

CHEMISTRY

General chemistry

1. General ideas of Chemistry. Matter, physical states of matter. Avogadro's law. Mole. Chemical formulas.
2. Atom. Molecule. Relative atomic & molecular masses.
3. Atomic structure. AO. Quantum numbers. Isotopes. Nuclear reactions. Properties of atom.
4. Chemical bonding. Covalent bond, σ - and π - bonds. Single, double and triple bonds. Properties of covalent bond.
5. Ionic, metallic and hydrogen bonds. Valence and oxidation number.
6. Gas state. Molar volume.
7. Solutions. Solubility. Methods of expression of concentration.
8. Electrolytes and electrolytic dissociation. Ionic equations.
9. Oxidation- reduction reactions. Oxidation and reduction.
10. Electrolysis.
11. Rate of chemical reactions and chemical equilibrium.
12. Main classes of inorganic compounds: oxides, acids, bases and salts. Hydrolysis of salts.

Inorganic chemistry

13. Hydrogen, water, hydrogen peroxide. Preparing methods, physical and chemical properties.
14. Subgroup of halogens, general description. Chlorine, preparing methods, physical and chemical properties.
15. Subgroup of oxygen, general description. Oxygen, preparing methods, chemical properties. Ozone.
16. Sulfur, preparing methods, chemical properties. Compounds of sulfur.
17. Subgroup of nitrogen, general description. Nitrogen and its hydrogen and oxygen compounds.
18. Phosphorus, compounds.
19. Subgroup of carbon, general description. Carbon and its hydrogen and oxygen compounds.
20. Silicon. Physical and chemical properties, oxygen compounds, silicides.
21. General description of metals.
22. Metallic bond. Physical and chemical properties.
23. Alkaline metals. Oxides and hydroxides.
24. Alkaline - earth metals. Physical and chemical properties, preparing methods Oxides and hydroxides.
25. Aluminum and iron. Chemical properties.

Organic chemistry

26. General description of organic compounds. Structural theory.
27. Alkanes, structure, isomerism, nomenclature. Preparing methods and chemical properties.
28. Cycloalkanes. Structure, isomerism, nomenclature. Preparing methods and chemical properties.
29. Alkenes, structure, isomerism, nomenclature. Preparing methods and chemical properties.
30. Alkadienes, structure, isomerism, nomenclature. Preparing methods and chemical properties.
31. Alkynes. Structure, isomerism, nomenclature. Preparing methods and chemical properties.
32. Aromatic hydrocarbons. Benzene, structure, isomerism of derivatives, preparing methods and chemical properties.
33. Monatomic alcohols, preparing methods and chemical properties, uses.
34. Di- and tri- atomic alcohols. Preparing methods, chemical properties and uses. Phenol.
35. Aldehydes, structure, preparing methods and properties.
36. Carboxylic acids, structure, preparing methods and properties. Representatives.
37. Fats, properties, uses.
38. Carbohydrates. Glucose, structure, properties, uses.
39. Di- and polysaccharides, properties.
40. Amines. Aniline, preparing methods and properties.
41. Amino acids and proteins.