**Assessment tools for conducting attestation
in discipline « Physical and colloidal chemistry »
for students of 2024 year of admission
under the educational programme
cipher 33.05.01 Pharmacy,
specialisation (profile) Pharmacy
(Specialist's),
form of study full-time
for the 2025-2026 academic year**

1. Assessment tools for conducting current attestation in discipline

Assessment Tools for Conducting Certification in Seminar-Type Classes

Assessment in seminar-type classes includes the following types of assignments: testing and written examination.

1.1. Examples of tests

Assessed indicators of competence achievement: УК-1.1.1; УК-1.2.1; УК-1.3.1; ОПК-1.1.1; ОПК-1.2.1 ;ОПК-1.3.1; ПК-5.1.1; ПК-5.2.1; ПК-5.3.1.

1. Having calculated the ΔGr of the reaction, it is possible, without performing experiments, to conclude:

a) about the thermal effect of a chemical reaction

b) about the possibility of spontaneous flow of the process

c) the value of the internal energy of the system

d) the state of chemical equilibrium

2. The entropy of a crystalline body without lattice defects at 0 K is equal to:

a) 4.18 kJ/mol K

b) J/mol K

c) Experimentally undetermined

d) kJ/mol K

3. Energy does not arise from nothing and does not disappear without a trace, but some types of energy can transform into others in strictly equivalent quantities. this is the wording

a) the first law of thermodynamics

b) the law of conservation of mass of matter

c) the law of conservation of energy

d) the law of constancy of composition

4. An open thermodynamic system:

a) exchanges energy and mass with the environment

 b) does not exchange either energy or mass with the environment

c) exchanges energy with the environment

d) exchanges mass with the environment

5. With an increase in entropy in a thermodynamic system, the amount of disorder in it:

a) will not change

b) will increase

c) will decrease

d) does not depend on entropy

6. In an isolated thermodynamic system, a chemical reaction proceeds towards

a) an increase in the thermal effect of the chemical reaction

b) an increase in entropy

c) a decrease in pressure

d) a decrease in the reaction rate

7. The constant of thermodynamic equilibrium does not depend on:

a) on the nature of the reacting substances

b) on the concentration of reacting substances

c) on the presence of a catalyst in the reaction

d) on the course of the chemical reaction

8. An electrode whose standard electrode potential at 298K is assumed to be zero:

a) silver chloride

b) hydrogen

c) calomel

d) chingidron

9. Mathematical expression of Kohlrausch's law:

    a) $\lambda^{\infty} = la + lk$

    b) $\lambda^{\infty} = 1/\rho$

    c) $\lambda^{\infty} = \text{æ}/1000C$

    d) $\lambda^{\infty} = la - lk$

10. The electrophoretic effect is called:

    a) the ability of an ion to move directionally in an electric field

    b) the occurrence of carrier deceleration due to the fact that ions of the opposite sign, under the action of an electric field, move in the opposite direction to the direction of movement of the ion in question.

    c) carrier deceleration due to the fact that the ions are arranged asymmetrically with respect to their ionic atmospheres. The ability of a substance to conduct electric current

1.2. Examples of situational tasks

Assessed indicators of competence achievement: УК-1.1.1; УК-1.2.1; УК-1.3.1; ОПК-1.1.1; ОПК-1.2.1 ;ОПК-1.3.1; ПК-5.1.1; ПК-5.2.1; ПК-5.3.1.

1. Calculate ΔG^0 of the reaction at 500 ^{0}C

$BaO_{(тв)} + CO_{2(г)} = BaCO_{3(тв)}$

2. The constant reaction rate constant $CO + H_2O \rightarrow CO_2 + H_2$ at 313 °K is equal $8{,}15 \cdot 10^{-3}$ mol $^{-1} \cdot$ min $^{-1}$. The reaction is of the second order. The concentrations of the starting materials are 2 mol/l. How long after the start of the reaction will the concentrations of the reactants decrease by half? What will be the concentration after 30 minutes?

1.3 Examples of test options

Assessed indicators of competence achievement: УК-1.1.1; УК-1.2.1; УК-1.3.1; ОПК-1.1.1; ОПК-1.2.1 ;ОПК-1.3.1; ПК-5.1.1; ПК-5.2.1; ПК-5.3.1.

    1.   The concept of the rate of chemical reactions, the average and true rate, and its units of measurement. Why are two terms introduced: "chemical reaction rate" and "chemical reaction rate for a given substance"? What is the difference between records?:$W = -dN/Vdt$ и $W = -dC/dt$? How do various factors affect the reaction rate: the nature of substances, concentrations, temperature, pressure, etc.?

    2.   The dependence of the reaction rate on the temperature according to Van't Hoff. What is the temperature coefficient of the reaction rate? What restrictions are imposed on the Van't-Hoff rule? Can the temperature coefficient of the reaction rate be less than one?

    3.   Heterogeneous catalysis and its theoretical justification: theory of active centers, multiplet theory, theory of active ensembles, electron-chemical theory.

    4.   When storing analgin tablets, it was found that the decomposition rate constant at 20 ° C is $1{,}5 * 10^{-9}$ c^{-1}. Determine the shelf life of tablets (decomposition time of 10% of the substance) at 20 °C.

1.4. Examples of security questions for an interview

Assessed indicators of competence achievement: УК-1.1.1; УК-1.2.1; УК-1.3.1; ОПК-1.1.1; ОПК-1.2.1 ;ОПК-1.3.1; ПК-5.1.1; ПК-5.2.1; ПК-5.3.1.

1. Theories of coagulation, the adsorption theory of Freundlich, the electrostatic and physical theory of DLFO.

2. Daniel–Jacobi electroplating cements. Concentration galvanic cells The Nernst equation for EMF.

3. Mobility of ions. Kohlrausch's law.

4. Chemical potential. Criteria for the possibility of spontaneous chemical reactions in open systems.

5. Chemical thermodynamics (subject, tasks, opportunities).

1.5. Assessment tools for independent work of students

Assessment of independent work includes testing.

1.5.1. Examples of test tasks with a single answer

Assessed indicators of competence achievement: УК-1.1.1; УК-1.2.1; УК-1.3.1; ОПК-1.1.1; ОПК-1.2.1 ;ОПК-1.3.1; ПК-5.1.1; ПК-5.2.1; ПК-5.3.1.
1. Having calculated the ΔGp of the reaction, it is possible, without experimenting, to conclude:
about the possibility of spontaneous flow of the process
about the thermal effect of the chemical reaction
about the value of the internal energy of the system
about the state of chemical equilibrium
2. Energy does not arise from nothing and does not disappear without a trace, but some types of energy can transform into others in strictly equivalent quantities. This is the formulation
of the first law of thermodynamics
 the law of conservation of mass of matter
 the law of conservation of energy
 and the law of constancy of composition.
3. An open thermodynamic system:
It exchanges energy and mass
with the environment, it does not exchange energy or mass
with the environment, it exchanges energy with the environment, it exchanges mass with the environment
4. With an increase in entropy in a thermodynamic system, the amount of disorder in it:
it will not increase
 it will not
decrease
 it does not depend on entropy
5. For which electrode, the standard electrode potential at 298K is assumed to be zero:
hydrogen
silver chloride
calomel
chingidron
6. Mathematical expression of Kohlrausch's law:$\lambda\infty = la + lk$
$\lambda\infty = 1/\rho$
$\lambda\infty = æ/1000C$
$\lambda\infty = la - lk$
7. With increasing viscosity, the specific electrical conductivity:
decreases
 increases, increases first, then decreases
 does not change
8. Electrical conductivity of solutions of weak and strong electrolytes increases with increasing temperature;
decreasing;
does not change
increases first, then decreases;
9. When diluting solutions of strong electrolytes, mobility:
increases;
decreasing;
does not change;
increases first, then decreases
10. The specific electrical conductivity is calculated by the formula:
$æ = 1/\rho$
$æ = 1/R$
$æ = 1/S$
$æ = uv$

1.5.2. Examples of multiple choice test tasks and/or matching and/or sequencing

Assessed indicators of competence achievement: УК-1.1.1; УК-1.2.1; УК-1.3.1; ОПК-1.1.1; ОПК-1.2.1 ;ОПК-1.3.1; ПК-5.1.1; ПК-5.2.1; ПК-5.3.1.
1. Chemical thermodynamics studies:
        Thermal effects,
        Directions of chemical processes.

The equilibrium of chemical reactions

Reaction mechanisms;

Changes in the concentration of substances

Reaction catalysis

The rate of chemical reactions and equilibrium;

2. Depending on the nature of the interaction with the environment, thermodynamic systems are divided into:

Isolated

Open

Closed

Not different

Different

Hidden

3. Living organisms are:

Systems that exchange energy with the environment

Open systems

Systems exchanging with the medium and mass

Isolated thermodynamic systems;

Closed systems;

Systems that are separated from the environment and do not exchange matter with it;

4. Enthalpy:

Depends only on the initial and final parameters;

Heat content of the system;

Thermal effect of chemical reaction

It is not a function of the system status;

It is a measure of the randomness of the system.

Reaction order

5. If the reaction rate depends on the concentration of reactants, then it is

a first-order reaction.;

Second order;

Third order;

Fractional order.

Lack of order

Complex order

6.   Establish a match

Definition (formula)	Calculation formula
Calculation of ΔG reaction	$\Delta Gp. = - 2{,}303 \cdot R \cdot T \cdot \lg Kc$
specific electrical conductivity	$æ = 1/\rho$
Kohlrausch's law	$\lambda\infty = lA + lK$
the speed of movement of ions	$u = U*E$

7.   Establish a match

Definition	Characteristic
The electrophoretic effect is called	the occurrence of carrier deceleration due to the fact that ions of the opposite sign, under the action of an electric field, move in the opposite direction to the direction of motion of the ion in question.
A double electrical layer is created	electric charges located on the metal and ions of the opposite sign oriented in solution at the surface of the electrode
A redox electrode is called	an inert metal in combination with an OV system
an electrode of the second kind consists of	a metal, a hard-to-dissolve salt of this metal, and a second compound, highly soluble and with the same anion as the first compound, is called polarography.

8. Set the correct recording sequence for the glass electrode:

The number is in order	Conditional entry
1.	Ag,AgCl|HCl (sol.)
2.	|KCl(sol.)||KCl(sol.)
3.	| the solution under study |
4.	|AgCl,Ag
5.	glass |

9. Establish the correct sequence of chain reaction stages

| The number is in order	Stage name
1.	The origin of the chain
2.	Chain growth
3.	chain breakage

10. Set the correct recording sequence for the zinc–hydrogen galvanic circuit:

1
Zn
2
H_2SO_4
3
Pt
4
5
H_2,
6
H_2SO_4

1.5.3. Examples of open-ended tasks (a question with an open answer)

Assessed indicators of competence achievement: УК-1.1.1; УК-1.2.1; УК-1.3.1; ОПК-1.1.1; ОПК-1.2.1 ;ОПК-1.3.1; ПК-5.1.1; ПК-5.2.1; ПК-5.3.1.

1. 1. Calculate the standard change in the isobaric potential ΔG for the reaction:

$$C_2H_{2(г)} + 5/2O_2 \leftrightarrows 2CO_2 + H_2O_{(ж)}$$
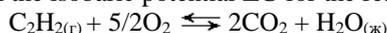
Substance	ΔH, kJ/mol	S, kJ/mol ·К
CO_2	− 393,51	213,6
$H_2O_{(sol.)}$	− 285,84	69,95
$C_2H_{2(g)}$	226,75	200,8
O_2	0	205,04

Can the reaction proceed spontaneously under standard conditions?

2. Calculate the saturated vapor pressure above a solution containing 1 mol of glycerol in 22.4 liters of water at 0°C 1 mol of glycerol in 22,4 liters of water at $p°(H_2O) = 0,6$ kPa.

3. The resistance of a 5% K_2SO_4 solution is 5.61 ohms. Calculate the electrical conductivity of the solution.

2. Assessment tools for conducting intermediate certification in the discipline

Interim certification is carried out in the form of an exam.

List of questions to prepare for intermediate certification:

№	List of questions to prepare for the intermediate attestation	Indicators of competence achievement
1.	Total and partial differentials of thermodynamic potentials for closed systems. Criteria for the possibility and direction of spontaneous processes.	УК-1.1.1; УК-1.2.1; УК-1.3.1; ОПК-1.1.1; ОПК-1.2.1 ;ОПК-1.3.1; ПК-5.1.1; ПК-5.2.1; ПК-5.3.1.
2.	Basic concepts of thermodynamics: systems, parameters, state functions, processes, internal energy and enthalpy of the system, work and heat.	УК-1.1.1; УК-1.2.1; УК-1.3.1; ОПК-1.1.1; ОПК-1.2.1 ;ОПК-1.3.1; ПК-5.1.1; ПК-5.2.1; ПК-5.3.1.
3.	The first principle of thermodynamics. Isobaric and isochoric heats of the process and the relationship between them.	УК-1.1.1; УК-1.2.1; УК-1.3.1; ОПК-1.1.1; ОПК-1.2.1 ;ОПК-1.3.1; ПК-5.1.1; ПК-5.2.1; ПК-5.3.1.
4.	Thermal effects. Hess's law and its consequences. The heat of neutralization, dissolution, and hydration.	УК-1.1.1; УК-1.2.1; УК-1.3.1; ОПК-1.1.1; ОПК-1.2.1 ;ОПК-1.3.1; ПК-5.1.1; ПК-5.2.1; ПК-5.3.1.

5.	Heat capacity: average, true and molar. The dependence of the heat of the process on the temperature. The Kirchhoff equation.	УК-1.1.1; УК-1.2.1; УК-1.3.1; ОПК-1.1.1; ОПК-1.2.1 ;ОПК-1.3.1; ПК-5.1.1; ПК-5.2.1; ПК-5.3.1.
6.	The second law of thermodynamics and its entropic formulation. Entropy change in isolated systems. Statistical character of the second law of thermodynamics.	УК-1.1.1; УК-1.2.1; УК-1.3.1; ОПК-1.1.1; ОПК-1.2.1 ;ОПК-1.3.1; ПК-5.1.1; ПК-5.2.1; ПК-5.3.1.
7.	Entropy. The dependence of entropy on temperature. The third law of thermodynamics. The absolute and standard entropy of matter.	УК-1.1.1; УК-1.2.1; УК-1.3.1; ОПК-1.1.1; ОПК-1.2.1 ;ОПК-1.3.1; ПК-5.1.1; ПК-5.2.1; ПК-5.3.1.
8.	Helmholtz and Gibbs energy and their relationship to maximum process performance.	УК-1.1.1; УК-1.2.1; УК-1.3.1; ОПК-1.1.1; ОПК-1.2.1 ;ОПК-1.3.1; ПК-5.1.1; ПК-5.2.1; ПК-5.3.1.
9.	Full and partial differentials of thermodynamic potentials for open systems. Chemical potential. Criteria for the possibility of spontaneous chemical reactions.	УК-1.1.1; УК-1.2.1; УК-1.3.1; ОПК-1.1.1; ОПК-1.2.1 ;ОПК-1.3.1; ПК-5.1.1; ПК-5.2.1; ПК-5.3.1.
10.	Methods for calculating the thermal effects of chemical reactions based on standard heats of formation and combustion.	УК-1.1.1; УК-1.2.1; УК-1.3.1; ОПК-1.1.1; ОПК-1.2.1 ;ОПК-1.3.1; ПК-5.1.1; ПК-5.2.1; ПК-5.3.1.
11.	The chemical potential of an ideal and a real gas. Fugitiveness and activity.	УК-1.1.1; УК-1.2.1; УК-1.3.1; ОПК-1.1.1; ОПК-1.2.1 ;ОПК-1.3.1; ПК-5.1.1; ПК-5.2.1; ПК-5.3.1.
12.	The law of the acting masses. The chemical equilibrium constant, the ways of its expression (K_p, K_c, K_a).	УК-1.1.1; УК-1.2.1; УК-1.3.1; ОПК-1.1.1; ОПК-1.2.1 ;ОПК-1.3.1; ПК-5.1.1; ПК-5.2.1; ПК-5.3.1.
13.	The equation of the isotherm of a chemical reaction. What kind of dependence does it show and what does it allow you to determine.	УК-1.1.1; УК-1.2.1; УК-1.3.1; ОПК-1.1.1; ОПК-1.2.1 ;ОПК-1.3.1; ПК-5.1.1; ПК-5.2.1; ПК-5.3.1.
14.	The dependence of the chemical equilibrium constant on temperature. The equation of isochores and isobars of a chemical reaction.	УК-1.1.1; УК-1.2.1; УК-1.3.1; ОПК-1.1.1; ОПК-1.2.1 ;ОПК-1.3.1; ПК-5.1.1; ПК-5.2.1; ПК-5.3.1.
15.	Basic concepts of thermodynamics of phase equilibria: homo– and heterogeneous systems, phase, component. Phase transformations and equilibria: sublimation, melting, evaporation. Gibbs' phase rule.	УК-1.1.1; УК-1.2.1; УК-1.3.1; ОПК-1.1.1; ОПК-1.2.1 ;ОПК-1.3.1; ПК-5.1.1; ПК-5.2.1; ПК-5.3.1.
16.	Gibbs' phase rule. Prediction of phase transitions when conditions change.	УК-1.1.1; УК-1.2.1; УК-1.3.1; ОПК-1.1.1; ОПК-1.2.1 ;ОПК-1.3.1; ПК-5.1.1; ПК-5.2.1; ПК-5.3.1.
17.	Single-component systems, water status diagram. The Claiperon-Clausius equation.	УК-1.1.1; УК-1.2.1; УК-1.3.1; ОПК-1.1.1; ОПК-1.2.1 ;ОПК-1.3.1; ПК-5.1.1; ПК-5.2.1; ПК-5.3.1.
18.	The Clapeyron–Clausius equation.	УК-1.1.1; УК-1.2.1; УК-1.3.1; ОПК-1.1.1; ОПК-1.2.1 ;ОПК-1.3.1; ПК-5.1.1; ПК-5.2.1; ПК-5.3.1.
19.	Diagram of the state of a two-component system with a chemical compound melting congruently.	УК-1.1.1; УК-1.2.1; УК-1.3.1; ОПК-1.1.1; ОПК-1.2.1 ;ОПК-1.3.1; ПК-5.1.1; ПК-5.2.1; ПК-5.3.1.
20.	Systems with unlimited solubility of components in liquid and mutual insolubility in solid state. Liquid and solid eutectic mixtures.	УК-1.1.1; УК-1.2.1; УК-1.3.1; ОПК-1.1.1; ОПК-1.2.1 ;ОПК-1.3.1; ПК-5.1.1; ПК-5.2.1; ПК-5.3.1.
21.	Melting diagrams of binary systems. Thermal analysis and its application for the study of solid dosage forms.	УК-1.1.1; УК-1.2.1; УК-1.3.1; ОПК-1.1.1; ОПК-1.2.1 ;ОПК-1.3.1; ПК-5.1.1; ПК-5.2.1; ПК-5.3.1.
22.	Diagrams of the state of limitedly soluble liquids with a critical dissolution temperature.	УК-1.1.1; УК-1.2.1; УК-1.3.1; ОПК-1.1.1; ОПК-1.2.1 ;ОПК-1.3.1; ПК-5.1.1; ПК-5.2.1; ПК-5.3.1.
23.	Raoul's law and its consequences. Cryoscopic and ebullioscopic constants and their relation to the heat of boiling and melting of the solvent.	УК-1.1.1; УК-1.2.1; УК-1.3.1; ОПК-1.1.1; ОПК-1.2.1 ;ОПК-1.3.1; ПК-5.1.1; ПК-5.2.1; ПК-5.3.1.
24.	Diagrams of the state of the two-component system "pressure-composition" and "temperature-composition". Konovalov's first law.	УК-1.1.1; УК-1.2.1; УК-1.3.1; ОПК-1.1.1; ОПК-1.2.1 ;ОПК-1.3.1; ПК-5.1.1; ПК-5.2.1; ПК-5.3.1.

25.	Negative and positive deviations from Raoul's law. Status diagrams. Azeotropes. Konovalov's second law.	УК-1.1.1; УК-1.2.1; УК-1.3.1; ОПК-1.1.1; ОПК-1.2.1 ;ОПК-1.3.1; ПК-5.1.1; ПК-5.2.1; ПК-5.3.1.
26.	Diagram of the state of a two-component system with unlimited solubility of components in liquid and solid state. The rule of leverage.	УК-1.1.1; УК-1.2.1; УК-1.3.1; ОПК-1.1.1; ОПК-1.2.1 ;ОПК-1.3.1; ПК-5.1.1; ПК-5.2.1; ПК-5.3.1.
27.	Simple, fractional distillation and rectification.	УК-1.1.1; УК-1.2.1; УК-1.3.1; ОПК-1.1.1; ОПК-1.2.1 ;ОПК-1.3.1; ПК-5.1.1; ПК-5.2.1; ПК-5.3.1.
28.	Three-component systems. Methods of depicting the composition.	УК-1.1.1; УК-1.2.1; УК-1.3.1; ОПК-1.1.1; ОПК-1.2.1 ;ОПК-1.3.1; ПК-5.1.1; ПК-5.2.1; ПК-5.3.1.
29.	The law of the distribution of substances between two immiscible liquids. The distribution coefficient. Extraction. The principle of obtaining tinctures and decoctions.	УК-1.1.1; УК-1.2.1; УК-1.3.1; ОПК-1.1.1; ОПК-1.2.1 ;ОПК-1.3.1; ПК-5.1.1; ПК-5.2.1; ПК-5.3.1.
30.	Theoretical foundations of extraction.	УК-1.1.1; УК-1.2.1; УК-1.3.1; ОПК-1.1.1; ОПК-1.2.1 ;ОПК-1.3.1; ПК-5.1.1; ПК-5.2.1; ПК-5.3.1.
31.	The use of extraction in medicine. Principles of obtaining tinctures and decoctions.	УК-1.1.1; УК-1.2.1; УК-1.3.1; ОПК-1.1.1; ОПК-1.2.1 ;ОПК-1.3.1; ПК-5.1.1; ПК-5.2.1; ПК-5.3.1.
32.	The law of the distribution of substances between two immiscible liquids. The distribution coefficient. Extraction. The principle of obtaining tinctures and decoctions.	УК-1.1.1; УК-1.2.1; УК-1.3.1; ОПК-1.1.1; ОПК-1.2.1 ;ОПК-1.3.1; ПК-5.1.1; ПК-5.2.1; ПК-5.3.1.
33.	Colligative properties of dilute solutions of solid non-volatile substances in a liquid: $\Delta r/r0$; $\Delta Tkip.$; $\Delta Tkam..$ Determination of the molar mass of a dissolved substance by cryoscopic method.	УК-1.1.1; УК-1.2.1; УК-1.3.1; ОПК-1.1.1; ОПК-1.2.1 ;ОПК-1.3.1; ПК-5.1.1; ПК-5.2.1; ПК-5.3.1.
34.	Osmosis and osmotic pressure. The importance of osmotic phenomena for the body and medicine.	УК-1.1.1; УК-1.2.1; УК-1.3.1; ОПК-1.1.1; ОПК-1.2.1 ;ОПК-1.3.1; ПК-5.1.1; ПК-5.2.1; ПК-5.3.1.
35.	Colligative properties of electrolytes. The isotonic coefficient. Cryometric method for determining the isotonic coefficient.	УК-1.1.1; УК-1.2.1; УК-1.3.1; ОПК-1.1.1; ОПК-1.2.1 ;ОПК-1.3.1; ПК-5.1.1; ПК-5.2.1; ПК-5.3.1.
36.	Как зависят температуры кипения и замерзания раствора от понижения давления насыщенного пара?	УК-1.1.1; УК-1.2.1; УК-1.3.1; ОПК-1.1.1; ОПК-1.2.1 ;ОПК-1.3.1; ПК-5.1.1; ПК-5.2.1; ПК-5.3.1.
37.	What characterizes the abuliometric and cryometric constants?	УК-1.1.1; УК-1.2.1; УК-1.3.1; ОПК-1.1.1; ОПК-1.2.1 ;ОПК-1.3.1; ПК-5.1.1; ПК-5.2.1; ПК-5.3.1.
38.	What is the process called osmosis?	УК-1.1.1; УК-1.2.1; УК-1.3.1; ОПК-1.1.1; ОПК-1.2.1 ;ОПК-1.3.1; ПК-5.1.1; ПК-5.2.1; ПК-5.3.1.
39.	What is Osmotic pressure?	УК-1.1.1; УК-1.2.1; УК-1.3.1; ОПК-1.1.1; ОПК-1.2.1 ;ОПК-1.3.1; ПК-5.1.1; ПК-5.2.1; ПК-5.3.1.
40.	Give a description of osmotic equilibrium	УК-1.1.1; УК-1.2.1; УК-1.3.1; ОПК-1.1.1; ОПК-1.2.1 ;ОПК-1.3.1; ПК-5.1.1; ПК-5.2.1; ПК-5.3.1.
41.	The phenomenon of isoosmia, hemolysis and plasmolysis. Isotonic, hypertensive and hypotonic solutions, their importance for medicine and pharmacy.	УК-1.1.1; УК-1.2.1; УК-1.3.1; ОПК-1.1.1; ОПК-1.2.1 ;ОПК-1.3.1; ПК-5.1.1; ПК-5.2.1; ПК-5.3.1.
42.	Blood buffer systems. The importance of buffer systems for the body. Buffer capacity, methods of its determination.	УК-1.1.1; УК-1.2.1; УК-1.3.1; ОПК-1.1.1; ОПК-1.2.1 ;ОПК-1.3.1; ПК-5.1.1; ПК-5.2.1; ПК-5.3.1.
43.	Buffer systems, their most important representatives and the mechanism of action. The Henderson-Hasselbach equation.	УК-1.1.1; УК-1.2.1; УК-1.3.1; ОПК-1.1.1; ОПК-1.2.1 ;ОПК-1.3.1; ПК-5.1.1; ПК-5.2.1; ПК-5.3.1.

44.	The body's buffer systems. The mechanism of maintaining constant acidity of the most important biological fluids.	УК-1.1.1; УК-1.2.1; УК-1.3.1; ОПК-1.1.1; ОПК-1.2.1 ;ОПК-1.3.1; ПК-5.1.1; ПК-5.2.1; ПК-5.3.1.
45.	Features of the properties of strong electrolytes. The basic concepts of the electrostatistical theory of strong electrolytes by Debye and Hückel. Calculation of activity coefficients.	УК-1.1.1; УК-1.2.1; УК-1.3.1; ОПК-1.1.1; ОПК-1.2.1 ;ОПК-1.3.1; ПК-5.1.1; ПК-5.2.1; ПК-5.3.1.
46.	Ideal and real solutions. Raoul's law and two forms of its writing. Extremely diluted solutions. Henry's law.	УК-1.1.1; УК-1.2.1; УК-1.3.1; ОПК-1.1.1; ОПК-1.2.1 ;ОПК-1.3.1; ПК-5.1.1; ПК-5.2.1; ПК-5.3.1.
47.	Thermodynamic dissociation constant. Activity, activity coefficients. The ionic strength of the solution.	УК-1.1.1; УК-1.2.1; УК-1.3.1; ОПК-1.1.1; ОПК-1.2.1 ;ОПК-1.3.1; ПК-5.1.1; ПК-5.2.1; ПК-5.3.1.
48.	The ionic product of water. The hydrogen index. The scale of solvent acidity.	УК-1.1.1; УК-1.2.1; УК-1.3.1; ОПК-1.1.1; ОПК-1.2.1 ;ОПК-1.3.1; ПК-5.1.1; ПК-5.2.1; ПК-5.3.1.
49.	The Daniel–Jacobi galvanic cell. Electromotive force. The Nernst equation for EMF.	УК-1.1.1; УК-1.2.1; УК-1.3.1; ОПК-1.1.1; ОПК-1.2.1 ;ОПК-1.3.1; ПК-5.1.1; ПК-5.2.1; ПК-5.3.1.
50.	Concentration galvanic cells. The Nernst equation for EMF. Concentration jumps of potentials.	УК-1.1.1; УК-1.2.1; УК-1.3.1; ОПК-1.1.1; ОПК-1.2.1 ;ОПК-1.3.1; ПК-5.1.1; ПК-5.2.1; ПК-5.3.1.
51.	Specific and molar electrical conductivity, factors affecting their magnitude.	УК-1.1.1; УК-1.2.1; УК-1.3.1; ОПК-1.1.1; ОПК-1.2.1 ;ОПК-1.3.1; ПК-5.1.1; ПК-5.2.1; ПК-5.3.1.
52.	The mobility of ions. Kohlrausch's law.	УК-1.1.1; УК-1.2.1; УК-1.3.1; ОПК-1.1.1; ОПК-1.2.1 ;ОПК-1.3.1; ПК-5.1.1; ПК-5.2.1; ПК-5.3.1.
53.	Thermodynamics of a galvanic cell. Schematic representation of the electrodes of a galvanic cell. Symbols.	УК-1.1.1; УК-1.2.1; УК-1.3.1; ОПК-1.1.1; ОПК-1.2.1 ;ОПК-1.3.1; ПК-5.1.1; ПК-5.2.1; ПК-5.3.1.
54.	The electrode, the electrode potential, and the electromotive force of an electrochemical circuit.	УК-1.1.1; УК-1.2.1; УК-1.3.1; ОПК-1.1.1; ОПК-1.2.1 ;ОПК-1.3.1; ПК-5.1.1; ПК-5.2.1; ПК-5.3.1.
55.	A conductometric method for determining the degree and constant of dissociation. Conductometric titration of strong and weak electrolytes.	УК-1.1.1; УК-1.2.1; УК-1.3.1; ОПК-1.1.1; ОПК-1.2.1 ;ОПК-1.3.1; ПК-5.1.1; ПК-5.2.1; ПК-5.3.1.
56.	Theories of the potential jump at the metal-solution boundary: osmotic and solvation.	УК-1.1.1; УК-1.2.1; УК-1.3.1; ОПК-1.1.1; ОПК-1.2.1 ;ОПК-1.3.1; ПК-5.1.1; ПК-5.2.1; ПК-5.3.1.
57.	Electrode potentials. The mechanism of their occurrence. The Nernst equation. Standard electrode potentials.	УК-1.1.1; УК-1.2.1; УК-1.3.1; ОПК-1.1.1; ОПК-1.2.1 ;ОПК-1.3.1; ПК-5.1.1; ПК-5.2.1; ПК-5.3.1.
58.	Classification of electrodes. The principle of operation of the silver chloride electrode.	УК-1.1.1; УК-1.2.1; УК-1.3.1; ОПК-1.1.1; ОПК-1.2.1 ;ОПК-1.3.1; ПК-5.1.1; ПК-5.2.1; ПК-5.3.1.
59.	Classification of electrodes. The principle of operation of the hydrogen electrode. Standard hydrogen potential.	УК-1.1.1; УК-1.2.1; УК-1.3.1; ОПК-1.1.1; ОПК-1.2.1 ;ОПК-1.3.1; ПК-5.1.1; ПК-5.2.1; ПК-5.3.1.
60.	Redox potentials, the mechanism of their occurrence, the Peters equation. Standard electrode potential.	УК-1.1.1; УК-1.2.1; УК-1.3.1; ОПК-1.1.1; ОПК-1.2.1 ;ОПК-1.3.1; ПК-5.1.1; ПК-5.2.1; ПК-5.3.1.
61.	A potentiometric method for determining pH. Potentiometric titration. The importance of these methods in pharmaceutical practice.	УК-1.1.1; УК-1.2.1; УК-1.3.1; ОПК-1.1.1; ОПК-1.2.1 ;ОПК-1.3.1; ПК-5.1.1; ПК-5.2.1; ПК-5.3.1.
62.	The structure and mechanism of action of the glass electrode. Ion-selective electrodes.	УК-1.1.1; УК-1.2.1; УК-1.3.1; ОПК-1.1.1; ОПК-1.2.1 ;ОПК-1.3.1; ПК-5.1.1; ПК-5.2.1; ПК-5.3.1.
63.	The rate of homogeneous chemical reactions, the ways of its expression. The dependence of the reaction rate on the nature and concentration of substances. The reaction rate constant.	УК-1.1.1; УК-1.2.1; УК-1.3.1; ОПК-1.1.1; ОПК-1.2.1 ;ОПК-1.3.1; ПК-5.1.1; ПК-5.2.1; ПК-5.3.1.

64.	The law of the acting masses. Chemical equilibrium constant, ways of expressing it (K_p, K_c, K_a).	УК-1.1.1; УК-1.2.1; УК-1.3.1; ОПК-1.1.1; ОПК-1.2.1 ;ОПК-1.3.1; ПК-5.1.1; ПК-5.2.1; ПК-5.3.1.
65.	The molecularity and order of the reaction. The equation of kinetics of zero, first and second order reactions. The period of semi-conversion. Methods for determining the reaction order.	УК-1.1.1; УК-1.2.1; УК-1.3.1; ОПК-1.1.1; ОПК-1.2.1 ;ОПК-1.3.1; ПК-5.1.1; ПК-5.2.1; ПК-5.3.1.
66.	The period of semi-conversion. Methods for determining the reaction order.	УК-1.1.1; УК-1.2.1; УК-1.3.1; ОПК-1.1.1; ОПК-1.2.1 ;ОПК-1.3.1; ПК-5.1.1; ПК-5.2.1; ПК-5.3.1.
67.	The dependence of the reaction rate on temperature, the temperature coefficient of the reaction rate.	УК-1.1.1; УК-1.2.1; УК-1.3.1; ОПК-1.1.1; ОПК-1.2.1 ;ОПК-1.3.1; ПК-5.1.1; ПК-5.2.1; ПК-5.3.1.
68.	Theory of active collisions and activation energy. The Arrhenius equation. Determination of the activation energy.	УК-1.1.1; УК-1.2.1; УК-1.3.1; ОПК-1.1.1; ОПК-1.2.1 ;ОПК-1.3.1; ПК-5.1.1; ПК-5.2.1; ПК-5.3.1.
69.	Methods for determining the activation energy.	УК-1.1.1; УК-1.2.1; УК-1.3.1; ОПК-1.1.1; ОПК-1.2.1 ;ОПК-1.3.1; ПК-5.1.1; ПК-5.2.1; ПК-5.3.1.
70.	Molecular kinetics: the theory of active collisions and elements of the theory of the transition state or activated complex.	УК-1.1.1; УК-1.2.1; УК-1.3.1; ОПК-1.1.1; ОПК-1.2.1 ;ОПК-1.3.1; ПК-5.1.1; ПК-5.2.1; ПК-5.3.1.
71.	Complex reactions and their kinetic features: parallel, conjugate, and reversible.	УК-1.1.1; УК-1.2.1; УК-1.3.1; ОПК-1.1.1; ОПК-1.2.1 ;ОПК-1.3.1; ПК-5.1.1; ПК-5.2.1; ПК-5.3.1.
72.	Transformations of a medicinal substance in the body as a set of sequential reactions.	УК-1.1.1; УК-1.2.1; УК-1.3.1; ОПК-1.1.1; ОПК-1.2.1 ;ОПК-1.3.1; ПК-5.1.1; ПК-5.2.1; ПК-5.3.1.
73.	Kinetic features of successive reactions. The transformation of a substance in the body as a set of sequential reactions.	УК-1.1.1; УК-1.2.1; УК-1.3.1; ОПК-1.1.1; ОПК-1.2.1 ;ОПК-1.3.1; ПК-5.1.1; ПК-5.2.1; ПК-5.3.1.
74.	Unbranched and branched chain reactions. Photochemical reactions. Einstein's law of photochemical equivalence. The quantum yield of the reaction.	УК-1.1.1; УК-1.2.1; УК-1.3.1; ОПК-1.1.1; ОПК-1.2.1 ;ОПК-1.3.1; ПК-5.1.1; ПК-5.2.1; ПК-5.3.1.
75.	General patterns of catalytic reactions. The mechanism of action of catalysts, homogeneous catalysis, and its characteristics.	УК-1.1.1; УК-1.2.1; УК-1.3.1; ОПК-1.1.1; ОПК-1.2.1 ;ОПК-1.3.1; ПК-5.1.1; ПК-5.2.1; ПК-5.3.1.
76.	Heterogeneous catalysis. Multiplet theory by A.A. Balandin. Metal complex catalysis.	УК-1.1.1; УК-1.2.1; УК-1.3.1; ОПК-1.1.1; ОПК-1.2.1 ;ОПК-1.3.1; ПК-5.1.1; ПК-5.2.1; ПК-5.3.1.
77.	Acid-base catalysis, specific and general. The general scheme of the catalytic process, specific examples and the connection with the protolytic theory of Brensted	УК-1.1.1; УК-1.2.1; УК-1.3.1; ОПК-1.1.1; ОПК-1.2.1 ;ОПК-1.3.1; ПК-5.1.1; ПК-5.2.1; ПК-5.3.1.
78.	Features and scheme of enzymatic catalysis Michaelis–Menten equation, Michaelis constant.	УК-1.1.1; УК-1.2.1; УК-1.3.1; ОПК-1.1.1; ОПК-1.2.1 ;ОПК-1.3.1; ПК-5.1.1; ПК-5.2.1; ПК-5.3.1.
79.	Equilibrium in solutions of weak electrolytes. The theory of S. Arrhenius and its shortcomings. The Brensted-Lowry proton theory of acids and bases.	УК-1.1.1; УК-1.2.1; УК-1.3.1; ОПК-1.1.1; ОПК-1.2.1 ;ОПК-1.3.1; ПК-5.1.1; ПК-5.2.1; ПК-5.3.1.
80.	Gibbs surface energy and surface tension. The dependence of surface tension on temperature. Methods for determining surface tension.	УК-1.1.1; УК-1.2.1; УК-1.3.1; ОПК-1.1.1; ОПК-1.2.1 ;ОПК-1.3.1; ПК-5.1.1; ПК-5.2.1; ПК-5.3.1.
81.	The dependence of surface tension on temperature.	УК-1.1.1; УК-1.2.1; УК-1.3.1; ОПК-1.1.1; ОПК-1.2.1 ;ОПК-1.3.1; ПК-5.1.1; ПК-5.2.1; ПК-5.3.1.
82.	Surface-inactive and surface-inactive substances.	УК-1.1.1; УК-1.2.1; УК-1.3.1; ОПК-1.1.1; ОПК-1.2.1 ;ОПК-1.3.1; ПК-5.1.1; ПК-5.2.1; ПК-5.3.1.
83.	Surfactants. Surface activity. The Duclos-Traube rule. The Shishkovsky equation.	УК-1.1.1; УК-1.2.1; УК-1.3.1; ОПК-1.1.1; ОПК-1.2.1 ;ОПК-1.3.1; ПК-5.1.1; ПК-5.2.1; ПК-5.3.1.

84.	Excessive Gibbs adsorption. The fundamental Gibbs adsorption equation and its analysis.	УК-1.1.1; УК-1.2.1; УК-1.3.1; ОПК-1.1.1; ОПК-1.2.1 ;ОПК-1.3.1; ПК-5.1.1; ПК-5.2.1; ПК-5.3.1.
85.	The main provisions of the theory of polymolecular adsorption as the basic equation of the generalized Langmuir theory.	УК-1.1.1; УК-1.2.1; УК-1.3.1; ОПК-1.1.1; ОПК-1.2.1 ;ОПК-1.3.1; ПК-5.1.1; ПК-5.2.1; ПК-5.3.1.
86.	Adsorption at the interface "solid – gas" and "solid – liquid". The Langmuir and Freundlich isotherm equation.	УК-1.1.1; УК-1.2.1; УК-1.3.1; ОПК-1.1.1; ОПК-1.2.1 ;ОПК-1.3.1; ПК-5.1.1; ПК-5.2.1; ПК-5.3.1.
87.	Adsorption at the interface "T-G" and "T-Z". The Langmuir and Freundlich isotherm equation. The relation of the Gibbs and Langmuir equations and the definition of the physical meaning of constants in the Shishkovsky equation.	УК-1.1.1; УК-1.2.1; УК-1.3.1; ОПК-1.1.1; ОПК-1.2.1 ;ОПК-1.3.1; ПК-5.1.1; ПК-5.2.1; ПК-5.3.1.
88.	The main provisions of the theory of polymolecular adsorption. The equation of polymolecular adsorption as the basic equation of the generalized Langmuir theory.	УК-1.1.1; УК-1.2.1; УК-1.3.1; ОПК-1.1.1; ОПК-1.2.1 ;ОПК-1.3.1; ПК-5.1.1; ПК-5.2.1; ПК-5.3.1.
89.	Sorption of gases. Capillary condensation in pores of various types is the Kelvin equation of capillary condensation.	УК-1.1.1; УК-1.2.1; УК-1.3.1; ОПК-1.1.1; ОПК-1.2.1 ;ОПК-1.3.1; ПК-5.1.1; ПК-5.2.1; ПК-5.3.1.
90.	Electrolyte adsorption: selective and ion-exchange. Ionites. The ion exchange constant. The use of ionites in pharmacy.	УК-1.1.1; УК-1.2.1; УК-1.3.1; ОПК-1.1.1; ОПК-1.2.1 ;ОПК-1.3.1; ПК-5.1.1; ПК-5.2.1; ПК-5.3.1.
91.	Ion exchange adsorption. Ionites and their classification.	УК-1.1.1; УК-1.2.1; УК-1.3.1; ОПК-1.1.1; ОПК-1.2.1 ;ОПК-1.3.1; ПК-5.1.1; ПК-5.2.1; ПК-5.3.1.
92.	Physico-chemical characteristics of ionites: a) exchange and statistical capacity; b) acid-base characteristics; c) chemical and mechanical resistance; d) swelling.	УК-1.1.1; УК-1.2.1; УК-1.3.1; ОПК-1.1.1; ОПК-1.2.1 ;ОПК-1.3.1; ПК-5.1.1; ПК-5.2.1; ПК-5.3.1.
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94.	The use of ionites in pharmacy.	УК-1.1.1; УК-1.2.1; УК-1.3.1; ОПК-1.1.1; ОПК-1.2.1 ;ОПК-1.3.1; ПК-5.1.1; ПК-5.2.1; ПК-5.3.1.
95.	The main tasks, features and classification features of the chromatographic analysis method.	УК-1.1.1; УК-1.2.1; УК-1.3.1; ОПК-1.1.1; ОПК-1.2.1 ;ОПК-1.3.1; ПК-5.1.1; ПК-5.2.1; ПК-5.3.1.
96.	The basic equation of ideal equilibrium chromatography.	УК-1.1.1; УК-1.2.1; УК-1.3.1; ОПК-1.1.1; ОПК-1.2.1 ;ОПК-1.3.1; ПК-5.1.1; ПК-5.2.1; ПК-5.3.1.
97.	Analysis of the equilibrium chromatography equation. Dependence of the shape of the chromatographic zone on the type of adsorption isotherm. Characteristics of differential chromatograms and basic ellution parameters ($\tau_{уд.}$ и $V_{уд.}$).	УК-1.1.1; УК-1.2.1; УК-1.3.1; ОПК-1.1.1; ОПК-1.2.1 ;ОПК-1.3.1; ПК-5.1.1; ПК-5.2.1; ПК-5.3.1.
98.	Characteristics of differential chromatograms and basic elution parameters ($\tau_{уд.}$ и $V_{уд.}$).	УК-1.1.1; УК-1.2.1; УК-1.3.1; ОПК-1.1.1; ОПК-1.2.1 ;ОПК-1.3.1; ПК-5.1.1; ПК-5.2.1; ПК-5.3.1.
99.	Classification of dispersed systems according to various criteria. Methods of purification of colloidal systems.	УК-1.1.1; УК-1.2.1; УК-1.3.1; ОПК-1.1.1; ОПК-1.2.1 ;ОПК-1.3.1; ПК-5.1.1; ПК-5.2.1; ПК-5.3.1.
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106.	Specific and molar electrical conductivity, factors affecting their magnitude. The speed of movement and mobility of ions. Kohlrausch's law.	УК-1.1.1; УК-1.2.1; УК-1.3.1; ОПК-1.1.1; ОПК-1.2.1 ;ОПК-1.3.1; ПК-5.1.1; ПК-5.2.1; ПК-5.3.1.
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108.	Colligative properties of electrolytes. The isotonic coefficient. Cryometric method for determining the isotonic coefficient.	УК-1.1.1; УК-1.2.1; УК-1.3.1; ОПК-1.1.1; ОПК-1.2.1 ;ОПК-1.3.1; ПК-5.1.1; ПК-5.2.1; ПК-5.3.1.
109.	Coagulation, the factors that cause it. Theories of coagulation: the adsorption theory of Freundlich. Electrostatic and physical theory of DLFO.	УК-1.1.1; УК-1.2.1; УК-1.3.1; ОПК-1.1.1; ОПК-1.2.1 ;ОПК-1.3.1; ПК-5.1.1; ПК-5.2.1; ПК-5.3.1.
110.	Coagulation with indifferent and non-indifferent electrolytes. Mechanism and kinetics of coagulation.	УК-1.1.1; УК-1.2.1; УК-1.3.1; ОПК-1.1.1; ОПК-1.2.1 ;ОПК-1.3.1; ПК-5.1.1; ПК-5.2.1; ПК-5.3.1.
111.	Kinetics of coagulation. Recharge of sol and alternating coagulation zones. Mutual coagulation and coagulation by electrolyte mixtures.	УК-1.1.1; УК-1.2.1; УК-1.3.1; ОПК-1.1.1; ОПК-1.2.1 ;ОПК-1.3.1; ПК-5.1.1; ПК-5.2.1; ПК-5.3.1.
112.	Aerosols, their preparation and properties, aggregative stability and its determining factors. The use of aerosols.	УК-1.1.1; УК-1.2.1; УК-1.3.1; ОПК-1.1.1; ОПК-1.2.1 ;ОПК-1.3.1; ПК-5.1.1; ПК-5.2.1; ПК-5.3.1.
113.	Powders and their properties. Miscibility, granulation and atomizability of powders. Application in pharmacy.	УК-1.1.1; УК-1.2.1; УК-1.3.1; ОПК-1.1.1; ОПК-1.2.1 ;ОПК-1.3.1; ПК-5.1.1; ПК-5.2.1; ПК-5.3.1.
114.	Molecular kinetic properties: sedimentation, the sedimentation constant. Determination of particle size by sedimentation analysis.	УК-1.1.1; УК-1.2.1; УК-1.3.1; ОПК-1.1.1; ОПК-1.2.1 ;ОПК-1.3.1; ПК-5.1.1; ПК-5.2.1; ПК-5.3.1.
115.	Emulsions, their properties and preparation. Emulsifiers and their mechanism of action. The use of emulsions in pharmacy.	УК-1.1.1; УК-1.2.1; УК-1.3.1; ОПК-1.1.1; ОПК-1.2.1 ;ОПК-1.3.1; ПК-5.1.1; ПК-5.2.1; ПК-5.3.1.
116.	Micelle formation in surfactant solutions (soaps, detergents, tannides, dyes). The critical concentration of micelle formation. Solubilization and its importance in pharmacy.	УК-1.1.1; УК-1.2.1; УК-1.3.1; ОПК-1.1.1; ОПК-1.2.1 ;ОПК-1.3.1; ПК-5.1.1; ПК-5.2.1; ПК-5.3.1.
117.	Suspensions, their characteristics. Factors of suspension stability. Flocculation. The use of suspensions in pharmacy.	УК-1.1.1; УК-1.2.1; УК-1.3.1; ОПК-1.1.1; ОПК-1.2.1 ;ОПК-1.3.1; ПК-5.1.1; ПК-5.2.1; ПК-5.3.1.
118.	Osmotic pressure of solutions of polymer nonelectrolytes. The Haller equation. Determination of the molar mass of polymer nonelectrolytes.	УК-1.1.1; УК-1.2.1; УК-1.3.1; ОПК-1.1.1; ОПК-1.2.1 ;ОПК-1.3.1; ПК-5.1.1; ПК-5.2.1; ПК-5.3.1.
119.	Swelling and dissolution of the IUD. The mechanism of swelling. Thermodynamics of swelling and dissolution of IUD. The influence of various factors on the degree of swelling. Lyotropic series.	УК-1.1.1; УК-1.2.1; УК-1.3.1; ОПК-1.1.1; ОПК-1.2.1 ;ОПК-1.3.1; ПК-5.1.1; ПК-5.2.1; ПК-5.3.1.
120.	Factors of Navy stability. Gelling. The influence of various factors on the rate of hardening.	УК-1.1.1; УК-1.2.1; УК-1.3.1; ОПК-1.1.1; ОПК-1.2.1 ;ОПК-1.3.1; ПК-5.1.1; ПК-5.2.1; ПК-5.3.1.
121.	IUD salting, salting thresholds and their dependence on the pH of the medium. Lyotropic series of ions. Coacervation, biological significance. Microcapsulation	УК-1.1.1; УК-1.2.1; УК-1.3.1; ОПК-1.1.1; ОПК-1.2.1 ;ОПК-1.3.1; ПК-5.1.1; ПК-5.2.1; ПК-5.3.1.
122.	Viscosity of IUD solutions. Specific, reduced, and characteristic viscosities. The Staudinger equation and its modification	УК-1.1.1; УК-1.2.1; УК-1.3.1; ОПК-1.1.1; ОПК-1.2.1 ;ОПК-1.3.1; ПК-5.1.1; ПК-5.2.1; ПК-5.3.1.

123.	Polyelectrolytes. Osmotic pressure of polyelectrolyte solutions. Donnan's membrane equilibrium.	УК-1.1.1; УК-1.2.1; УК-1.3.1; ОПК-1.1.1; ОПК-1.2.1 ;ОПК-1.3.1; ПК-5.1.1; ПК-5.2.1; ПК-5.3.1.
124.	Viscosity of IUD solutions, viscosity anomaly, methods of expressing and measuring the viscosity of IUD solutions.	УК-1.1.1; УК-1.2.1; УК-1.3.1; ОПК-1.1.1; ОПК-1.2.1 ;ОПК-1.3.1; ПК-5.1.1; ПК-5.2.1; ПК-5.3.1.
125.	High molecular weight compounds and their solutions. What are their differences from true colloidal solutions? Colloidal protection.	УК-1.1.1; УК-1.2.1; УК-1.3.1; ОПК-1.1.1; ОПК-1.2.1 ;ОПК-1.3.1; ПК-5.1.1; ПК-5.2.1; ПК-5.3.1.

The intermediate attestation includes the following types of tasks interview on control questions

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Head of the Department   A.K.Brel'