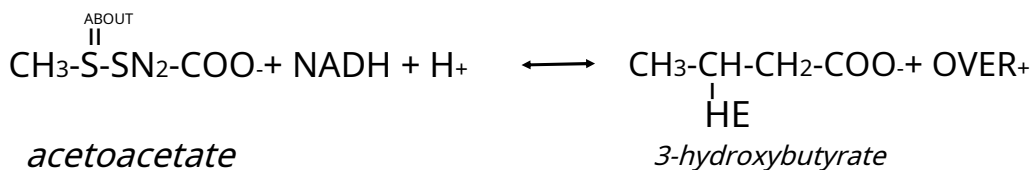
Response standard:

A) Reaction equation:

B) In an alkaline environment, an acid is negatively charged.

Task 60.

The chemical reaction proceeds according to the equation:



Define:

A) how to change the concentration of acetoacetate so that the equilibrium shifts to the right; B)
what type of reaction does it belong to?

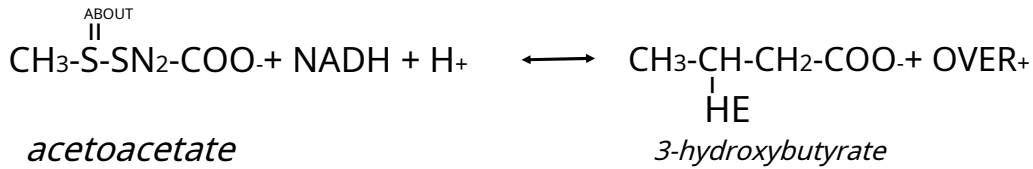
Response standard:

A) increase

B) hydrogenation reaction (reduction, redox)

Task 61.

The chemical reaction proceeds according to the equation:



Define:

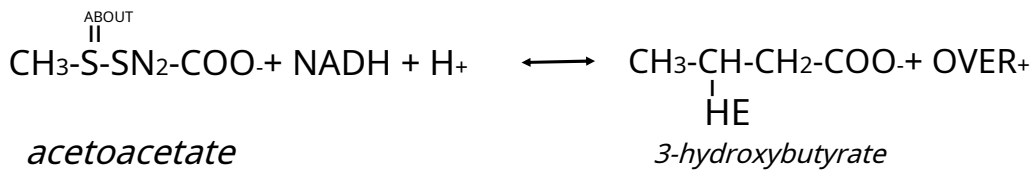
A) how to change the concentration of NADH so that the equilibrium shifts to the right; B) what type of reaction does it belong to?

Response standard:

A) increase

B) hydrogenation reaction (reduction, redox) Task 62.

The chemical reaction proceeds according to the equation:



Define:

A) how to change the NAD concentration, so that the balance shifts to the right; B) what type of reaction does it belong to?

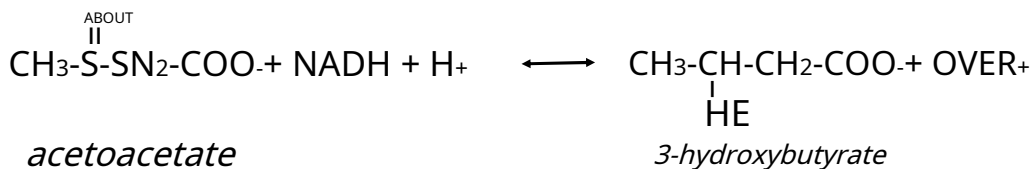
Response standard:

A) lower

B) hydrogenation reaction (reduction, redox)

Task 63.

The chemical reaction proceeds according to the equation:



Define:

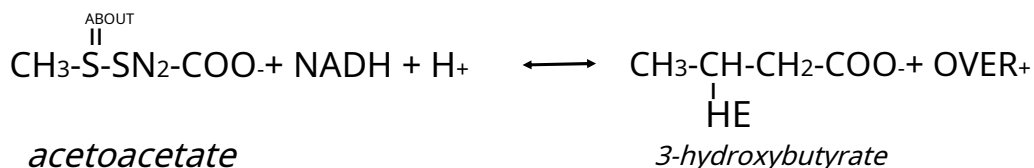
A) how to change the concentration of 3-hydroxybutyrate so that the equilibrium shifts to the right; B) what type of reaction does it belong to?

Response standard:

- A) lower
- B) hydrogenation reaction (reduction, redox)

Task 64.

The chemical reaction proceeds according to the equation:



Define:

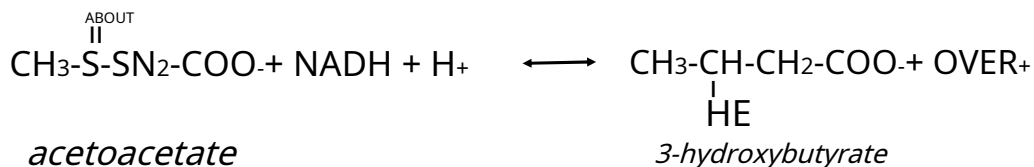
- A) how to change the concentration of 3-hydroxybutyrate so that the equilibrium shifts to the left;
- B) what type of reaction does it belong to?

Response standard:

- A) increase
- B) hydrogenation reaction (reduction, redox)

Task 65.

The chemical reaction proceeds according to the equation:



Define:

- A) how to change the NAD concentration so that the balance shifts to the left; B)
- what type of reaction does it belong to?

Response standard:

- A) increase
- B) hydrogenation reaction (reduction, redox)

Task 66.

When formic acid (HCOOH) is dissolved in water, a pH = 6.4 is created. Determine:

- A) the conjugate base formula for composing the buffer system.
- B) the buffer action zone of the resulting buffer system.

Response standard:

- A) formula of the conjugate base - HCOO⁻. B)

Buffer zone = 6.4 ± 1.

Task 67.

When valeric acid (CH₃-(SN₂)₄-COOH) pH = 6.4 is created in water. Define:

A) conjugate base formula for composing a buffer system. B) the buffer action zone of the resulting buffer system.

Response standard:

A) formula of the conjugate base - $\text{CH}_3\text{-(SN}_2\text{)}_4\text{-SOO}^-$. B)

Buffer zone = 6.4 ± 1 .

Task 68.

When dissolving butyric acid ($\text{CH}_3\text{-(SN}_2\text{)}_2\text{-COOH}$) pH = 6.4 is created in water. Define:

A) conjugate base formula for composing a buffer system. B) the buffer action zone of the resulting buffer system.

Response standard:

A) formula of the conjugate base - $\text{CH}_3\text{-(SN}_2\text{)}_2\text{-SOO}^-$. B)

Buffer zone = 6.4 ± 1 .

Task 69.

When dissolving pyruvic acid ($\text{CH}_3\text{-C(=O)-COOH}$) in water creates a pH=6.2. Define:

A) conjugate base formula for composing a buffer system. B) the buffer action zone of the resulting buffer system.

Response standard:

A) formula of the conjugate base - $\text{CH}_3\text{-C(=O)-COO}^-$. B)

Buffer zone = 5.6 ± 1 .

Task 70. Interview question.

When dissolving propionic acid ($\text{CH}_3\text{-SN}_2\text{-COOH}$) pH = 6.4 is created in water. Define:

A) conjugate base formula for composing a buffer system. B) the buffer action zone of the resulting buffer system.

Response standard:

A) formula of the conjugate base - $\text{CH}_3\text{-SN}_2\text{-SOO}^-$. B)

Buffer zone = 6.4 ± 1 .

Task 71. Interview question. *Hydrocarbonate buffer*

system($\text{N}_2\text{CO}_3/\text{NSO}_3$) - the most powerful and fastest system response to changes in blood pH. Indicate how this buffer system reacts in response to an increase in the concentration of A) hydrogen ions; B) hydroxyl ions.

Response standard:

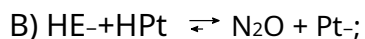
A) $\text{H}^+ + \text{HCO}_3^- \rightleftharpoons \text{H}_2\text{CO}_3 \rightleftharpoons \text{H}_2\text{O} + \text{CO}_2(\text{pp}) \rightarrow \text{CO}_2(\text{gas})\uparrow$;

B) $\text{OH}^- + \text{H}_2\text{CO}_3 \rightleftharpoons \text{H}_2\text{O} + \text{HCO}_3^-$

Task 72. Interview question.

Protein buffer system(HPt/Pt⁻)- one of the blood buffer systems that responds to changes in blood pH. Indicate how this buffer system reacts in response to an increase in the concentration of A) hydrogen ions; B) hydroxyl ions.

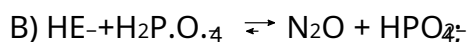
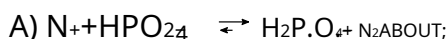
Response standard:



Task 73. Interview question. *Hydrogen*

phosphate buffer system($\text{H}_2\text{P.O.}_4$ / HPO_4^-)- one of the blood buffer systems, responding to changes in blood pH. Indicate how this buffer system reacts in response to an increase in the concentration of A) hydrogen ions; B) hydroxyl ions.

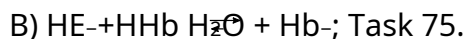
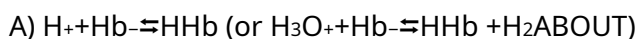
Response standard:



Task 74. Interview question.

Hemoglobin buffer system(HHb/Hb⁻)- one of the blood buffer systems that reacts to changes in blood pH. Indicate how this buffer system reacts in response to an increase in the concentration of A) hydrogen ions; B) hydroxyl ions.

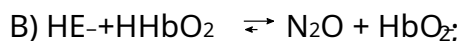
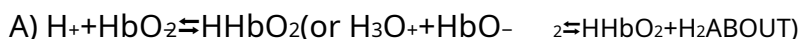
Response standard:



Interview question.

Oxyhemoglobin buffer system(HHbO_2 /HbO₂⁻)- one of the blood buffer systems, responding to changes in blood pH. Indicate how this buffer system reacts in response to an increase in the concentration of A) hydrogen ions; B) hydroxyl ions.

Response standard:



CRITERIA for assessing competencies and rating scales

Grade "unsatisfactory" (not accepted) or absence formation competencies	Grade "satisfactorily" (passed) or satisfactory (threshold) level of development competencies	Rated "good" (passed) or sufficient level development competencies	Excellent rating (passed) or high level development competencies
<p>failure to student on one's own demonstrate knowledge when solving tasks, tasks absence independence V application skills. Absence confirmation availability formation competencies testifies about negative results development academic discipline</p>	<p>student demonstrates independence V application of knowledge skills and abilities to solve educational tasks V complete compliance With example, data teacher, By tasks, solution which was shown teacher, should be considered What competence on formed on satisfactory level.</p>	<p>student demonstrates independent application knowledge, skills and skills at decision tasks, tasks similar samples, What confirms Availability formed competencies on more high level. Availability such competencies on sufficient level testifies about sustainable fixed practical skill</p>	<p>student demonstrates ability To full independence in choice way solutions non-standard tasks in within disciplines With using knowledge, skills And skills, received How V progress development of this discipline, so and adjacent disciplines should count competence formed on high level.</p>

Criteria for assessing test control:

percentage of correct answers	Marks
91-100	Great
81-90	Fine
70-80	satisfactorily
Less than 70	unsatisfactory

When grading tasks with multiple correct answers, one error is allowed.

Interview assessment criteria:

Mark	Descriptors		
	strength of knowledge	skill (introduce) explain (introduce) essence phenomena, processes, do conclusions	logic sequence answer
Great	strength of knowledge, knowledge of basic processes of the studied subject area, the answer is different depth and completeness disclosure of the topic; possession terminological apparatus; logic and consistency answer	high skill explain the essence phenomena, processes, events, do conclusions and generalizations, give reasoned answers, give examples	high logic And subsequence answer
Fine	solid knowledge main processes subject matter being studied area, different depth and completeness disclosure of the topic; possession terminological apparatus; free possession monologue speech, however one is allowed - two inaccuracies in the answer	ability to explain essence, phenomena, processes, events, draw conclusions and generalizations, give reasoned answers, give examples; however one or two inaccuracies in the answer are allowed	logic and subsequence answer

satisfy flax	satisfactory process knowledge subject matter being studied areas, answer, different insufficient depth and completeness of disclosure Topics; knowledge of basic theoretical issues. Several are allowed errors in content answer	satisfactory ability to give reasoned answers and provide examples; satisfactorily formed analysis skills phenomena, processes. Allowed several errors in content of the answer	satisfactory logic and subsequence answer
dissatisfy strictly	poor knowledge of the subject area being studied, shallow opening Topics; poor knowledge main issues theories, weak skills analysis of phenomena, processes. Allowed serious mistakes in content of the answer	inability to give reasoned answers	absence logic and sequences answer

Criteria for assessing situational tasks:

Mark	Descriptors			
	understanding Problems	analysis situations	skills solutions situations	professional thinking
Great	complete implication problems. All requirements, declared task,	high benefit analyze situation, draw conclusions	high benefit select method solutions problems, faithful	high level professional thoughts

	completed		solution skills situations	
Fine	complete implication problems. All requirements, declared task, completed	benefit analyze situation, draw conclusions	benefit select method solutions problems faithful solution skills situations	residual level professional thoughts. one goes down - there are inaccuracies in reply
satisfy flax	astastic implication problems. majority requirements declared task, completed	please satisfy nyaya benefit analyze situation, draw conclusions	satisfactory skills solutions situations, falsity with choosing a method solutions to the problem	residual level professional thoughts. falls more a bunch of inaccuracies in reply or error sequences solutions
dissatisfy strictly	misunderstanding problems. legs requirements, declared task, not completed. No Tveta. Did not have experiments to solve hello	izkaya benefit analyze situation	insufficient solution skills situations	missing