

**BOARD OF SECONDARY EDUCATION, TELANGANA**  
**SSC (CLASS 10) SYLLABUS**

*PHYSICS*

**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. Acids, Bases and Salts**

- 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 Metal 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 - pH scale
- 3.6 Importance of pH in everyday life
  - 3.6.1 Sensitivity of plants and animals to pH
  - 3.6.2 pH of soils, pH in digestive system, pH 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 pH of salts
- 3.8 Chemicals 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, Angle 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  $1 \times$  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, Electro- negativity, 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 H<sub>2</sub>, Cl<sub>2</sub>, H<sub>2</sub>O, BF<sub>3</sub>, CH<sub>4</sub>, NH<sub>3</sub>, C<sub>2</sub>H<sub>6</sub>, C<sub>2</sub>H<sub>4</sub>, C<sub>2</sub>H<sub>2</sub> etc
- 8.7 Hybridisation and explanation of H<sub>2</sub>O, BF<sub>3</sub>, CH<sub>4</sub>, NH<sub>3</sub> etc., molecules
- 8.8 Properties of Ionic and Covalent Compounds

## **9. Electric Current**

- 9.1 Electric current
  - 9.1.1  $I = Q/t$
  - 9.1.2  $I = nqAVd$
- 9.2 Potential difference
- 9.3 How a battery or a cell works
  - 9.3.1 EMF
- 9.4 Ohms 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 Kirchoff'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 Unsturated 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 12.10.1Combustion 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

