Essay topics

$$$001
The role of computer technology in chemistry teaching

$$$002
"Pedagogical conditions for teaching chemistry in an inclusive environment"

$$$003
Modern educational trends

$$$004
The role of the dual education system in the training of chemistry teachers

$$$005
Solving environmental problems in teaching chemistry

$$$006
Issues of professional development of future chemistry teachers in pedagogical practice.

$$$007
Possibilities of using artificial intelligence in chemistry

$$$008
World traditions and modern methods of teaching chemistry

$$$009
Ways to Develop Students' Research Skills in Chemistry Lessons

$$$0010
Development of professional competence of chemistry teachers: a modern approach

Questions

###001
Regularities of the development of chemical science and regularities of knowledge assimilation as a methodological basis for teaching chemistry.
###002
System-structural approaches to the construction of the content of the chemistry course
###003
Individualization and differentiation of chemistry training as a way to implement personality-oriented chemistry training. Methods of differentiation of students ' academic work and tasks in chemistry.
###004
Basic concepts of chemistry and their evolution: atom, chemical element, molecule, chemical compound, structure of matter, chemical reaction.

###005
Concepts of chemical education, new educational paradigms and the main directions of modernization of chemical education.

###006
Formation of the main tasks and goals of teaching inorganic chemistry.
###007
Teaching chemistry as a pedagogical system, its features: goals, content, methods and technologies of teaching, means and forms of organization of the educational process, control of students ' knowledge.
###008
Content and structure of the course of inorganic chemistry. Periodic law of D. I. Mendeleev as a theoretical basis for the construction of inorganic chemistry.
###009
Didactic principles of teaching chemistry: scientific character, accessibility, clarity and consistent complexity of the course content.
###010
The result of the introduction of new material in the educational process. Modern methods and technologies of teaching at the university.
###011
Methods of teaching chemistry as a science and academic discipline in higher education. The place of didactics of chemistry in the system of pedagogical sciences.
###012
A method of teaching inorganic chemistry with the integration of electronic and multimedia systems.
###013
Modern organizational forms of interactive teaching of inorganic chemistry. Evaluation of the effectiveness of teaching inorganic chemistry in the point rating at the intermediate control.
###014
Features of teaching inorganic chemistry in the transition to the credit learning process.
###015
Methods of teaching the main sections of inorganic chemistry.
###016
Describe analytical chemistry as a science
###017
Describe the types of chemical analysis and how they are classified
###018
Describe the modern stage of development of analytical chemistry.
###019
Solution theory in analytical chemistry
###020
Protolytic theory of acids and bases.
###021
Autoprotolysis. Hydrogen and hydroxide parameters pH and pOH
###022

What is called the degree of dissociation of the electrolyte? Give examples of strong and weak electrolytes, and calculate their pH
###023
What is the ion activity coefficient and ionic strength of the solution?
###024
Buffer solutions used in the analysis
###025
Buffer capacity and calculation of the pH of buffer solutions
###026
Hydrolysis of salts. What is the degree of hydrolysis and the hydrolysis constant, calculating the pH of hydrolyzed salts
###027
Complex compounds in chemical analysis. Classification of complex compounds
###028
Stability and instability constants of complex compounds
###029
Oxidation-Reduction (Redox) reactions in chemical analysis. Redox potential, Nernst equation
###030
Give examples of typical oxidizing agents and reducing agents. How does the oxidation state of the elements change during oxidation and reduction?
###031
Chemical equilibrium in heterogeneous systems. The solubility product and solubility
###032
Conditions of precipitation formation in precipitation reactions
###033
The nature of the covalent bond. Electronic effects. Acids and bases
###034
Alkanes. Methods of preparation, chemical properties and application. Mechanism of radical substitution reaction in alkanes (SR).
###035
Cycloalkanes. General formula for cycloalkanes. Types of isomerism. Bayer theory. Methods for obtaining three -, five-and six-part cycles. Chemical properties of alicyclic hydrocarbons.
###036
Stereoisomerism. Spatial structure of organic compounds. Isomerism. Basic principles of Systematic Nomenclature (IUPAC) and Rational Nomenclature.
###037
Alkenes. Methods of preparation, chemical properties and application. Zaitsev's rule. The mechanism of the electrophilic addition reaction (AdE) in alkenes. Markovnikov's rule. The Karash effect.
###038

Alkynes. Methods of preparation, chemical properties and application. Acidic properties of acetylene and its derivatives. Reactions of nucleophilic addition of alkynes. Kucherov's reaction.
###039
Dienes. Methods of obtaining. Structure of 1,3-butadiene. Classification of dienes - cumulated, conjugated, and isolated. 1,2 - and 1,4 – addition reactions.
###040
Halogen derivatives of alkanes. Classification and nomenclature . Methods of preparation, chemical properties.
###041
Organoelement compounds. Organometallic compounds. Structure. Methods of obtaining. Reactions.
###042
Alcohols. Methods of preparation, chemical properties and application. Acid-base properties of alcohols. The reaction of dehydration of alcohols. Zaitsev's rule.
###043
Polyatomic alcohols. Structure and reactions.
###044
Simple ethers. Methods of preparation, structure, and reactions.
###045
Aldehydes and ketones. Electronic structure of the carbonyl group. Methods of obtaining. Physical and chemical properties. Oxidation-reduction reactions.
###046
Carboxylic acids and their derivatives. Synthesis of functional derivatives of carboxylic acids (anhydrides, chlorohydrides, esters, amides).
###047
Saturated carboxylic acids and their derivatives. Electronic structure of the carboxyl group. Nomenclature. Methods of obtaining.
###048
Unsaturated carboxylic acids and their derivatives. Methods of obtaining. Reactions.
###049
Orientation rules in electrophilic aromatic substitution: ortho -, para-orientants (substituents of the first row); meta-orientants (substituents of the second row).
###050
Orientation rules and reactivity of substituted benzenes from the standpoint of the theory of molecular orbitals. Electrophilic substitution in polysubstituted benzenes: consistent and inconsistent orientation; unco-substitution reactions.
###001
Methods of organizing independent work of undergraduates.
###002
Problems of distance learning in inorganic chemistry.
###003
Types of cognitive tasks in chemistry.
###004

Cognitive tasks as an organizational and managerial tool for teaching chemistry.
###005
Methods of teaching general chemistry, their brief description. Classification and grouping of methods used in teaching chemistry. Special methods of teaching chemistry.
###006
General logical and general pedagogical methods in the process of teaching chemistry.
###007
Modern technologies of teaching chemistry. The reasons for the formation and current trends in the development of technologization of chemistry education.
###008
Solving chemical problems as a method of studying chemistry. The role and functions of computational problems in teaching chemistry.
###009
Basic theoretical problems of inorganic chemistry.
###010
Methodological foundations of content integration in the teaching of chemistry. Integrative courses "Natural science" and "General chemistry" in chemical education.
###011
Educational technology, its essence and structure. The focus of educational technologies on the result-the acquisition of new knowledge, the development of skills and key competencies.
###012
Subject and inter-subject connections, their didactic purpose and ways of implementation in the teaching of chemistry.
###013
Chemical reactions of substances in various aggregate states.
###014
Features of designing and conducting chemistry lessons. Solving and composing problems in chemistry.
###015
The project method in teaching inorganic chemistry.
016
Conducting a class on the classification of inorganic substances based on the method of debate.
017
Modern methods of teaching general and inorganic chemistry
018
Factors affecting the solubility of presipitates in precipitation reactions
019
Organic reagents used in analytical chemistry
020
Name the areas of use of organic reagents, give examples

021
Separation and concentration methods
022
Extraction method. Extraction of organic substances and metal ions
023
Qualitative chemical analysis. Fractional and systematic ion analysis
024
Classification of cations and anions
025
Quantitative analysis. Tasks of quantitative analysis
026
Methods for expressing the concentration of solutions
027
What is the essence of gravimetric and titrimetric analysis?
028
The essence of titrimetric analysis. Basic methods of titrimetric analysis
029
Titration methods (direct, reverse, and indirect). Calculations in titrimetric analysis
030
Acid-base titration. Acidimetric and alkalimetric titration.
031
Indicators of Acid-base titration
032
Titration curves and indicator selection in acid-base titration
033
Complexometric titration. Complexons
034
Sulfonic acids (sulfonic acids). Methods of preparation, chemical properties.
###035
Nitro compounds. Methods of obtaining. Physical and chemical properties. . Konovalov's reaction.
###036
Amines. Primary, secondary, and tertiary amines and chemical properties.
###037
Diaz compounds. Classification and nomenclature. Physical properties and structure. Methods of obtaining. Reactions.
038
Heterocyclic compounds. Five-membered heterocyclic compounds. Pirol, furan, thiophene. Physical properties and structure.
039
Heterocyclic compounds. Condensed five-membered heterocyclic compounds. Indole. Methods of obtaining.
040
Heterocyclic compounds. Six-membered heterocyclic compounds. Pyridine. Methods of obtaining.

###041
Carbohydrates. Monosaccharides. Disaccharides. Polysaccharides. Structure and classification.
###042
Amino acids, peptides, and proteins. Structure and classification.
Methods of obtaining. Chemical properties.
043
Nucleic acids. Structure.
044
Cycloalkanes. Methods of obtaining. Physical properties and structure.
045
Cycloalkanes. Types of tension and the nature of connections. Features of the spatial structure of some cycloalkanes. The nature of bonds in cyclopropane.
046
Aromatic compounds, aromaticity criteria.
047
Benzene. Structural formula of benzene; conjugation energy; electronic structure of benzene.
048
Rules of aromaticity. Annulenes and their ions: Annulenes; NMR criteria for aromaticity; Aromatic ions; Quantum chemical determination of aromaticity; Graphical method for determining aromaticity.
049
Condensed benzoid hydrocarbons. Non-benzoid aromatic compounds.
050
Electrophilic substitution in the aromatic series: the mechanism of electrophilic aromatic substitution reactions. Electrophilic aromatic substitution reactions: benzene halogenation; benzene sulfonation; benzene nitration; Friedel-Crafts alkylation; Friedel-Crafts acylation; arene reactions with other electrophiles.
###001
Discussion of metal chemistry topics
###002
Application of modern methods on the general properties of metals, their distribution in nature, extraction.
###003
Using interactive methods on the topic of Group 1 metals in the periodic table
###004
Implementation of feedback on the chemistry of nonmetals
###005
Conducting the topic of changes in the properties of nonmetals in connection with the position of D. I. Mendeleev in EPG on the basis of a problem situation
###006
General properties of nonmetals, their distribution in nature, the method of critical analysis of the topic
###007

Elements of Group VI. Conducting the topic of oxygen with the help of interactive training
###008
Water. Abnormal properties of water. Using a modular process on the topic of hydrogen peroxide
###009
Elements of group V. Application of the case method on the topic of phosphorus
###011
Application of new methods in the field of nitrogen extraction, physical and chemical properties
###012
Elements of group IV. Carbon. Conducting a discussion on the topic of silicon
###013
Elements of group III. Modern methods of teaching the topic of Boron.
###014
Snowstorm. Using interactive methods on topic karboranov
###015
Features of the use of the case method on the topic of inorganic transformations of circuits
###016
Conducting a description of the elements of group VIII on the basis of problematic questions on the topic.
###017
Modern methods of teaching the subject noble (inert) gases
###018
Indicators of complexometric titration
###019
Complexometric titration curves
###020
Redox titration. Classification of redox titration
###021
Redox titration curves
###022
Applicable indicators of redox titration
###023
Permanganatometry. Preparation and standardization of potassium permanganate
###024
Iodometry. Working solutions. Indicators
###025
Methods of precipitation titration. Argentometry
###026
Precipitation titration curves. Applicable indicators
###027
Gravimetric analysis. Calculations in gravimetric analysis
###028

Method of distillation, separation and deposition in gravimetric analysis
###029
Optical methods of analysis. Bouguer-Lambert-Beer law
###030
Photocolorimetric and spectrophotometric analysis
###031
Electrochemical methods of analysis. Classification. Potentiometry.
###032
Voltammetry. Polarography. Amperometric titration .
###033
Chromatography. Classification of chromatography methods
###034
Gas and liquid chromatography
###035
Alkylbenzenes and alkenbenzenes: nomenclature of benzene derivatives; methods for the preparation of alkylbenzenes; physical properties of alkylbenzene; reactions of alkylbenzene.
###036
Alkenylbenzenes: methods for the production of styrene and its derivatives. Reactions.
###037
Polycyclic aromatic hydrocarbons. Polycyclic arenas with isolated cycles. Methods for the production of biphenyl derivatives. Structure of biphenyl derivatives. Reactions of biphenyl derivatives.
###038
Condensed benzoid hydrocarbons Production methods. Reactions.
###039
Spectral methods for the identification of organic substances.
###040
Halogenarenes. Classification and nomenclature. Methods of obtaining. Physical properties and structure. Reactions. Nucleophilic halogen substitution in activated haloarenes (SNAr). Nucleophilic halogen substitution in non-activated haloarenes. Nucleophilic halogen substitution catalyzed by copper.
###041
Phenols. Classification and nomenclature. Methods of obtaining. Physical properties and structure. Reactions. Acidity.
###042
Aromatic aldehydes and ketones. Classification and nomenclature. Methods of obtaining. Physical properties and structure. Reactions. Specific properties of aromatic aldehydes.
###043
Aromatic carboxylic acids. Classification and nomenclature. Methods of obtaining. Physical properties and structure. Reactions.
###044

Sulfonic acids. Classification and nomenclature. Methods of obtaining. Physical properties and structure. Reactions. Acidic properties.

###045

Aromatic nitro compounds. Classification and nomenclature. Methods of obtaining. Physical properties and structure. Reactions. CH-acidity.

###046

Aromatic amines. Classification and nomenclature. Methods of obtaining. Physical properties and structure. Reactions. Acid-base properties. Electrophilic substitution in aromatic amines.

###047

Aromatic diazo -, azo-compounds. Classification and nomenclature. Methods of obtaining. Physical properties and structure. Reactions.

###048

Heterocyclic compounds. Classification and nomenclature. Five-membered heterocyclic compounds. Pirol, furan, thiophene.

###049

Six-membered heterocyclic compounds. Pyridine.

###050

Carbohydrates. Monosaccharides. Disaccharides. Polysaccharides