

Документ подписан простой электронной подписью
Информация о владельце:
ФИО: Семенов Юрий Алексеевич
Должность: Ректор
Дата подписания: 24.02.2026 13:28:34
Уникальный программный ключ:
7ee61f7810e60557bee49df655173820157a6d87

**Federal state budgetary educational institution of higher education
Ural State Medical University
Ministry of Healthcare of the Russian Federation**

Department of General Chemistry



УТВЕРЖДАЮ
Проректор по образовательной деятельности
А.А. Ушаков
«12» июня 2025 г.

**EVALUATION MATERIALS
CHEMISTRY**

Major: Dentistry
Level of higher education: specialist
Qualification: General Dentist

Ekaterinburg
2025

Evaluation materials are compiled in accordance with the requirements of the Federal State Educational Standard of Higher Education, specialty 31.05.03 Dentistry (specialist level), approved by order of the Ministry of Education and Science of the Russian Federation No. 984 dated 12.08.2020 (Edition with amendments No. 1456 dated 11/26/2020), and taking into account the requirements of the professional standard 02.005 "Dentist", approved by order of the Ministry of Labor and Social Protection of the Russian Federation of May 10, 2016 No. 227n (registered with the Ministry of Justice of the Russian Federation on June 2, 2016, reg. No. 42399)

Prepared by: Belokonova N.A., Doctor of Technical Sciences, Associate professor, Head of General chemistry department

Medvedeva O. M., PhD (Chemistry), assistant professor of General chemistry department

Naronova N. A., PhD (Pedagogy), assistant professor of General chemistry department

Reviewed by: Andriyanova G.N, advanced doctor of Pharmaceutical Sciences, professor of Pharmacy Department

1. Codifier of learning outcomes

Category (group) of universal and general professional competencies	Code and name of universal and general professional competencies	Code and name of the indicator of achievement (IA) of universal and general professional competencies	Didactic unit (DU)	Supervised learning elements formed as a result of mastering the discipline			Didactic unit (DU)
				Knowledge	Skills	Abilities	
Basics fundamental and natural science knowledge	GPC – 8 Able to use the basic physico-chemical, mathematical and natural science concepts and methods in solving professional problems	IGPC – 8.1 Knows: basic physical chemical, mathematical and natural scientific concepts and methods that are used in medicine	DU 1 Introduction to chemistry GPC-8	Methods for calculating the concentration of solutions. Basic laws of chemical kinetics and equilibrium. Laws of oxidation-reduction processes. Laws of heterogeneous equilibria IGPC-8.1	Assess the possibility of shifting the direction of equilibrium when external conditions change. Assess the possibility of obtaining precipitates and the conditions for their dissolution. Determine the possibility and direction of redox processes. Prepare solutions, determine the concentration by electroconductivity IGPC-8.2	Skills in working on conductometer IGPC-8.3	Oral survey, test controls, microcontrols, ticket controls, checking written lecture notes and laboratory reports, final testing with open type tasks
			DU 2 The doctrine of solutions GPC-8	Properties of electrolyte solutions. Influence of solutions' composition on its osmotic, and buffer properties IGPC-8.1	Determine physico-chemical properties of solutions Prepare buffer solutions and evaluate the buffering capacity of the solution. IGPC-8.2	IGPC-8.3 Skills in working on pH meter IGPC-8.3	

			<p>DU 4</p> <p>Natural high-molecular compounds and their components</p> <p>GPC-8</p>	<p>Classification, nomenclature, structure, chemical and physical properties, biological significance of metabolites: amino acids, proteins, monosaccharides, polysaccharides, nucleosinnucleosides, nucleotides, nucleic acids.</p> <p>IGPC-8.1</p>	<p>Determine classification features, name according to modern and historical nomenclature.</p> <p>Evaluate the physicochemical properties of polymeric organic compounds according to their structure. Explain the biological effect of substances depending on their structure and properties.</p> <p>IGPC-8.1 IGPC-8.2</p>	<p>Methods for conducting qualitative reactions for the detection of components of biopolymers.</p> <p>IGPC-8.3</p>	
		<p>IGPC-8.2 Knows how to: interpret the data of basic physical and chemical, mathematical and natural scientific research methods in solving professional problems</p>	<p>DU 1</p> <p>Introduction to chemistry</p> <p>GPC-8</p>	<p>Methods for calculating the concentration of solutions.</p> <p>Basic laws of chemical kinetics and equilibrium.</p> <p>Laws of oxidation-reduction processes.</p> <p>Laws of heterogeneous equilibria</p> <p>IGPC-8.1</p>	<p>Assess the possibility of shifting the direction of equilibrium when external conditions change.</p> <p>Assess the possibility of obtaining precipitates and the conditions for their dissolution.</p> <p>Determine the possibility and direction of redox processes.</p> <p>Prepare solutions, determine the concentration by electroconductivity</p> <p>IGPC-8.2</p>	<p>Skills in working on conductometer</p> <p>IGPC-8.3</p>	

			<p>DU 2</p> <p>The doctrine of solutions</p> <p>GPC-8</p>	<p>Properties of electrolyte solutions.</p> <p>Influence of solutions' composition on its osmotic, and buffer properties</p> <p>IGPC-8.1</p>	<p>Determine physico-chemical properties of solutions</p> <p>Prepare buffer solutions and evaluate the buffering capacity of the solution.</p> <p>IGPC-8.2</p>	<p>IGPC-8.3</p> <p>Skills in working on pH meter</p> <p>IGPC-8.3</p>	
			<p>DU 3</p> <p>The main representatives of biologically significant non-polymeric organic compounds and their properties.</p> <p>GPC-8</p>	<p>Fundamentals of the theory of hybridization, conjugation, electronic effects, acid-base properties of bioorganic substances. Classification, nomenclature, structure, chemical and physical properties, biological significance of metabolites: carboxylic acids, high fatty acids, lipids.</p> <p>IGPC-8.1</p>	<p>Determine the type of hybridization of carbon atoms, the type of conjugation in the molecules of organic substances. Compare acid-base properties, name them according to modern and historical nomenclature, determine their place in the classification of substances.</p> <p>IGPC-8.2</p>	<p>Laboratory methods for the identification of organic substances</p> <p>IGPC-8.3</p>	
			<p>DU 4</p> <p>Natural high-molecular compounds and their components</p> <p>GPC-8</p>	<p>Classification, nomenclature, structure, chemical and physical properties, biological significance of metabolites: amino acids, proteins, monosaccharides, polysaccharides, nucleosinnucleosides, nucleotides, nucleic acids.</p> <p>IGPC-8.1</p>	<p>Determine classification features, name according to modern and historical nomenclature.</p> <p>Evaluate the physicochemical properties of polymeric organic compounds according to their structure. Explain the</p>	<p>Methods for conducting qualitative reactions for the detection of components of biopolymers.</p> <p>IGPC-8.3</p>	

					biological effect of substances depending on their structure and properties. IGPC-8.1 IGPC-8.2		
		<p>IGPC-8.3 Has practical experience: application of basic physical and chemical, mathematical and natural scientific research methods in solving professional problems</p>	<p>DU 1 Introduction to chemistry GPC-8</p>	<p>Methods for calculating the concentration of solutions. Basic laws of chemical kinetics and equilibrium. Laws of oxidation-reduction processes. Laws of heterogeneous equilibria IGPC-8.1</p>	<p>Assess the possibility of shifting the direction of equilibrium when external conditions change. Assess the possibility of obtaining precipitates and the conditions for their dissolution. Determine the possibility and direction of redox processes. Prepare solutions, determine the concentration by electroconductivity IGPC-8.2</p>	<p>Skills in working on conductometer IGPC-8.3</p>	
			<p>DU 3 The main representatives of biologically significant non-polymeric organic compounds and their properties.</p>	<p>Fundamentals of the theory of hybridization, conjugation, electronic effects, acid-base properties of bioorganic substances. Classification, nomenclature, structure, chemical and physical properties, biological significance of metabolites:</p>	<p>Determine the type of hybridization of carbon atoms, the type of conjugation in the molecules of organic substances. Compare acid-base properties, name them according to modern and historical nomenclature,</p>	<p>Laboratory methods for the identification of organic substances IGPC-8.3</p>	

			<p>GPC-8</p> <p>carboxylic acids, high fatty acids, lipids.</p> <p>IGPC-8.1</p>	<p>determine their place in the classification of substances.</p> <p>IGPC-8.2</p>		
		<p>Natural high-molecular compounds and their components</p> <p>GPC-8</p>	<p>Classification, nomenclature, structure, chemical and physical properties, biological significance of metabolites: amino acids, proteins, monosaccharides, polysaccharides, nucleosinnucleosides, nucleotides, nucleic acids.</p> <p>IGPC-8.1</p>	<p>Determine classification features, name according to modern and historical nomenclature.</p> <p>Evaluate the physicochemical properties of polymeric organic compounds according to their structure. Explain the biological effect of substances depending on their structure and properties.</p> <p>IGPC-8.1 IGPC-8.2</p>	<p>Methods for conducting qualitative reactions for the detection of components of biopolymers.</p> <p>IGPC-8.3</p>	

1. EVALUATION MATERIALS

Assignment 1 "Concentration"

Control work. task example

IGPC-8.1, IGPC-8.2

Task 1

1. Please calculate the mass of sodium chloride (m_{NaCl} , g) needed to prepare a solution of a concentration 1 % and volume 100 ml. Density is 1,0053 g/ml.
2. Please calculate the molar concentration of that solution.
3. What is molar concentration if 5 ml of that solution were diluted to 20 ml

Task 2

1. Please calculate volume (ml) of 5 % solution NaCl ($\rho_{\text{sol}} = 1,034$ g/ml) needed to prepare solution with $\omega = 0.9\%$ and volume given as 50 ml.
2. What is the mass of sodium chloride in that solution?

Correct answer:

Task 1

1. 1,005 g
2. 0,17 M
3. 0,043 M

Task 2

1. 8,7 ml
2. 0,45 g

Assignment 2 "Chemical kinetics"

Test example

IGPC-8.1, IGPC-8.2

1. The law of mass action for the reaction $2\text{CO}(\text{g}) + \text{O}_2(\text{g}) = 2\text{CO}_2(\text{g})$ has the following equation
 - a) $\vec{V} = \vec{k} \cdot C_{\text{CO}}$
 - b) $\vec{V} = \vec{k} \cdot C_{\text{CO}}^2 \cdot C_{\text{O}_2}$
 - c) $\vec{V} = \vec{k} \cdot C_{\text{CO}_2}$
 - d) $\vec{V} = \vec{k} \cdot C_{\text{O}_2}$

Correct answer: b

2. At a temperature of 20°C, the reaction proceeds in 2 minutes. How many minutes required for this reaction at 0°C? Temperature coefficient is equal to 2.
 - a) 4 minutes;
 - b) 8 minutes;
 - c) 1 minute;

d) 2.5 minutes

Correct answer: a

3. Consider the reaction $2\text{SO}_2(\text{g}) + \text{O}_2(\text{g}) \leftrightarrow 2\text{SO}_3(\text{g})$

How will the reaction rate change with increasing SO_2 concentration by 2 times?

- a) will decrease by 2 times
- b) will increase 2 times
- c) will decrease by 4 times
- d) will increase by 4 times

Correct answer: c

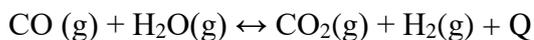
4. Consider the reaction $\text{FeO} + \text{CO} \leftrightarrow \text{Fe} + \text{CO}_2$

How will increasing CO concentration influence on equilibrium?

- a) balance will shift to the right
- b) balance will shift to the left
- c) Will not change

Correct answer: b

5. A shift of chemical equilibrium to the right in the system



will be facilitated by:

- a) a decrease in temperature
- b) a decrease in pressure
- c) an increase in pressure
- d) an increase in temperature

Correct answer: a

Assignment 3 “Heterogenous equilibria”

Control work, task example

IGPC-8.1, IGPC-8.2

1. Write the heterogeneous equilibrium equation for CaF_2 and an expression for SP
2. Calculate the solubility of CaF_2 in mol/L and g/L (using tables)

Correct answer:

1. $\text{CaF}_{2(\text{solid})} \leftrightarrow \text{Ca}^{2+} + 2\text{F}^-_{(\text{sat.solution})}$ $\text{SP} = [\text{Ca}^{2+}] \cdot [\text{F}^-]^2$
2. $S = 4.64 \cdot 10^{-3} \text{ mol/L}$

$$S = 0.36 \text{ g/L}$$

Assignment 4 "Redox reactions"

Testexample

IGPC-8.1, IGPC-8.2

1. Match the compound and its redox properties

Compound

Redox properties

A) HNO_3 1) both an oxidizing agent and a reducing agent

B) Mg 2) reducing agent only

C) SO_2 3) oxidizing agent only

4) neither an oxidizing agent and neither a reducing agent

Correct answer

A	B	C
3	2	1

2. Specify the reducing agent in the reaction $\text{P} + \text{KClO}_3 \rightarrow \text{P}_2\text{O}_5 + \text{KCl}$

a) P

b) KClO_3

c) P_2O_5

d) KCl

Correct answer: a

3. Specify reaction type $\text{NaNO}_3 \rightarrow \text{NaNO}_2 + \text{O}_2$

a) **Intramolecular**

b) Intermolecular

c) Disproportionation

Correct answer: a

4. Which system exhibits the greatest reducing properties?

a) $\text{S}_2\text{O}_8^{2-} + 2\text{e}^- \leftrightarrow 2\text{SO}_4^{2-}$, $E^\circ = 2,01 \text{ B}$

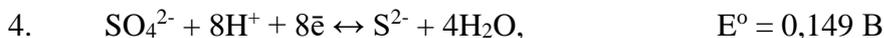
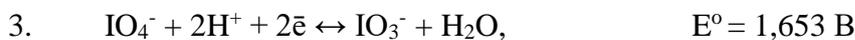
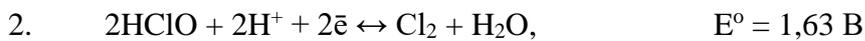
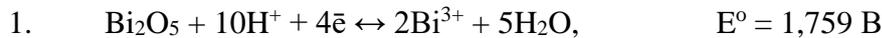
b) $\text{O}_4^{2-} + \text{H}_2\text{O} + 2\text{e}^- \leftrightarrow \text{SO}_3^{2-} + 2\text{OH}^-$, $E^\circ = -0,93 \text{ B}$

c) $\text{SO}_4^{2-} + 8\text{H}^+ + 8\text{e}^- \leftrightarrow \text{S}^{2-} + 4\text{H}_2\text{O}$, $E^\circ = 0,149 \text{ B}$

d) $\text{SO}_4^{2-} + 10\text{H}^+ + 8\text{e}^- \leftrightarrow \text{H}_2\text{S} + 4\text{H}_2\text{O}$, $E^\circ = 0,308 \text{ B}$

Correct answer: b

5. Arrange the half-reactions in order of increasing oxidizing properties



Correct answer: 4<2<3<1

Assignment 5 “Electrolytes. Osmosis”

Control work. task example

IGPC-8.1, IGPC-8.2

1. The molar concentration of magnesium chloride solution equals 0.5M. Calculate magnesium ions` activity in the solution and the osmotic pressure of the solution at T=310K (37C). Define whether the solution is hypo-, hyper- or isotonic in relation to whole blood.

Steps: 1) find I (ionic strength)

2) find f (activity coefficient, using tables)

3) find a (activity)

4) find π (osmotic pressure)

5) make a conclusion (hypo-, hyper- or isotonic?)

2. Define the pH of hydrochloric acid solution with acid concentration 0,1 M and after a 1000-fold dilution.

3. Calculate pH of 0.1M acetic acid solution, PC_a is 4.75

4. Calculate pH of 0.1M ammonia solution, PC_b is 4.75

Correct answer:

1. 1) I = 1.5 M

2) f = 0.004

3) a = 0.002M

4) $\pi = 3607 \text{ kPa}$

5) hypertonic

2. pH = 1 before dilution, pH = 4 after dilution of hydrochloric acid solution with acid concentration 0,1 M and after a 1000-fold dilution.

3. pH = 2.875

4. pH = 11.125

Assignment 6 “Buffer systems” (Test on MedSpace)

Test example

IGPC-8.1, IGPC-8.2

1. Choose proteolytic bases only (excluding amphoteric)

- a) H_2O
- b) H_2PO_4^-
- c) $(\text{CH}_3)_2\text{NH}$
- d) NH_3
- e) CH_3COOH
- f) H_2S
- g) HS^-

Correct answer: c,d

2. Buffer systems of the second type consist of:

- a) A weak base and a salt of this base and a strong acid;
- b) A weak acid and a salt of this acid and a strong base;
- c) Two salts;
- d) A strong base and a salt of this base and a strong acid.

Correct answer: a

3. Calculate pH of acetate buffer system consisting of 10mL of 0.1 M acetic acid solution and 1 mL of 0.1 M sodium acetate solution, $pK_a=4.75$

- a) 3.75
- b) 4.75
- c) 5.75

Correct answer: a

4. Calculate buffer capacity of hydrocarbonate buffer system if pH was changed by 0.05 after adding of 2 ml of 0.1M HCl to 20 ml of buffer

- a) 20
- b) 0.2
- c) 0.1
- d) 50

Correct answer: b

5. Choose a buffer system with a larger acid buffer capacity ($B_a > B_b$)

- a) 50 ml 1 M H_2CO_3 + 100 ml 1 M NaHCO_3
- b) 200 ml 0,5 M H_2CO_3 + 100ml 0,5 M NaHCO_3
- c) 100 ml 1 M H_2CO_3 + 50ml 1 M NaHCO_3

d) 100 ml 0,1 M H₂CO₃ + 100 ml 0,1 M NaHCO₃

Correct answer: a

Assignment 7 “Nomenclature and classification of organic compounds”

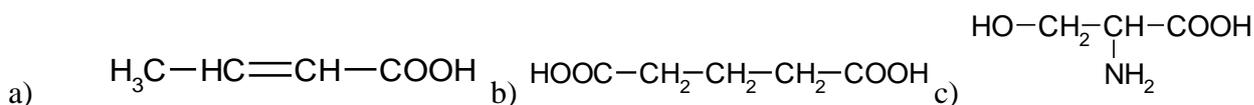
Micro-control, task example

Variant 1IA-1PC-5

1. Write a structural formula for each of the following compounds:

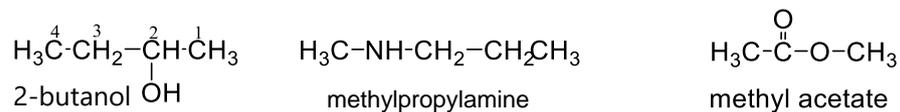
a) 2-butanol; b) methylpropylamine; c) methyl acetate

2. Name the following compounds by the IUPAC substitutive nomenclature:



Correct answer:

1.



2. a) 2-butenoic acid; b) pentanedioic acid; c) 2-amino-3-hydroxypropanoic acid

Assignment 8 “Carboxylic acids. Lipids”

Testexample

1. The trivial name 2-oxopropanoic acid is

a) pyruvic

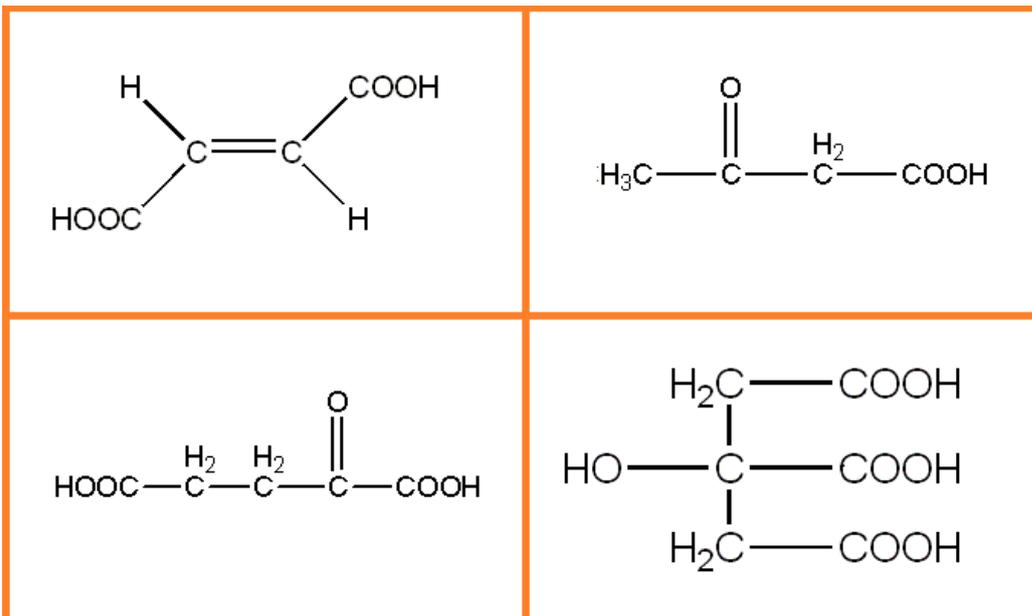
b) oxaloacetic

c) racemic

d) maleic

Correct answer: a

2. Choose the formula of α -ketoglutaric acid



Correct answer: lower left formula

IA-1PC-5

3. When β -hydroxybutyric acid is dehydrated, a compound is formed
- maleic acid
 - fumaric acid
 - 3-butenoic acid
 - 2-butenoic acid

Correct answer: d

4. An unsaturated fatty acid C-18 in a supplement is marked as ω -3. What is the acid?
- oleic
 - linolenic
 - linoleic
 - arachidonic

Correct answer: b

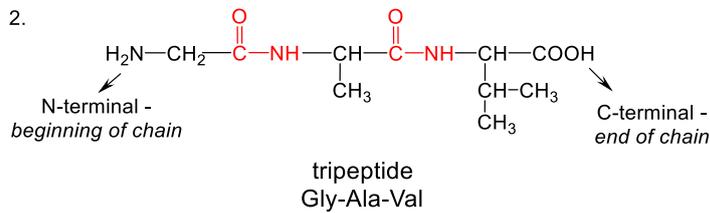
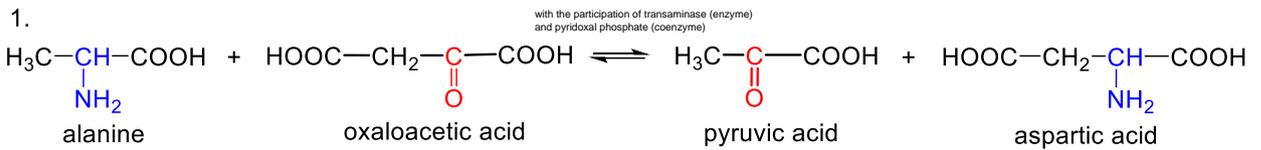
Assignment 9 “Aminoacids and peptides”

Micro-control, task example

IA-2PC-5

- Write the equation for the transamination reaction *in vivo*: alanine + oxaloacetic acid \leftrightarrow . Specify the conditions, name the products.
- Write the structural formula of the tripeptide, which contains the following amino acids: glycine, alanine, valine.

Correct answer:



Assignment 10 “Carbohydrates”

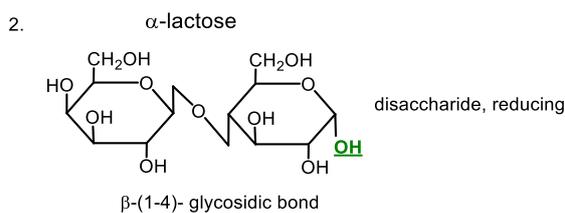
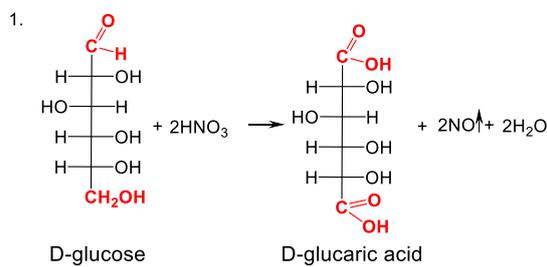
Micro-control, task example

IA-2PC-5

- Write the reaction equation for the oxidation of D-glucose with nitric acid. Specify the conditions, name the products.
- Write the structural formula of α -lactose, indicate the type of glycosidic bond in the molecule. List the classification signs of cellobiose.

Classification signs means is that di- or polysaccharide, if disaccharide is it reducing or non-reducing, if polysaccharide is it homo- or hetero-.

Correct answer:



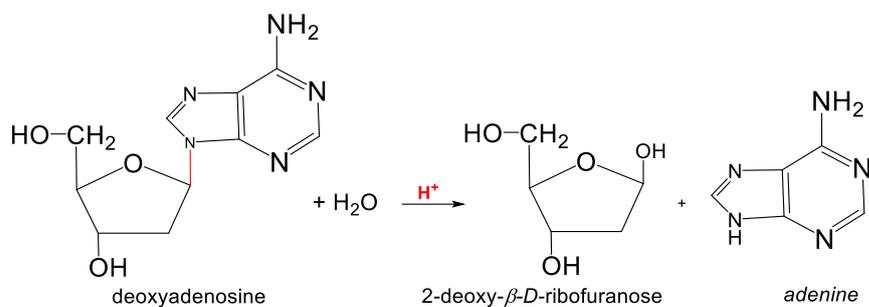
Assignment 11 “Nucleic acids”

Micro-control, task example

IA-2PC-5

During nucleoside hydrolysis in the acidic medium, two compounds were obtained: adenine and 2-deoxy- β -D-ribofuranose. Write the structural formula of the nucleoside and the hydrolysis reaction in the acidic medium.

Correct answer:



Final Assignment (test)

The test is a form of final assessment in the Chemistry discipline. Test is done on Medspace platform in computer room of Chemistry department.

Test example:

What natural fatty acid contains 18 carbon atoms and three double bonds?

Выберите один или несколько ответов:

- 1. oleic
- 2. linoleic
- 3. arachidonic
- 4. linolenic

1.

Correct answer: 4

Trivial name of 2-hydroxypropanoic acid is

Выберите один или несколько ответов:

- 1. malic
- 2. malonic
- 3. lactic
- 4. pyruvic

2.

Correct answer: 3

What acid is formed by dehydrogenation of succinic acid?

Выберите один ответ:

- 1. 2-buthenoic
- 2. acetoacetic
- 3. Buthenedioic
- 4. 3-buthenoic

3.

Correct answer: 3

Choose the conditions of hydrolysis of β -N-glycosidic bond in nucleic acids

Выберите один или несколько ответов:

- 1. acidic medium
- 2. alkaline medium
- 3. neutral medium
- 4. the bonds aren't being hydrolyzed

4.

Correct answer: 1

Food carbohydrate sucrose consists of

Select one:

- 1. Glucose, Galactose
- 2. Glucose, Fructose
- 3. Fructose, Ribose
- 4. Galactose, Ribose
- 5. Glucose, Ribose

5.

Correct answer: 2

Choose an aldohexose

Выберите один ответ:

- 1. glucose
- 2. maltose
- 3. ribose
- 4. fructose

6.

Correct answer: 1

Choose a monoamino dicarboxylic acid

Select one:

- 1. aspartic
- 2. cystein
- 3. arginine
- 4. proline
- 5. lysine

7.

Correct answer: 1

Secondary structure of a protein is

Select one:

- 1. long unorganized helix
- 2. combination of spiral and globular structures
- 3. globule
- 4. alpha helix

8.

Correct answer: 4

9.

Within the structure of nucleic acids nitrous bases exist in a form of

Выберите один или несколько ответов:

- 1. imine
- 2. lactim
- 3. endiole
- 4. lactam

10.

Correct answer: 2

What are the units of measurement of solution's titer?

Выберите один ответ:

- 1. %
- 2. g/ml
- 3. mol/kg
- 4. mol/l

11.

Correct answer: 2

Calculate the mass of NaCl needed to prepare 0,1 liter of solution with $C = 0.1 \text{ M}$

- 1. 0,06 g
- 2. 6 g
- 3. 60 g
- 4. 0,6 g

12.

Correct answer: 1

Calculate the value of CP (concentration product) ($PbCl_2$), if $C Pb^{2+} = 10^{-4}$, $C Cl^- = 10^{-3}$ mol*ion/l

Выберите один ответ:

- 1. $CP = 10^{-9}$
- 2. $CP = 10^{-10}$
- 3. $CP = 10^{-8}$
- 4. $CP = 10^{-7}$

13.

Correct answer: 2

Which compound does not respond to the theory of SP?

Select one:

- 1. $NaHCO_3$
- 2. $MgCO_3$
- 3. Ag_2S
- 4. AgI

14.

Correct answer: 1

Chose a weak electrolyte

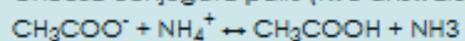
Select one or more:

- 1. magnesium chloride
- 2. hydrochloric acid
- 3. hydrosulfuric acid
- 4. aluminum sulfate

15.

Correct answer: 3

Choose conjugate pairs (two answers)



Выберите один или несколько ответов:

- 1. $\text{CH}_3\text{COO}^- \leftrightarrow \text{CH}_3\text{COOH}$
- 2. $\text{NH}_4^+ \leftrightarrow \text{CH}_3\text{COOH}$
- 3. $\text{NH}_4^+ \leftrightarrow \text{NH}_3$
- 4. $\text{CH}_3\text{COO}^- \leftrightarrow \text{NH}_4^+$
- 5. $\text{CH}_3\text{COOH} \leftrightarrow \text{NH}_3$

16.

Correct answer: 1, 3

Chose a strong electrolyte:

Выберите один или несколько ответов:

- 1. ammonium hydrate
- 2. hydrosulfuric acid
- 3. sodium carbonate
- 4. formic acid

17.

Correct answer: 3

Choose a second type buffer system:

Выберите один ответ:

- 1. organic phosphate
- 2. inorganic phosphate
- 3. acetate
- 4. pyridine

18.

Correct answer: 4

Calculate ionic force of 0.1 CaCl₂ solution

- 1. 0.1
- 2. 0.2
- 3. 0.6
- 4. 0.3

19.

Correct answer: 4

Calculate the osmotic pressure for 0.1 M glucose solution at 310K.

- 260 kPa
- 31 kPa
- 0.831 kPa

20.

Correct answer: 1

3. RATING SYSTEM

1. General Provisions

1.1 This Methodology of the rating system for the discipline "Chemistry" was developed in accordance with the Regulations on the rating system for assessing the academic achievements of USMU students, adopted at the meeting of the Academic Council on April 18, 2025 (minutes No. 11) and approved by order of the rector No. 203-r dated May 6, 2025.

1.2. The department proceeds from the fact that the point-rating system of measuring scientific achievements is intended for obtaining reports and modern control of students' knowledge.

1.3. In accordance with this Methodology, the teachers of the department check the students' knowledge at each practical lesson, and at the end of the lesson inform the students about its employment.

2. Procedure for defining disciplinary modules

2.1. In the discipline "Chemistry" the classroom load is: 34 lecture hours and 36 hours of practical training. The time of training lasts for one (winter) semester and ends with a differentiated test (exam) with an assessment.

2.2. There are two disciplinary modules (each includes two didactic units). The current control of the student's rating in the discipline in the semester is formed for all designated disciplinary modules. The grade for a course in a semester, obtained based on the results of current monitoring of academic performance, is calculated as the share of all positive grades received during interim assessments in the maximum possible number of points (the sum of all excellent grades for interim assessments in a semester), expressed as a percentage. The grade for a course in a semester, obtained based on the results of current monitoring of academic performance, is calculated on a 100-point scale.

2.3. Each disciplinary module ends with an intermediate assessment based on assignments developed by the department; the results of the midterm assessments are assessed on a five-point scale.

2.4 After completing the previous disciplinary module, the student has the right, when the teacher conducts ongoing consultations, to earn additional points by working on missed topics of seminar classes included in the previous module, as well as by completing assignments for missed midterm tests, etc. In this regard, the current rating grade for the previous module may change, and the teacher has the right to make appropriate corrections to the current progress log, indicating the date and grade.

3. Algorithm for determining student rating by discipline

3.1. Attendance at practical classes, completion of homework and student activity in practical (laboratory) classes are assessed in rating points from 3 to 5.

3.2. Routine controls, as well as final controls after each module are carried out in writing or in the form of testing.

3.3. Current and final controls are carried out during the semester, in accordance with the Lecture and Practice plan, approved at a meeting of the department. Lecture and Practice plan is available for students on the website and stand of the department.

3.4. For the educational and methodological support of the implementation of the point-rating system for assessing the educational achievements of students, adjustments were made to the educational and methodological complexes of the department's disciplines.

3.5.1. In the work program of the discipline "Chemistry", disciplinary modules are designated and the following didactic units are highlighted:

No. disciplinary module	№ of the didactic unit	Name of didactic unit (topic)	Hours by type of occupation	
			Lectures	Practical classes/ Laboratory works

№ 1. General chemistry	DU 1	Introduction to chemistry	34	36
	DU 2.	The doctrine of solutions		
№ 2. Bioorganic chemistry	DU 3	The main representatives of biologically significant non-polymeric organic compounds and their properties.		
	DU 4	Natural high-molecular compounds and their components		

3.5.2. Ranges of rating points for each type of student's academic work.

Type of academic work and form of current control	Minimum grade	Maximum grade	DU
Test/control work on the topic "Concentrations of solutions"	3	5	1
Test/control work on the topic "Chemical kinetics"	3	5	1
Test/control work on the topic "Solubility Product Theory"	3	5	1
Test/control work on the topic "Oxidation-reduction reactions"	3	5	1
Test/control work on the topic «Electrolytes. Osmosis»	3	5	2
Test/control work on the topic "Buffer systems"	3	5	2
Lecture notes for the module "General Chemistry"	3	5	1,2
Test/control work on the topic « Nomenclature, hybridization, conjugation, aromaticity, electronic effects, acid-base properties of organic substances»	3	5	3
Test on the topic «Carboxylic acids, fatty acids, lipids»	3	5	3
Control work on the topic «Amino acids, proteins"	3	5	4

Control work on the topic «Hydrocarbons: mono-, di-, polysaccharides»	3	5	4
Control work on the topic «Nucleic acids»	3	5	4
Lecture notes for the module "Bioorganic Chemistry"	3	5	3,4
Attendance of practical classes	3	5	1-4
Activity in practical classes	3	5	1-4

The final result of academic performance in the semester is expressed in rating points as a percentage expression of the sum of positive grades for all types of academic work received by the student in the semester, to the maximum possible number of points based on the results of all types of academic work in the semester.

The calculation of the final rating in the semester is made according to the formula:

Final rating (R) = $\sum (a_1+a_2+\dots a_i) / \sum (m_1+m_2+\dots+m_i) \times 100\%$, where

final rating (R) is the final number of rating points in the semester; a_1, a_2, a_i are positive grades (3, 4, 5) received by the student based on the results of all types of academic work provided for by the course program in the semester; m_1, m_2, m_i are the maximum grades (5) for the same types of academic work provided for by the course program in the semester.

4. The procedure and terms for getting extra-points

4.1. After summing up the results of the current control of students' knowledge and rating the student by discipline in the semester, this information is brought to the attention of students at the last practical lesson, at the information stand of the department, the USMU website, <http://tandem.usma.ru/>.

4.2. Before the start of the examination session and before the date of submission to the dean's office of the journal of attendance and current performance of students, he has the right to get points to the minimum amount of rating points (40 rating points), at which he can be admitted to the exam test.

4.3. The addition of rating points can take place in the form of a test control of students' knowledge, performing independent work on the instructions of the leading teacher.

5. Algorithm for determining the rating for an academic discipline on a differentiated basis

5.1. A student is admitted to the final assessment for a discipline (credit with a grade) if his rating for the semester for the discipline is 40 or more rating points.

5.2. Credit for a discipline is conducted in form of computer test on MedSpace platform, according to the results of which a maximum of 20 points can be scored.

To transfer the final rating of a student in a discipline, the following scale is introduced into the attestation mark:

Attestation mark	The final rating of the student by discipline, rating points
Unsatisfactory	0-9
Satisfactorily	10 – 13
Good	14 – 17
Excellent	18 – 20

The attestation mark and the final rating score for the discipline received by the students are set in the student's credit book and examination sheet.

Рецензия

на Фонд оценочных средств дисциплины «Химия» Базовой части
для студентов, обучающихся по специальности 31.05.03 «Стоматология»

Фонд оценочных средств по дисциплине «Стоматология» составлен в соответствии с требованиями Федерального государственного образовательного стандарта высшего образования, специальность 31.05.03 – Стоматология, утвержденного приказом Министерства науки и высшего образования РФ от 12 августа 2020 г. № 988 (редакция с изменениями № 1456 от 26.11.2020).

Разработчики: Белоконова Н.А., д.т.н., зав. кафедрой общей химии;
Наронова Н.А., к.п.н., доцент кафедры общей химии;
Лопатин Д.А., к.х.н., старший преподаватель кафедры
общей химии.

В рецензируемом документе указано, какие знания, умения и навыки формируются при изучении каждого раздела дисциплины «Химия».

Представлены примеры аттестационных материалов в виде билетов для письменных контролей по вопросам общей химии и микроконтролей по биоорганической химии, а также компьютерных тестов по каждому разделу изучаемой дисциплины.

Приведен алгоритм определения рейтинга студентов, представлена методика БРС для оценки знаний, указан порядок предоставления возможности дополнительного набора баллов для получения зачета. Указан перечень вопросов для подготовки к итоговому зачету по дисциплине, представлен пример билета для итогового контроля.

В целом данный Фонд оценочных средств отвечает требованиям, предъявляемым по специальности «Стоматология», в соответствии с ФГОС 3++, и может быть рекомендован для утверждения.

Рецензент: доктор фармацевтических наук, профессор,
профессор кафедры фармации
ФГБОУ ВО УГМУ Минздрава России



Г.Н. Андрианова