

Syllabus 2020-21

CLASS – X

Physical Science

Contents

1. Reflection of light at curved surface	2
2. Chemical Equations and Reactions	2
3. Acids, Bases and Salts	2
4. Refraction of light at curved surface.....	3
5. Human eye and colourful world	3
6. Structure of atom.....	3
7. Classification of Elements - The Periodic Table	4
8. Chemical Bonding	4
9. Electric Current	4
10. Electromagnetism	5
11. Principles of Metallurgy	5
12. Carbon and its compounds	5

1. Reflection of light at curved surface

- 1.1 Normal to the curved surface
- 2.1 Spherical mirrors, convex, concave mirrors
- 3.1 Pole, Focus, Centre of curvature, principle axis, radius of curvature, Focal length
- 4.1 Images formed by spherical mirrors
- 5.1 Ray diagrams for spherical mirrors
 - 1.5.1 Rules for Ray diagrams by using laws of reflection
- 6.1 Formula for spherical mirrors – sign convention
 - 1.6.1 Magnification
- 7.1 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
 - 3.1.2 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 oxide
- 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 formatioon - Dervation 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 Refractive Index of Prism
 - 5.4.2 Derivation of formula for Refractive 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 subshells
 - 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 O Groups O Periods O 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 $I = Q/t$ 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
 - O Extracting metals low in the activity series
 - O Extracting metal in the middle of the activity series
 - O Extracting metal in the top of the activity series
 - 11.2.3 Refining metals (purification of the crude metal)
 - O Electrolytic refining
 - O Distillation
 - O Poling
 - O Liquefaction
- 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
 - O Amorphous Forms
 - O 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 Unstaturated 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