

PHYSICAL SCIENCE - SYLLABUS**10th CLASS****1. Reflection of light at curved surface**

- 1.1 Normal to the curved surface
- 1.2 Spherical mirrors, convex, concave mirrors
- 1.3 Pole, Focus, Centre of curvature, principle axis, Radius of curvature, Focal length
- 1.4 Images formed by spherical mirrors
- 1.5 Ray diagrams for spherical mirrors
 - 1.5.1 Rules for Ray diagrams by using laws of reflection
- 1.6 Formula for spherical mirrors – sign convention
 - 1.6.1 Magnification
- 1.7 Application of reflection – Solar Cooker

2. Chemical Equations and Reactions

- 2.1 Some daily life examples of chemical reactions.
- 2.2 Chemical equations – writing chemical equations, skeletal chemical equations, balancing chemical equations
- 2.3 Writing symbols of physical states, Heat changes, gas evolved and precipitate formed
- 2.4 Interpreting a balanced chemical equation
 - 2.4.1 Calculations based on mass, volume, number of molecules and moles

3. Laws of motion

- 3.1 Chemical properties of acids & bases
 - 3.1.1 Acids & Bases in laboratory – Indicators
 - 3.1.2 Reaction of Acids & Bases with Metals
 - 3.1.3 Reaction of Acids & Bases with Metals Carbonates and Metal hydrogen carbonates
 - 3.1.4 Reaction of Acids & Bases with each other (Neutralization)
 - 3.1.5 Reaction of Acids with Metallic oxides
 - 3.1.6 Reaction of Bases with Non-Metallic oxides
- 3.2 What do acids have in common? What do bases have in common?
- 3.3 Do Acids produce Ions Only in Aqueous Solution?
- 3.4 Reaction of Acid, Base with water
- 3.5 Strength of Acid or Base – P^H scale
- 3.6 Importance of P^H in everyday life

- 3.6.1 Sensitivity of plants and animals to P^H
- 3.6.2 P^H of soils, P^H in digestive system, P^H tooth decay
- 3.6.3 Self defense by animals and plants through chemical warfare
- 3.7 Salts
 - 3.7.1 Family of salts
 - 3.7.2 P^H of salts
- 3.8 Chemical from common salt
 - 3.8.1 Common salt – a raw material for other chemicals
 - 3.8.2 Preparation of Sodium Hydroxide, Bleaching powder, Baking soda, Washing soda and uses
 - 3.8.3 Removing of water of crystallization
 - 3.8.4 Plaster of Paris
- 4. Refraction of light at curved surface**
 - 4.1 Refraction of light at curved surface
 - 4.1.1 Image formation – Derivation of curved surface formula
 - 4.2 Lenses
 - 4.2.1 Focal length of the lens
 - 4.3 Rules for Ray diagram
 - 4.4 Images formed by the lenses
 - 4.5 Formula derived for thin lenses
 - 4.6 Focal length of lens depends on surrounding medium
 - 4.7 Lens maker formula
- 5. Human eye and colourful world**
 - 5.1 Least distance of distinct vision, Angles of vision
 - 5.2 Structure of human Eye – Focal length of human Eye lens, accommodation
 - 5.3 Common accommodation defects of vision – Myopia, Hypermetropia, presbyopia
 - 5.3.1 Power of lens
 - 5.4 Prism
 - 5.4.1 Rerective Index of Prism
 - 5.4.2 Derivation of formula for Rerective Index of Prism
 - 5.5 Dispersion
 - 5.5.1 Rainbow
 - 5.6 Scattering of light
- 6. Structure of atom**
 - 6.1 Spectrum
 - 6.1.1 Wave nature of light
 - 6.2 Electromagnetic Spectrum

- 6.2.1 planck's theory
- 6.3 Bohr's model of Hydrogen atom and its limitations
 - 6.3.1 Bohr - Sommerfeld model of an Atom
- 6.4 Quantum mechanical model of an Atom
 - 6.4.1 Quantum numbers
 - 6.4.2 Main shells, Sub-shells and orbitals in different sub-shells
 - 6.4.3 Shapes of s, p & d orbitals
- 6.5 Electronic Configuration of elements in their atoms
- 6.6 $n l^x$ rule, Energies of electronic energy levels (n+l) rule ; Aufbau Principal, Paulis principal, Hund's Rule of maximum multiplicity, Stable configurations.

7. Classification of Elements - The Periodic Table

- 7.1 Need for arrangement of elements in an organized manner
 - 7.1.1 Historical background of classification of elements
- 7.2 Doberieners Triads - Limitations
- 7.3 Newland's law of Octaves
- 7.4 Mendeleev's Periodic Table (Periodic law, Achievements & Limitations)
- 7.5 Modern Periodic Table.
 - 7.5.1 Position of Elements in Modern Periodic Table
 - Groups
 - Periods
 - Metals and Non-metals
 - 7.5.2 Trends in Modern Periodic Table (Valency, Atomic size, Ionization Energy, Electron Affinity, Electronegativity, Metallic & Non-metallic properties)

8. Chemical Bonding

- 8.1 Chemical bond definition (brief explanation)
 - 8.1.1 Lewis Symbols (or) Lewis Dot Structures
- 8.2 Electronic theory of Valence by Lewis and Kossel
 - 8.2.1 Octet Rule
- 8.3 Ionic and Covalent bonds: examples with Lewis Dot formulae
 - 8.3.1 The arrangement of Ions in Ionic compounds
 - 8.3.2 Factors affecting the formation of cation and anion
- 8.4 Shapes, bond lengths and bond energies in molecules
- 8.5 Valence shell electron pair repulsion theory
- 8.6 Valence bond theory - examples like H₂, Cl₂, H₂O, BF₃, CH₄, NH₃, C₂H₆, C₂H₄, C₂H₂ etc
- 8.7 Hybridisation and explanation of H₂O, BF₃, CH₄, NH₃ etc., molecules
- 8.8 Properties of Ionic and Covalent Compounds

9. Electric Current

9.1 Electric current

9.1.1 $I = \frac{Q}{t}$

9.1.2 $I = nqAV_d$

9.2 Potential difference

9.3 How a battery or a cell works

9.3.1 EMF

9.4 Ohm's law and its limitations, resistance, specific resistance, factors influencing resistance, electric shock

9.5 Electric Circuits

9.5.1 Series and parallel connection of resistances

9.5.2 Kirchhoff's Laws

9.6 Electric power

9.7 Safety fuses

10. Electromagnetism

10.1 Oersted Experiment

10.2 Magnetic field – field lines

10.2.1 Magnetic Flux - Magnetic Flux density

10.3 Magnetic field due to currents

10.3.1 Due to current carrying straight wire

10.3.2 Due to circular loop

10.3.3 Solenoid

10.4 Magnetic force on moving charge and current carrying wire

10.4.1 Right hand rule

10.5 Electric motor

10.6 Electromagnetic induction – Faraday's law (including magnetic flux) – Lenz law

10.6.1 Derivation of Faraday's law

10.6.2 Applications of Faraday's law of electromagnetic induction

10.7 Generators and Alternating – Direct Currents

11. Principles of Metallurgy

11.1 Occurrence of Metals in nature

11.2 Extractions of metals from the Ores – activity series and related metallurgy, flow chart of steps involved in the extraction of metals from ore.

11.2.1 Enrichment of ores (Concentration or Dressing)

11.2.2 Extraction of Crude metal from the ore

- Extracting metals low in the activity series
- Extracting metal in the middle of the activity series
- Extracting metal in the top of the activity series

- 11.2.3 Refining metals (purification of the crude metal)
 - Electrolytic refining
 - Distillation
 - Poling
 - Liquation
- 11.3 Corrosion – Prevention of Corrosion
- 11.4 Important Processes used in metallurgy
 - 11.4.1 Smelting
 - 11.4.2 Rosting
 - 11.4.3 Calcination
- 11.5 Flux
- 11.6 Furnace

12. Carbon and its compounds

- 12.1 Introduction of Carbon compounds
- 12.2 Promotion of an Electron – Bonding in Carbon including Hybridization
- 12.3 Allotropes of Carbon
 - Amorphous Forms
 - Crystalline Forms (Diamond, Graphite, C₆₀ and Nano tubes)
- 12.4 Versatile nature of carbon
 - 12.4.1 Catenation and tetravalency
- 12.5 Hydrocarbons
 - 12.5.1 Open and Closed Chain Hydrocarbons
 - 12.5.2 Saturated and Unsaturated Hydrocarbons
- 12.6 Bonding of carbon with other elements
 - 12.6.1 Functional groups in carbon compounds
- 12.7 Isomerism
- 12.8 Homologous series (Alkanes, Alkenes and Alkynes)
- 12.9 Nomenclature of Carbon compounds
- 12.10 Chemical properties of carbon compounds
 - 12.10.1 Combustion reactions
 - 12.10.2 Oxidation Reaction (Alcohol to Acids)
 - 12.10.3 Addition reactions
 - 12.10.4 Substitution reactions
- 12.11 Important carbon compounds
 - 12.11.1 Ethanol
 - 12.11.2 Properties of Ethanol – General properties, reaction of ethanol with sodium, reaction with hot concentrated sulphuric acid.
 - 12.11.3 Ethanoic acid
 - 12.11.4 Properties of Ethanoic acid – General properties, Reaction with a base, sodium hydroxide, sodium carbonate and sodium hydrogen carbonate

- 12.12 Esterification reactions
- 12.13 Soaps – Saponification, Micelles
 - 12.13.1 Cleansing action of Soap