

INORGANIC CHEMISTRY SYLLABUS

1 Classification of elements and periodicity in properties

Modern periodic law and present form of the periodic table s, p, d and f block elements, periodic trends in properties of elements, atomic and ionic radii, ionization enthalpy, electron gain enthalpy, valence, oxidation states, and chemical reactivity

2 General principles and processes of isolation of metals

Modes of occurrence of elements in nature, minerals, ores, Steps involved in the extraction of metals, concentration, reduction (chemical and electrolytic methods), and refining with special reference to the extraction of AL Cu, Zn, and Fe,

Thermodynamic and electrochemical principles involved in the extraction of metals

3 Hydrogen

Position of hydrogen in periodic table, isotopes, preparation, properties and uses of hydrogen,

Physical and chemical properties of water and heavy water, Structure, preparation, reactions, and uses of hydrogen peroxide,

Classification of hydrides ionic, covalent, and interstitial, Hydrogen as a fuel

4 S-block elements(Alkali and Alkaline earth metals)

Group -1 and 2 Elements General introduction, electronic configuration and general trends in physical and chemical properties of elements,

anomalous properties of the first element of each group, diagonal relationships, Preparation and properties of some important compounds,

sodium carbonate and sodium hydroxide and sodium hydrogen carbonate, Industrial uses of lime, limestone,

Plaster of Paris and cement, Biological significance of Na, K. Mg, and Ca.

5 p-block elements

Group-13 to Group-18 elements Electronic configuration and general trends in physical and chemical properties of elements across the periods and down the groups unique behavior of the first element in each group, Preparation, properties, and uses of boron and aluminum, Structure, properties, and uses of borax, boric acid, diborane, boron trifluoride, aluminum chloride, and alums

Group-14: The tendency for catenation, Structure, properties, and uses of Allotropes and oxides of carbon, silicon tetrachloride, silicates, zeolites, and silicones

Group-15: Properties and uses of nitrogen and phosphorus, Allotropic forms of phosphorus, Preparation, properties, structure, and uses of ammonia, nitric acid, phosphine, and phosphorus halides, (PCl₃. PCl₅); Structures of oxides and oxoacids of nitrogen and phosphorus

Group-16: Preparation, properties, structures, and uses of ozone, Allotropic forms of sulphur- Preparation, properties, structures, and uses of sulphuric acid (including its industrial preparation); Structures of oxoacids of sulphur

Group-17: Preparation, properties and uses of hydrochloric acid, Trends in the acidic nature of hydrogen halides, Structures of Interhalogen compounds and oxides and oxoacids of halogens

Group-18: Occurrence and uses of noble gases, Structures of fluorides and oxides of xenon

6 d and f block elements

General introduction, electronic configuration, occurrence and characteristics, general trends in properties of the first-row transition elements, physical properties, ionization enthalpy, oxidation states, atomic radii, color, catalytic behavior, magnetic properties, complex formation, interstitial compounds, alloy formation, Preparation, properties, and uses of K₂Cr₂O₇, and KMnO₄

Inner transition elements Lanthanoids: Electronic configuration, oxidation states, lanthanoid contraction

Actinides- Electronic configuration and oxidation states

7 Coordination compounds

Introduction to coordination compounds, Werner's theory, ligands, coordination number, denticity, chelation, IUPAC nomenclature of mononuclear coordination compounds, isomerism, Bonding, Valence bond approach and basic ideas of Crystal field theory, color and magnetic properties, Importance of coordination compounds (in qualitative analysis, extraction of metals and in biological systems)

8 Environmental chemistry

Environmental pollution: Atmospheric, water, and soil Atmospheric pollution: Tropospheric and Stratospheric and tropospheric pollution,

Gaseous pollutants: Oxides of carbon, nitrogen and sulphur, hydrocarbons and their sources, harmful effects and prevention, Greenhouse effect and Global warming:

Acid rain, Particulate pollutants, Smoke, dust, smog, fumes, mist and their sources, harmful effects, and prevention.

Stratospheric pollution, Formation and breakdown of ozone, depletion of the ozone layer and its mechanism and effects, Water Pollution,

Major pollutants such as pathogens, organic wastes, chemical pollutants and their harmful effects and prevention Soil pollution:

Major pollutants such as Pesticides (insecticides, herbicides and fungicides) and their harmful effects and prevention, Strategies to control environmental pollution