

JAMB Topics for Chemistry

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Broad Topic

Sub Topics

Separation of Mixtures and Purification of Chemical Substances

- Pure and impure substances
- Boiling and melting points
- Elements, compounds and mixtures
- Chemical and physical changes
- Separation processes: evaporation, distillation, sublimation, filtration, crystallization, chromatography, magnetization, decantation

Chemical Combination

- Stoichiometry
- Laws of definite and multiple proportions
- Law of conservation of matter
- Gay Lussac's law
- Avogadro's law
- Chemical symbols, formulae and equations
- Relative atomic mass and mole concept
- Avogadro's number

Kinetic Theory of Matter and Gas Laws

- Kinetic theory of matter
- Changes of state: melting, boiling, freezing, vaporization, condensation
- Gas laws: Boyle's, Charles', Graham's, Dalton's law
- Ideal gas equation ($PV=nRT$)
- Vapour density and relative molecular mass

Atomic Structure and Bonding

- Concept of atoms, molecules, ions
- Atomic structure, electron configuration
- Periodic table and periodicity
- Chemical bonding (electrovalent, covalent, coordinate, metallic, hydrogen bonding)
- Shapes of molecules
- Nuclear chemistry (radioactivity, nuclear reactions)

Air

- Constituents and proportions of air
- Air as a mixture and uses of noble gases

Broad Topic

Sub Topics

Water

- Water as product of hydrogen combustion
- Water as solvent and significance
- Hard and soft water
- Water treatment
- Water of crystallization, efflorescence, deliquescence, hygroscopy

Solubility

- Types of solutions
- Solubility curves and calculations
- Solvents for fats, oils, stains
- False solutions (suspensions, colloids)

Environmental Pollution

- Sources and effects
- Air, water, soil pollution
- Biodegradable and non-biodegradable pollutants

Acids, Bases and Salts

- Characteristics and types
- Acid-base indicators
- Salt preparation and types
- pH and pOH scales
- Acid-base titrations
- Hydrolysis of salts

Oxidation and Reduction

- Definitions by oxygen/hydrogen
- Electron transfer and oxidation numbers
- IUPAC nomenclature
- Tests for oxidizing/reducing agents

Electrolysis

- Electrolytes and non-electrolytes
- Electrolysis of various compounds
- Uses of electrolysis
- Electrochemical cells
- Corrosion and metal protection

Energy Changes

- Heat changes (ΔH)
- Entropy and disorder
- Spontaneity ($\Delta G = \Delta H - T\Delta S$)

Broad Topic

Sub Topics

Rates of Chemical Reaction

- Factors affecting rate (temperature, concentration, surface area, catalyst)
- Reaction rate curves
- Activation energy
- Arrhenius law and collision theory

Chemical Equilibria

- Dynamic equilibrium
- Le Chatelier's principle
- Equilibrium constant

Non-metals and Their Compounds

- Hydrogen, oxygen, sulphur
- Nitrogen, ammonia, nitric acid
- Carbon and its oxides
- Coal, coke, synthesis gas

Metals and Their Compounds

- General and specific metal properties
- Alkali and alkaline-earth metals
- Aluminium, tin, iron, copper
- Transition metals
- Alloys

Organic Compounds

- Tetravalency and general formula
- Alkanes, alkenes, alkynes
- Aromatic hydrocarbons
- Alkanols, alkanoates, alkanolic acids
- Alkanals, alkanones, amines
- Carbohydrates, proteins
- Polymers (natural/synthetic)

Chemistry and Industry

- Types of industries
- Raw materials and relevance
- Biotechnology

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Total Topics: 18

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