

PHYSICAL SCIENCE - SYLLABUS

8th CLASS

1. Force

1.1 What is force ?

1.1.1 Identifying push or pull through different actions

1.2 Types of forces

1.2.1 Contact forces

1.2.1.1 Muscular Force

- Preparing a list of instances where muscular force is used.
- Observing the muscle while working

1.2.1.2 Force of Friction (Frictional force)

- Observing the motion of a ball on different surfaces
- Observing the motion of objects on an inclined plane

1.2.1.3 Normal Force

1.2.1.4 Tension

Lab Activity : To find the limiting force that can be borne by a string

1.2.2 Forces acting at a distance (Field Forces)

1.2.2.1 Magnetic Force

- Observing the magnetic force

1.2.2.2 Electrostatic Force

- Observing electrostatic force

1.2.2.3 Gravitational Force

- Explaining the force acting at a distance :
Concept of field
- Visualizing magnetic field

1.3 Net force

- Effects of net force acting on a table
- Effects of stretched rubber bands on fingers

1.3.1 Calculating Net force from Free Body Diagrams (FBD)

1.4 Effect of force on change of the state of motion of an object and its direction

1.4.1 Effects of net force on direction of moving object

1.4.2 Effects of force on the shape of an object

1.5 Pressure

- Change in effect of force with area of contact
- What is pressure ?
- Identifying effects of force

2. Friction

2.1 Force of friction - Types

- Identifying forces acting on a body and the effect of frictional force.

2.1.1 To understand the nature of friction and the concept of static friction

- Definitions of friction, sliding friction, static friction
- Observing the variations in frictional force

- 2.2 Factors affecting friction
 - 2.2.1 Effect of rough surface on frictional force
 - 2.2.2 Effect of area of contact on frictional force
 - 2.2.3 Effect of Normal force on friction
- 2.3 Is friction necessary ?
 - 2.3.1 Friction produces heat
- 2.4 Increasing the decreasing friction
 - 2.4.1 How to reduce friction ?
 - 2.4.2 Effect of rollers on friction
 - 2.4.3 Understanding the principle of ball bearings
- 2.5 Fluid friction
 - Observing fluid friction
 - 2.5.1 Identifying factors influencing the fluid friction

3. Synthetic Fibres and Plastics

- 3.1 Clothes made from Natural fibres
- 3.2 What is synthetic fibre ?
 - 3.2.1 Concepts of monomer and polymer
- 3.3 Identifying synthetic fibres
 - 3.3.1 identifying synthetic fibres by burning test
- 3.4 Some of the synthetic fibres / examples for synthetic fibres
 - 3.4.1 Nylon
 - How is nylon made ?
 - How strong is nylon ?
 - 3.4.2 Rayon
 - How is rayon prepared ?
 - Why are different synthetic fibres mixed ?

- 3.4.3 Acrylic
- 3.4.4 Why synthetic fibres ?
- 3.4.5 Polyesters
 - How can you say a bottle is PET bottle ?
 - Identification of various articles with recycling codes
- 3.5 Plastics around us
 - 3.5.1 What is a plastic ?
 - 3.5.2 Types of plastics
 - Identifying thermoplastic and thermo setting plastic by flame test.
 - 3.5.2.1 Thermoplastics
 - 3.5.2.2 Thermo setting plastics
 - 3.5.3 Why do we prefer plastics ?
 - 3.5.4 Plastics and Environment
- 3.6 Bio degradable and non-bio degradable substances
- 3.7 Principle of 4R (Reduce, Recycle, Reuse and Recover)
 - 3.7.1 Reduce
 - 3.7.2 Reuse
 - 3.7.3 Recycle
 - Recycling code
 - Role of codes in Recycling process
 - Uncoded plastics
 - 3.7.4 Recover

4. Metals and Non metals

- 4.1 Metals and non metals - an introduction
- 4.2 Physical properties of metals and non metals
 - 4.2.1 Appearance - Lustrous nature
 - Observing appearance and colour of materials
 - 4.2.2 Sonarity
 - Listening sound produced by some materials
 - 4.2.3 Malleability
 - Identifying malleability of material
 - 4.2.4 Ductility
 - 4.2.5 Electrical conductivity
 - Identifying electrical conductivity of a material
 - 4.2.6 Conductivity of Heat
 - Observing conductivity of heat of metals
- 4.3 Chemical properties of metals and non metals
 - 4.3.1 Reaction with oxygen
 - Rusting of metals
 - 4.3.2 Reaction with water
 - 4.3.3 Reaction with acids
- 4.4 Reactivity of metals
- 4.5 Some uses of non metals
- 4.6 Some uses of metals

5. Sound

- 5.1 Production of sound
 - listening sound and predicting source
 - identifying different sounds

5.1.1 Vibrating bodies produce sound

- Observing sound produced by a vibrating body

5.2 Sound has energy

5.3 Musical instruments

- producing sounds that resembles sound of rainfall
- observing changes in sound

5.4 Sounds produced by human

5.4.1 Structure of voice box

- Observing movements of vocal cords during speech

5.5 Sound propagation

5.5.1 Sound needs medium to propagate

5.5.2 Propagation of sound in different media

- Observing sound propagation in Solids
- Observing sound propagation in liquids

5.5.3 Is sound propagate without medium

5.6 How do we hear sound

5.6.1 Structure and function of eardrum

5.7 Characteristics of sound

5.7.1 Loudness - Feebleness

- Observing relationship between the intensity of sound produced and vibrations of a body

5.7.2 Pitch

- Identifying pitch or shrillness of a sound

5.8 Normal sound consists of mixed frequencies

5.9 Noise and music

5.10 Audible range

- 5.11 Sound pollution
 - 5.11.1 Effects of sound pollution
 - 5.11.2 Controlling measures

6. Reflection of Light at plane surfaces

- 6.1 Formation of image by a Pin hole camera
- 6.2 Fermat principle
- 6.3 Plane mirror
- 6.4 Reflection – its laws
 - 6.4.1 Plane of reflection
- 6.5 Plane mirrors – image formation
 - 6.5.1 Characteristics of an image formed by a plane mirror

7. Coal and Petroleum

- 7.1 Sources of materials
- 7.2 Exhaustible and inexhaustible resources
- 7.3 Fuels - Coal, Petroleum, Natural Gas
 - 7.3.1 Production of petroleum
 - 7.3.2 Natural gas is an important source
 - 7.3.3 Uses of coal, petroleum, natural gas
 - 7.3.4 various uses of petroleum
 - 7.3.5 Coal and its products
 - Coke
 - Coal gas
 - Coaltar
 - 7.3.6 Uses of coal products
 - Observing gases evolved in burning of coal
- 7.4 Some petrochemical products
- 7.5 Natural gas and petrochemicals
- 7.6 Formation of coal, petroleum
- 7.7 Versatile nature of coal and petroleum

- 7.8 Conserving coal and petroleum
- 7.9 Misuse of energy resources
 - 7.9.1 Harmful effects of fuels

8. Combustion, Fuels and flame

- 8.1 Do all materials burn ?
- 8.2 What is required for the process of combustion ?
 - 8.2.1 Testing of necessity of air for burning
 - 8.2.2 Oxygen helps in burning
- 8.3 Ignition temperature
 - 8.3.1 Burning paper with sun rays
 - 8.3.2 Understanding ignition temperature
- 8.4 Types of Combustion
- 8.5 Fuels
- 8.6 Fire controll
- 8.7 Flame
 - 8.7.1 Observing behaviour of different solid fuels
 - 8.7.2 Structure of flame
 - 8.7.3 Observing situations, happens in different zones of candle flame

9. Electrical Conductivity of Liquids

- 9.1 Testing the material to know which allows electric current to pass through it.
- 9.2 Electrical conductivity of liquids
 - 9.2.1 Testing the electrical conductivity of liquids
 - 9.2.2 When do liquids conduct electricity - electric conductivity of electrolyte.
- 9.3 Chemical effects of electric current
 - Testing the effect of electric current on potato.

- 9.4 Electrolytic cell
 - 9.4.1 Making of an electric cell
- 9.5 Electroplating
 - 9.5.1 Electroplating procedure
 - 9.5.2 Uses of electroplating

10. Some natural phenomena

- 10.1 Lightning
 - 10.1.1 Sparks - that the greeks know about
- 10.2 Charging by rubbing
 - 10.2.1 Effects of rubbing
 - 10.2.2 Effects of charged bodies
- 10.3 Types of charges and their interaction
 - 10.3.1 Finding the presence of charge on a body
 - 10.3.2 Transfer of charge
- 10.4 Story of Lightning - Safety measures
 - 10.4.1 Lightning conductor
- 10.5 Earthquakes
 - 10.5.1 Collecting information about earthquake damages
 - 10.5.2 What is earthquake
 - 10.5.3 Causes of earthquake
 - 10.5.4 Earthquakes - safety measures
 - 10.5.5 Earthquakes in Telangana

11. Stars and the Solar system

- 11.1 Observing changes in length of shadow
- 11.2 Understanding the North - South movement of Sun
- 11.3 Sun-dail
- 11.4 Phases of moon

- 11.4.1 Why moon shape changed
- 11.4.2 Moon surface
- 11.5 Solar eclipse
 - 11.5.1 Types of Solar eclipse
- 11.6 Lunar eclipse
 - 11.6.1 Types of lunar eclipse
- 11.7 Know about stars
 - 11.7.1 Observing movements of constellation
 - 11.7.2 Why polar star appears fixed at a point
- 11.8 The Solar System
 - 11.8.1 Sun
 - 11.8.2 The Planets
 - 11.8.3 Some other members of Solar system
 - Asteroids
 - Comets
 - Meteors and Meteorites
- 11.9 Artificial Satellites
- 11.10 How people know earth is spherical
 - 11.10.1 How people know earth rotates on its own axis

12. Graphs of Motion

- 12.1 Motion, Graphs - Introduction
- 12.2 Graph is not a map
- 12.3 Graphs of uniform motion
 - 12.3.1 Slope of Graph - Velocity
 - 12.3.2 Graphs of Stationary Objects
- 12.4 Graphs of non-uniform motion

PHYSICAL SCIENCE SYLLABUS

9th CLASS

1. Matter around us

- 1.1 States of matter
- 1.2 Properties of solids, liquids and gases
 - 1.2.1 Shape and volume
 - 1.2.2 Identifying the shape and volume of liquids
 - 1.2.3 Do the gases have definite shape and fixed volume
 - 1.2.4 Compressibility
 - 1.2.5 Observing compressibility of different materials
- 1.3 Diffusion
 - 1.3.1 Observing diffusion of gases
 - 1.3.2 Observing the diffusion of liquids
 - 1.3.3 Observing diffusion of particles of solids into liquids
 - 1.3.4 Diffusion of two gases
- 1.4 Can matter change its state ?
- 1.5 What is matter made up of
 - 1.5.1 How small are the particles of matter
 - 1.5.2 Space between particles
- 1.6 Particles of matter attract each other
 - 1.6.1 Observing the force of attraction between the particles of matter.
- 1.7 How diffusion takes place
- 1.8 Effect of temperature on change of state
- 1.9 Effects of change of pressure on change of state

1.10 Evaporation

- 1.10.1 Effects of surface area, humidity and wind speed on evaporation
- 1.10.2 Experience with evaporation

2. Motion

- 2.1 What is relative
- 2.2 Motion is relative
 - 2.2.1 Distance and displacement
 - Drawing path and distinguishing between distance and displacement
 - Drawing displacement vectors
- 2.3 Average speed and average velocity
 - 2.3.1 Measuring average speed and average velocity
 - 2.3.2 Speed and velocity
 - 2.3.3 Observing direction of motion of a body
- 2.4 Uniform motion
- 2.5 Non uniform motion
 - 2.5.1 Observing the motion of a ball on an inclined plane
 - 2.5.2 Observing uniform circular motion
 - 2.5.3 Observing motion of an object thrown into air
- 2.6 Acceleration
 - 2.6.1 Equations of uniform accelerated motion
 - 2.6.2 Finding the acceleration and velocity of an object moving on an inclined plane

3. Laws of motion

- 3.1 An introduction into laws of motion - thought of Galileo
- 3.2 First law of motion
 - 3.2.1 Observing motion of coin kept on thick paper
 - 3.2.2 Observing motion of the coins hit by a striker
- 3.3 Inertia and mass
 - 3.3.1 Pushing two wooden blocks with same force
- 3.4 Second law of motion
 - 3.4.1 Linear momentum
 - Net force - acceleration
 - Mass - acceleration
 - Atwood machine
- 3.5 Third law of motion
 - 3.5.1 Pulling two spring balances
 - 3.5.2 Balloon rocket
 - 3.5.3 Action and reaction forces acting on two different objects
- 3.6 Conservation of momentum
 - 3.6.1 Dropping eggs on different surfaces - net force on egg

4. Refraction of light at plane surface

- 4.1 Refraction
- 4.2 Refractive index
- 4.3 Relative refractive index
 - 4.3.1 Obtaining the relation between angle of incidence and angle of refraction - Snell's law

4.3.2 Derivation of Snell's Law

- 4.4 Total internal reflection
 - 4.4.1 Mirages
- 4.5 Applications of total internal reflection
 - 4.5.1 Brilliance of diamonds
 - 4.5.2 Optical Fibres
- 4.6 Reflection through a glass slab
 - 4.6.1 Lateral shift
 - 4.6.2 Vertical shift

5. Gravitation

- 5.1 Uniform circular motion
 - 5.1.1 Observing the motion of an object moving in circular path
 - 5.1.2 Drawing velocity vectors in uniform circular motions
 - 5.1.3 Centripetal acceleration, Centripetal Force
- 5.2 Universal law of gravitation
 - 5.2.1 Acceleration is independent of masses
 - 5.2.2 What is the direction of 'g' ?
- 5.3 Weight
 - 5.3.1 Can we measure the weight of free fall body ?
 - 5.3.2 Observing changes during the free fall of a body
- 5.4 Centre of gravity
 - 5.4.1 Balancing objects
 - 5.4.2 Locating centre of gravity

- 5.5 Stability
- 5.6 Shift of the centre of gravity and its effects

6 Is matter pure ?

- 6.1 Is full cream pure ?
- 6.2 What is mixture ?
- 6.3 Types of mixtures (homogenous, heterogeneous)
- 6.4 Solutions
 - 6.4.1 Properties of Solutions
 - 6.4.2 Concentration of Solutions
 - 6.4.3 Preparation of saturated and unsaturated solutions
 - 6.4.4 Factors affecting on the rate of dissolving
- 6.5 Suspensions and colloids
 - 6.5.1 Finding of heterogeneous mixture - suspensions and colloids
- 6.6 Separations of components of a mixture
 - 6.6.1 Sublimation - Separation of mixtures by sublimation
 - 6.6.2 Evaporation - Process of Evaporation of Water
- 6.7 Chromatography - Paper Chromatography
- 6.8 Separation of immiscible and miscible liquids
 - 6.8.1 Separation of immiscible liquids
 - 6.8.2 Separation of mixture of two immiscible liquids
 - 6.8.3 Distillation - Separation of two miscible liquids by distillation
 - 6.8.4 Fractional distillation

- 6.9 Types of pure substances
 - 6.9.1 Can we separate Sulphur and Oxygen from Copper Sulphate
 - 6.9.2 Understanding the nature of elements, compounds and mixtures

7. Atoms Molecules and Chemical Reaction

- 7.1 An introduction about atoms
- 7.2 Change of mass in chemical reactions
- 7.3 Law of conservation of mass
- 7.4 Law of constant proportions
- 7.5 Dalton's atomic theory
 - 7.5.1 Atoms and molecules
- 7.6 Why do we name elements ?
- 7.7 Symbols of elements
- 7.8 Some unusual symbols
- 7.9 Elements with more than one atom in their molecules
- 7.10 Atomicity
- 7.11 Valency
- 7.12 What is ion ?
- 7.13 Atomic mass
- 7.14 Molecules of compounds
 - 7.14.1 Chemical formulae of compounds(Criss-Cross method)
- 7.15 Molecular mass

- 7.16 Formula unit mass
- 7.17 Mole concept
 - 7.17.1 Molar mass
- 7.18 Types of Chemical Reactions
 - 7.18.1 Combinations reaction : (Exothermic chemical reactions, Endothermic reactions)
 - 7.18.2 Decomposition reaction : (Thermal, Electrolytic, Photo-chemical reactions- examples only without mentioning names)
 - 7.18.3 Displacement reaction
 - 7.18.4 Double displacement reaction
- 7.19 Oxidation and Reduction
- 7.20 How you observe the effects of Oxidation reactions in dialy life
 - 7.20.1 Corrosion and prevention of corrosion
 - 7.20.2 Combustion
 - 7.20.3 Yeast reaction
 - 7.20.4 Bleaching
 - 7.20.5 Rancidity

8. Floating bodies

- 8.1 Can objects sink or float ? (fun activity)
- 8.2 Density - relative density
- 8.3 Relative density of liquids
 - 8.3.1 Making of lactometer

- 8.4 When do objects float on water ?
 - 8.4.1 Do objects denser than water float on it ?
 - 8.4.2 Is the weight of object and weight of water displaced by it equal ?
 - 8.4.3 Making aluminium to float
- 8.5 Upward force in liquids
- 8.6 Pressure of Air
 - 8.6.1 Atmospheric pressure
 - 8.6.2 Measuring atmospheric pressure
- 8.7 Pressure at a depth 'h' in a liquid
 - 8.7.1 Pressure difference at different levels of depth in fluids
- 8.8 Measuring the force of buoyancy
 - 8.8.1 Measuring the weight of the water displaced by the immersed stone
- 8.9 Archimedes' principles
- 8.10 Pascal's principle - Bramah press

9. What is inside atom

- 9.1 Sub-atomic particles
 - 9.1.1 Electrons, protons, neutrons
- 9.2 Structure of atom
 - 9.2.1 Sketch the structure of atom as you imagine
- 9.3 Thomson's Model of atom
- 9.4 Rutherford's alpha particles scattering experiment - Rutherford's observations
 - 9.4.1 Nuclear model of an Atom - Limitations of Rutherford's atomic model

- 9.5 Bohr's model of the atom
- 9.6 Distribution of electrons in different orbits (shells)
- 9.7 Valency
 - 9.7.1 Importance of valency
- 9.8 Atomic number
- 9.9 Atomic mass number
- 9.10 Writing symbols of atoms
- 9.11 Isotopes
 - 9.11.1 Applications of isotopes
- 10. Work and Energy**
 - 10.1 Work
 - 10.1.1 Scientific meaning of the work
 - 10.1.2 Definition of work in science
 - 10.2 Energy
 - 10.2.1 Energy transfer and work
 - 10.2.2 Understanding the increase and decrease in energy of an object
 - 10.3 Kinetic energy
 - 10.3.1 Mathematical Expression for Kinetic energy
 - 10.4 Potential energy
 - 10.4.1 Observing energy in stretched rubber band
 - 10.4.2 Observing the energy in an object at some height

- 10.5 Mechanical energy
- 10.6 Conversion of energy
 - 10.6.1 Conservation of mechanical energy
 - 10.6.2 Calculating total energy of free fall at different heights
- 10.7 Power
- 10.8 Sources of Energy
 - 10.8.1 Source of Energy
 - 10.8.2 Fuels
- 10.9 Renewable energy Resources
 - 10.9.1 Solar energy, Solar Cells
 - 10.9.2 Biomass
 - 10.9.3 Biogas
 - 10.9.4 Ocean energy
 - Tidal energy
 - Motion Thermal energy
 - 10.9.5 Geo Thermal energy
 - 10.9.6 Wind energy
 - 10.9.7 Atomic energy
 - Nuclear Fission
 - Nuclear Fusion
- 11. Heat**
 - 11.1 Thermal equilibrium - Heat and Temperature
 - 11.1.1 Heat
 - 11.1.2 Temperature and Kinetic Energy

- 11.2 Specific heat
 - 11.2.1 Applications of Specific Heat capacity
- 11.3 Methods of mixtures
 - 11.3.1 Principle of method of mixtures - Determination of specific heat of a solid
- 11.4 Evaporation, Condensation, Humidity, Dew and Fog, Boiling, Melting, Freezing

12. Sound

- 12.1 Sound is a form of energy
- 12.2 Production of sound
 - 12.2.1 Observing the vibration of tuning fork
- 12.3 How does sound travel
 - 12.3.1 Propagation of sound
- 12.4 Types of waves
 - 12.4.1 Transverse waves
 - 12.4.2 Sound waves are Longitudinal waves
- 12.5 Characteristics of sound wave
 - 12.5.1 Wave length
 - 12.5.2 Amplitude
 - 12.5.3 Time period, frequency
 - 12.5.4 Speed of sound wave
- 12.6 Characteristics of musical waves
 - 12.6.1 Pitch

- 12.6.2 Loudness
- 12.6.3 Quality
- 12.7 Reflection of sound
 - 12.7.1 Listening reflected sound - Echo
 - 12.7.2 Reverberation
 - 12.7.3 Uses of multiple reflection of sound
 - Megaphone, Horn
 - Stethoscope
 - Designing of Concert halls and Cinema halls
- 12.8 Range of Hearing
- 12.9 Applications of ultrasounds
 - 12.9.1 Industrial applications
 - 12.9.2 Medical applications
- 12.10 Sonar

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 sign 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 - 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 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 n, l, m, s rule, Energies of electronic energy levels (n+l) rule ; Aufbau Principle, 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 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
 - Liqation

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
 - 12.10.1 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

