

Ministry of Health of Russian Federation
Federal State Autonomous Educational Institution
of Higher Education "N.I. Pirogov Russian National Research Medical University"
Ministry of Health of Russian Federation
FGAOU RNIMU named after N.I. Pirogov of the Ministry of Health of Russia

THE PROGRAM
of the Entry Test in
Medicinal Chemistry

I. Scope of application and regulatory references

The program of the entrance test is designed for applicants to the FGAOU VO RNIMU named after N.I. Pirogov of the Ministry of Health of the Russian Federation for training in higher education programs: bachelor's degree programs and specialty programs, based on the requirements of federal state educational standards of secondary vocational education in specialties related to the field of knowledge "Health and medical Sciences", the requirements of federal state educational standards for specialties related to the fields of knowledge "Health and medical Sciences", "Education and Pedagogical Sciences", "Mathematical and Natural Sciences", "Agriculture and agricultural Sciences", in accordance with the rules of admission to higher education educational programs – bachelor's degree programs, specialty programs, master's degree programs in the Federal State Autonomous Educational Institution of Higher Education "Russian National Research Medical University named after N.I. Pirogov" of the Ministry of Health of the Russian Federation (FSAOU IN RNIMU named after. N.I. Pirogova of the Ministry of Health of Russia) for the 2025/26 academic year.

II. The program of the entrance test

1. Theoretical chemistry

1.1. Basic concepts and laws of chemistry. The subject of chemistry. The main provisions of the atomic-molecular doctrine

Relative atomic and relative molecular weights. The amount of substance. Mole. Molar mass. Avogadro's law and its consequences. The molar volume of the gas. Normal conditions. Absolute and relative gas density. Volume ratios of gases in chemical reactions.

1.2. The structure of the atom. Periodic law of D.I. Mendeleev. Chemical bond

Atom. Models of the structure of the atom. Nuclei and nucleons. Nuclides and isotopes. Electron. The structure of the electronic shells of atoms. Energy levels and sublevels, atomic orbitals. Electronic configurations of atoms. Valence electrons. The ground and excited states of atoms.

The main patterns of electron placement in atoms of small and large periods, s-, p-, d- elements.

Periodic law. Reasons for the periodicity of the properties of elements. Periods, groups and subgroups in the periodic table. The relationship of the properties of elements and their compounds with the position in the periodic table.

Molecules and chemical bonding. Covalent bond, its varieties and mechanisms of formation. Characteristics of the covalent bond. Electronegativity. The degree of oxidation and valence. Ionic bond. Metal connection. Hydrogen bonding. Substances of molecular and non-molecular structure.

1.3. Physico-chemical patterns of chemical reactions

Classification of chemical reactions in inorganic and organic chemistry according to various characteristics: by changing the degrees of oxidation of atoms, by the number and composition of initial and formed substances, by the type of bond breaking, by thermal effect, by reversibility.

Energy of chemical transformations. Thermal effect of a chemical reaction. Thermochemical equations of reactions.

The rate of chemical reactions. Homogeneous and heterogeneous reactions. Dependence of the chemical reaction rate on various factors. Reversibility of chemical reactions. Chemical

equilibrium. The equilibrium constant. The displacement of the equilibrium under the influence of various factors. The Le Chatelier principle.

1.4. Solutions

The mechanism of formation of solutions and their classification. Pure substances and mixtures. Methods of expressing the composition of solutions: the mass fraction of the dissolved substance. Solutions of electrolytes. Theory of electrolytic dissociation. The mechanism of electrolytic dissociation of substances with ionic and covalent polar bonds. Dissociation of acids, bases and salts. Strong and weak electrolytes.

Chemical properties of acids, bases and salts in the light of the theory of electrolytic dissociation.

Ion exchange reactions in aqueous solutions of electrolytes, conditions of their irreversibility. Acid-base interactions in solutions. Amphotericity.

1.5. Redox processes

The degree of oxidation. The most important oxidizing agents and reducing agents. Compilation of equations of redox reactions by the electronic balance method.

Redox reactions in solutions. Electrolysis of solutions and melts.

2. Chemistry of elements

2.1. Classification of inorganic compounds

Oxides, classification of oxides. Methods of obtaining oxides. Their physical and chemical properties. Nomenclature of oxides.

Bases, their classification, methods of preparation and chemical properties. Amphoteric hydroxides. The nomenclature of the bases.

Acids, their classification, methods of preparation, physical and chemical properties. The nomenclature of acids.

Salts, their classification, methods of preparation and chemical properties. Nomenclature of salts. Hydrolysis of salts.

2.2. Metals. General characteristics

The position of metals in the periodic table of chemical elements of D.I. Mendeleev. Features of the electronic structure of their atoms. General characteristics of metals of the main and secondary subgroups of the periodic table, their oxides and hydroxides: acid-base and redox properties. General methods of obtaining metals. The concept of metallurgy. Alloys.

2.2.1. Metals of the main subgroups I and II of groups of the periodic table (s-elements)

The structure of atoms. Physical properties. Chemical properties: interaction with nonmetals (halogens, oxygen, sulfur, nitrogen, phosphorus, carbon, hydrogen), water, acid solutions. Compounds of alkaline and alkaline earth metals: oxides, peroxides, hydroxides, hydrides, nitrides, phosphides and carbides. Their chemical properties

2.2.2. Aluminum

The structure of the atom. Physical properties. Chemical properties of aluminum: interaction with nonmetals (halogens, oxygen, sulfur, nitrogen and carbon), oxides, dilute and concentrated acid solutions (hydrochloric, sulfuric, nitric), alkali solutions and alkali metal carbonates, water. Aluminum oxide and hydroxide, their amphoteric properties.

2.2.3. Metals of side subgroups (*d*-elements)

Features of the structure of their atoms. General characteristics of *d*-elements.

2.2.4. Iron

The structure of the atom. Characteristic ions and degrees of oxidation of iron. Physical properties. Chemical properties: interaction with nonmetals (halogens, oxygen, sulfur), dilute and concentrated acid solutions (hydrochloric, sulfuric, nitric). Iron(II) oxide and hydroxide, iron(II) salts, their reducing properties. Iron(III) oxide and hydroxide, their amphoteric properties.

2.2.5. Manganese

The structure of the atom. Characteristic ions, degrees of oxidation of manganese and corresponding oxides, hydroxides and salts. The interaction of manganese with acids. Change of acid-base and redox properties of manganese compounds with a change in the degree of oxidation of manganese. Manganese(IV) oxide, its oxidizing properties in an acidic environment. Manganates and permanganates, their oxidizing properties.

2.2.6. Chrome

The structure of the atom. Characteristic ions, oxidation states of chromium and corresponding oxides, hydroxides and salts. The interaction of chromium with acids. Changes in the acid-base and redox properties of chromium compounds depending on the degree of chromium oxidation. Chromium(III) oxide and hydroxide, their amphoteric properties. Chromates and dichromates, their mutual transformations depending on the acidity of the medium. Oxidizing properties of chromium(VI) compounds.

2.2.7. Zinc

The structure of the atom. Chemical properties: interaction of zinc with nonmetals (chlorine, oxygen, sulfur), with water, with dilute and concentrated solutions of acids (hydrochloric, sulfuric, nitric), with alkalis. Zinc oxide and hydroxide, their amphoteric properties.

2.2.8. Copper and Silver

The structure of the atom. Characteristic oxidation states. Chemical properties: interaction with nonmetals (halogens, oxygen, sulfur), acids.

2.3. Nonmetals

The position of nonmetals in the periodic table of D.I. Mendeleev.

2.3.1. Hydrogen

Isotopes of hydrogen. Compounds of hydrogen with metals and nonmetals. Production of hydrogen.

2.3.2. The main subgroup of the VII group of the periodic system. Halogens

The structure of atoms. The structure of molecules. Physical properties of halogens. Chemical properties: interaction with hydrogen, metals, nonmetals (S, C, Si, P), with complex substances (acids, salts, water, alkalis, organic compounds).

Halogenated hydrogen. The structure of molecules. Hydrogen bonding in hydrogen fluoride. Physical properties. Comparison of the strength of hydrofluoric acids. Chemical properties: general properties of acids, reducing properties, interaction of hydrofluoric acid with silicon

oxide(IV). Oxygen compounds of chlorine.

2.3.3. Oxygen subgroup

The structure of atoms. Physical properties, allotropy.

2.3.4. Oxygen

Chemical properties: interaction with metals, nonmetals, complex substances reducing agents (oxides, hydroxides, acids, salts, organic compounds). Oxygen production in industry and in the laboratory.

Water. The structure of the molecule. Hydrogen bonding and its effect on water properties.

Acid-base and redox properties of water. Hydrogen peroxide. Redox properties of hydrogen peroxide (oxidation of sodium nitrite, hydrogen iodide; reduction of potassium permanganate in acidic medium, silver oxide).

2.3.5. Sulfur

Chemical properties: interaction with metals, oxygen, chlorine and hydrogen. Hydrogen sulfide. The structure of the molecule. Physical properties. Production of hydrogen sulfide. Acidic properties of an aqueous solution of hydrogen sulfide of hydrogen sulfide acid. Redox properties of hydrogen sulfide and hydrogen sulfide acid (interaction with metals, oxygen, bromine (chlorine), hydrogen peroxide, sulfur oxide(IV) and sulfurous acid). Sulfides, hydrolysis of sulfides.

Sulfur oxide(IV). The structure of the molecule. Physical properties. Production of sulfur oxide(IV). Acidic properties of an aqueous solution of sulfur oxide(IV) sulfurous acid. Redox properties of sulfur(IV) oxide and sulfurous acid (interaction with metals, oxygen, bromine (chlorine), hydrogen peroxide, hydrogen sulfide). Sulfur oxide(VI). The structure of the molecule. Physical properties. Production of sulfur oxide(VI). Chemical properties of sulfur oxide (VI): interaction with water, reducing agents (sulfur, carbon, potassium iodide), thermal decomposition. Sulfuric acid. The structure of the molecule. Production of sulfuric acid (chemistry).

Chemical properties of dilute sulfuric acid. Chemical properties of concentrated sulfuric acid.

2.3.6. Nitrogen subgroup

The structure of atoms. General characteristics of the elements.

2.3.7. Nitrogen

The structure of the molecule. Chemical Properties: oxidative interactions with metals, hydrogen; reducing interactions with oxygen. The structure of the molecule, its polarity. Physical properties.

Production of ammonia. Chemical properties of ammonia. Main properties: interaction with water and acids. Reducing properties: interaction with oxygen, halogens, hydrogen peroxide, heavy metal oxides. The structure of the ammonium ion. Acidic properties of ammonium salts: interaction with bases, basic oxides, water (hydrolysis). Reducing properties of ammonium salts.

Nitrogen oxides. Receiving. Physical properties. Chemical properties. Nitric oxide(II): interaction with reducing agents hydrogen, ammonia; interaction with oxidizer oxygen. Nitric oxide(IV): interaction with reducing agents hydrogen, magnesium, phosphorus; interaction with oxidizer oxygen; interaction with water and alkalis (disproportionation reaction).

Nitric acid. Acidic properties. Instability of nitric acid. Nitrous acid salts are nitrites. Thermal

decomposition of ammonium nitrite. Nitric acid. The structure of the molecule. Production of nitric acid (chemistry). Chemical properties. Acidic properties. Interaction with reducing agents metals, nonmetals, complex substances. The effect of the reducing ability of metals and the concentration of acid on the depth of its recovery. Nitric acid salts are nitrates. Thermal decomposition of nitrates.

2.3.8. Phosphorus

Physical properties. Allotropy. Chemical properties of phosphorus: interaction with reducing agents metals, hydrogen; interaction with oxidizing agents oxygen, chlorine, nitrogen oxides(II) and (IV), nitric and concentrated sulfuric acids.

Oxides of phosphorus(III) and (V), phosphorous and orthophosphoric acids. Acidic properties. Phosphine.

2.3.9. Carbon subgroup

The structure of atoms. Physical properties. Allotropy.

2.3.10. Carbon

Chemical properties. Interaction with metals, hydrogen; interaction with oxidizing agents: oxygen, carbon(IV) oxide, heavy metal oxides, nitric and concentrated sulfuric acids. Carbon monoxide(II), reducing properties.

Carbon monoxide(IV). Physical properties. Production of carbon monoxide(IV). Chemical properties: interaction with reducing agents carbon, magnesium. Carbonic acid. Acidic properties. Carbonic acid salts carbonates and bicarbonates, their mutual transformations.

2.3.11. Silicon

Receiving. Chemical properties: interaction with oxidizing agents fluorine, oxygen, halogens; interaction with aqueous solutions of alkalis.

Silicon oxide(IV). Silicic acid, silicates.

3. Organic Chemistry

3.1. Introduction

Theory of the structure of organic compounds. Carbon skeleton. Radical. Functional group. Homologues and homological series. Structural and spatial isomerism. The structure of the electron shells of the carbon atom. Hybridization of orbitals (sp , sp^2 , sp^3). Types of bonds in organic molecules and ways to break them. Types of reactions in organic chemistry. Ionic and radical reaction mechanisms. Chemical bonding in carbon compounds. Ionic, covalent and hydrogen bonds. Electronegativity. The degree of oxidation and valence.

3.2. Alkanes

Methane, its structural formula, tetrahedral structure of the methane molecule, sp^3 -hybridization, the nature of chemical bonds. Homological series of methane, homological difference. Spatial structure of marginal hydrocarbons. Nomenclature and isomerism. Physical properties of alkanes. Natural springs.

Chemical properties of alkanes: substitution reactions (halogenation, nitration); thermal decomposition (cracking, pyrolysis); isomerization; oxidation (gorenje, mild oxidation, production of alcohols, aldehydes, ketones and carboxylic acids).

Radical mechanism of substitution reactions. Selectivity of the interaction of halogens with alkanes. The use of marginal hydrocarbons. Methane. Production of synthesis gas and hydrogen

from methane.

3.3. Halogen - derived alkanes

Chemical properties of halogen-derived alkanes: interaction of halogen-derived alkanes with metals (Wurtz reaction).

3.4. Alkenes

Ethene (ethylene), its structural formula, double bond, σ - and π -bonds, sp^2 -hybridization. Homological series of ethylene. Physical properties. Isomerism: chain isomerism, double bond position isomerism, cis-, trans-isomerism. The nomenclature of alkenes.

Chemical properties of alkenes. The most characteristic reactions of ethylene hydrocarbons are electrophilic addition reactions: halogenation, hydrogen halide addition, sulfuric acid addition, hydration. The mechanism of reactions. Markovnikov's rule. Polymerization reactions. Oxidation reactions (oxidizing agents: oxygen, potassium permanganate in alkaline and acidic media, nitric acid). Preparation of alkenes: dehydrogenation of alkanes, dehydration of alcohols, dehydrohalogenation of alkyl halides, dehalogenation of dihaloalkanes, hydrogenation of alkynes.

3.5. Alkadienes

Chemical and electronic structure of alkadienes with conjugated bonds. Nomenclature and isomerism of alkadienes. Chemical properties: addition of halogens, hydrogen halides, hydrogen. Polymerization. Features of electrophilic connection to systems with conjugated double bonds. Production of 1,3-butadiene: from ethanol (S.V. Lebedev's method), from butane and butenes. Obtaining isoprene. Natural rubber, its structure and properties. Synthetic rubber.

3.6. Cycloalkanes

Structure, homological series, nomenclature, isomerism. Being in nature.

Chemical properties: the most characteristic for three -membered cycles of the addition reaction; halogenation, addition of hydrogen halides, hydrogenation. The most characteristic substitution reactions (radical) for hydrocarbons containing cycles with five or more hydrocarbon atoms are: halogenation, nitration.

3.7. Alkynes

Ethine (acetylene), its structural formula, triple bond, sp -hybridization.

The homological series of etin. Physical properties. Isomerism: isomerism of the chain, isomerism of the triple bond position. The nomenclature of alkenes. Chemical properties of alkenes.

Electrophilic addition reactions: halogenation, addition of hydrogen, hydrogen halides, hydration. Polymerization reactions (formation of benzene, vinyl acetylene). Substitution reactions, the acidic nature of the hydrogen atom in the sp -hybridized carbon atom. Oxidation reactions (oxidizing agents: oxygen, potassium permanganate). Production of alkanes: thermal decomposition (cracking) of hydrocarbons, decomposition of calcium carbide with water or acid, dehydrohalogenation of corresponding halogen-substituted compounds, dehalogenation of polyhalogen-substituted compounds.

3.8. Aromatic hydrocarbons. Arenas

Chemical and electronic structure of the benzene molecule. Benzene is a cyclic conjugate system. The conjugation energy. Homological series of benzene, nomenclature, isomerism. Chemical Properties of benzene: Electrophilic substitution reactions (nitration, sulfonation,

halogenation, alkylation with haloalkanes, alkenes; acylation). Addition reactions (hydrogen, halogens). Mechanism of electrophilic substitution reaction. Chemical properties of benzene homologues. The concept of the mutual influence of atoms in aromatic hydrocarbons. The rules of orientation in the benzene ring. Oxidation reactions. Styrene is one of the most important benzene derivatives.

Production of aromatic hydrocarbons: from oil and its refined products, from coal tar, dehydrocyclization of alkanes, alkylation with halogenated alkanes, alkenes and alcohols. The use of aromatic hydrocarbons. The relationship of saturated, unsaturated and aromatic hydrocarbons.

3.9. Natural sources of hydrocarbons and their processing

Natural sources of hydrocarbons: oil, natural and associated petroleum gases, coal. Oil, composition and properties. Oil refining: oil distillation, thermal and catalytic cracking.

3.10. Alcohols

Saturated monatomic alcohols. The structure of saturated monatomic alcohols. Functional group, its electronic structure. Primary, secondary and tertiary alcohols. The nomenclature of alcohols and isomerism.

Hydrogen bonding and its effect on the properties of alcohols. Chemical properties of alcohols.

Reactions occurring with the breaking of the O-H bond: the formation of metal alkoxides (acidic properties), the formation of esters, the formation of semi-acetals and acetals.

Reactions occurring with the breaking of the C-OH bond: substitution of a hydroxyl group for a halogen, intramolecular dehydration (formation of unsaturated compounds) and intermolecular (formation of esters). Oxidation and reduction reactions.

The mechanism of the nucleophilic substitution reaction.

Preparation of alcohols: hydration of alkenes, fermentation of carbohydrates, reduction of aldehydes and ketones, hydrolysis of halogen derivatives, hydrolysis of esters, production from carbon (II) oxide and hydrogen.

Polyatomic alcohols. The structure of polyatomic alcohols. Nomenclature and isomerism. Chemical properties and production of ethylene glycol and glycerin. Comparative characteristics of chemical properties of monatomic and polyatomic alcohols (acidic properties). The use of alcohols.

3.11. Phenols

Phenols. The structure of phenols. Nomenclature and isomerism. Chemical properties of phenol: acidic properties, electrophilic substitution reactions in the benzene ring (nitration, sulfonation, bromine water action), reduction reactions.

Mutual influence of atoms in a phenol molecule. Preparation and application of phenol.

3.12. Aldehydes and ketone

The structure of aldehydes and ketones. Carbonyl group, its structure. Nomenclature and isomerism of aldehydes and ketones. Physical properties.

Chemical properties: oxidation and reduction reactions, addition reactions of alcohols (formation of acetals), halogenation. Production of aldehydes and ketones: oxidation of alcohols, hydration of alkenes, decomposition of salts of organic acids, oxidation of alkanes, oxidation of ethylene (production of ethanal). The use of methanal and ethanal. Genetic relationship of aldehydes and ketones with other classes of organic compounds

3.13. Carboxylic acids

Classification of carboxylic acids. Saturated monobasic and aromatic carboxylic acids. Nomenclature. Homologous series of saturated monobasic carboxylic acids. Individual representatives of the ultimate monobasic and aromatic acids formic, acetic, palmitic, stearic, benzoic acids. Oxalic acid as a representative of dibasic carboxylic acids. Isomerism.

Monobasic unsaturated carboxylic acids. Nomenclature and isomerism. Some representatives of monobasic saturated carboxylic acids are acrylic, oleic, linoleic, linolenic acids. Physical properties of carboxylic acids.

The carboxyl group, its structure. Mutual influence of a carboxyl group and a hydrocarbon radical. Chemical properties of carboxylic acids.

Properties due to the carboxyl group: electrolytic dissociation, interaction with metals, basic and amphoteric oxides, bases, salts, formation of anhydrides, interaction with alcohols, ammonia, oxidation and reduction reactions. Properties caused by a hydrocarbon radical: substitution, addition, oxidation and reduction reactions.

Preparation of carboxylic acids: oxidation of alkanes, alkenes, aromatic hydrocarbons, alcohols, aldehydes and ketones; hydrolysis of trigalogen derivatives; hydrolysis of esters; decarboxylation of dibasic acids.

The genetic relationship of carboxylic acids with other classes of organic compounds. The use of carboxylic acids.

3.14. Esters. Fats

Esters of inorganic and organic acids. The structure of esters. Nomenclature. Physical properties. Esterification reaction. Reversibility of the esterification reaction. Chemical properties of esters: hydrolysis in acidic and alkaline media. Fats in nature, their structure, physical properties.

Chemical properties: hydrolysis of fats in acidic and alkaline media, hydrogenation of fats. The use of fats. The concept of synthetic detergents.

3.15. Carbohydrates

Classification of carbohydrates. Monosaccharides. The structure of monosaccharides. Open and cyclic forms of monosaccharides. Physical properties and being in nature. Individual representatives of the monosaccharides glucose, fructose, ribose, deoxyribose. Chemical properties of monosaccharides. Properties due to the presence of hydroxyl groups. Properties due to the presence of a carbonyl group. Disaccharides. Sucrose and fructose. The structure of the molecule. Physical properties and being in nature. Chemical properties: hydrolysis; reactions due to the presence of hydroxyl groups.

Polysaccharides. Starch. The structure of starch. Chemical properties of starch: hydrolysis, reaction with iodine, reactions due to the presence of hydroxyl groups. Cellulose. The structure of cellulose. Chemical properties of cellulose: hydrolysis; reactions due to the presence of hydroxyl groups. The use of polysaccharides and their derivatives.

3.16. Nitrogen-containing organic compounds

Amines. The structure of amines. Amino group. Nomenclature and isomerism. Physical properties. Chemical properties of amines: interaction with water and acids (basicity of amines), interaction with nitric acid, gorenje. Aniline, as a representative of aromatic amines. Preparation of aniline from nitrobenzene. Chemical properties of aniline: reactions due to the presence of an amino group, reactions in the benzene ring.

3.17. Amino Acids

The structure of α -amino acids. Nomenclature and isomerism. Physical properties. Chemical properties of α -amino acids: reactions associated with the presence of an amino group; reactions associated with the presence of a carboxyl group. Features of the chemical properties of amino acids due to the combination of carboxyl and amino groups. Formation of dipeptides.

3.18. Proteins as biopolymers

The main α -amino acids that form proteins (glycine, alanine, valine, phenylalanine, tyrosine, serine, cysteine, glutamic acid, lysine, tryptophan). Primary, secondary, tertiary and quaternary structure of proteins. Chemical properties of proteins: hydrolysis, denaturation, color reactions of proteins.

3.19. High molecular weight compounds

General concepts: monomer, polymer, structural link, degree of polymerization. Polymerization and polycondensation reactions. Polymers obtained by polymerization reaction (polyethylene, polypropylene, polyvinyl chloride, polymethylmethacrylate). Rubbers. Natural and synthetic rubbers, vulcanization of rubbers. Polymers obtained by polycondensation reaction. Phenol-formaldehyde resins.

3.20. Biologically important organic compounds and their properties.

Medico-biological significance of organic compounds

III. The form of the entrance test

The introductory test in chemistry is conducted in the form of electronic testing. The execution time is 210 minutes.

The tasks of the entry test in medicinal chemistry are presented on the website of the RNIMU named after N.I.Pirogov at the link: <https://tempolw.rsmu.ru/starttest/6>

IV. Indicators and criteria of the entrance test result, scale and evaluation procedure

The results of the entrance test show the degree (level) of assimilation of theoretical educational material in the discipline and the level of formation of skills and abilities.

Criteria determining the degree (level) of assimilation of theoretical educational material in the discipline at the entrance test:

- the correctness of the answer to the question;
- the volume (completeness) of theoretical knowledge within the framework of the program material.

Criteria determining the level of formation of skills and abilities in the discipline at the entrance test:

- correctness of the implementation of the algorithm for solving a practical problem;
- correct interpretation of the results obtained;
- the ability to draw conclusions from the data obtained.

The criteria for evaluating the test questions in points are given in the table.

Entry test evaluation criteria

№	Question topics	Score	Maximum score
1	Electronic configuration of atoms of biogenic elements	2(2)	2
2	Patterns of changes in the chemical properties of biogenic elements. Characteristics of the elements	2(1)	2
3	Electronegativity, oxidation state and valence of biogenic chemical elements	2(2)	2
4	Characteristics of chemical bonds. Dependence of the chemical properties on the composition and structure.	2(2)	2
5	Classification and nomenclature of inorganic substances.	3(3)	3
6	Properties of simple substances and oxides.	2(2)	2
7	Properties of amphoteric hydroxides, acids and salts.	2(2)	2
8	Properties of inorganic substances	4(4)	4
9	Medico-biological significance of organic compounds	4(4)	4
10	Ion exchange and dissociation	4(4)	4
11	Classification and nomenclature of organic compounds	4(4)	4
12	The theory of the chemical structure of organic compounds	2(2)	2
13	Properties of hydrocarbons.	2(2)	2
14	Properties of oxygen containing compounds.	2(2)	2
15	Properties of nitrogen containing compounds.	2(2)	2
16	Classification of chemical reactions in organic and inorganic chemistry.	2(2)	2
17	The reaction rate and its dependence on different factors	2(2)	2
18	Oxidation-reduction reactions.	3(3)	3
19	Characteristic properties of different classes of organic compounds.	4(4)	4
20	Biologically important organic compounds and their properties	4(4)	4
21	Qualitative reactions of organic compounds.	4(4)	4
22	The relationship of inorganic compounds: chains of transformations	4(4)	4
23	Hydrolysis of salts.	4(4)	4
24	Chemical equilibrium.	4(4)	4
25	Qualitative reactions of inorganic compounds.	4(4)	4
26	Media of water solutions of salts.	4(4)	4
27	Interrelation of different classes of inorganic substances and reactions description.	4(4)	4
28	Interrelation of organic compounds.	3(3)	3
29	Calculations using the concept of "mass fraction of a substance" in biological fluids and drugs	3(1)	3
30	Gas volume calculation.	2(1)	2
31	Calculation of the mass or volume by the parameters of one of the reactants.	2(1)	2
32	Calculations using the concept of "molar concentration of a substance" in biological fluids and drugs	2(1)	2
33	Ion-exchange reactions.	2(1)	2
34	Calculation of the mass fraction of a substance in a mixture.	2(1)	2
35	Thermal effects of chemical reactions	2(1)	2
Total score:			100

In tasks 5, 7-11, 18-28, the maximum score is given with a complete correct answer; with a partially correct answer to a question, a part of the points is given depending on the number of correct answers (the number of answers is indicated in brackets). In tasks 1-4, 6, 12-17, 29-35, the maximum score is given only with a complete correct answer; with an incorrect answer - 0 points. The total maximum amount of the entrance test is 100 points. The sum of points is not translated into a five-point scale.

V. Recommended literature

To prepare for the entrance tests, you can use school textbooks on chemistry (preferably of a profile level) by some authors.