

Physical Science :

CONTENT (Marks: 12)

1. Measurement:

Measurement of length, area, volume and time. CGS and SI units of length, area, volume and time. Conversion of units from CGS to S.I and Vice versa.

2. Motion:

Motion and Rest, Types of motion (Translatory, Rotatory and oscillatory), Scalars and vectors distance, displacement, speed, velocity, Average speed, average velocity, Uniform motion, equations of uniform accelerated motion.

3. Force and Friction:

Types of forces (field force and contact force), Net force (free body diagrams), Effects of net force, Pressure, types of friction (static, Sliding and Rolling), Factors affecting Friction (Roughness, normal force, area etc), Methods of reducing friction, Fluid friction.

4. Newton's law of motion:

History of laws of motion (Aristotle and Galilean view), Newton's I, II and III laws of motion, Linear momentum, Atwood machine (Application of Newton's law), Conservation of linear momentum and Impulse.

5. Gravitation:

Uniform circular motion (centripetal acceleration and centripetal force), Universal law of gravitation, acceleration due to gravity (g) (direction of (g). factors affecting (g), weight, Changes during free fall, Centre of gravity and stability

6. Floating bodies:

Density and relative density, Lactometer, Upward forces of liquids, Atmospheric pressure, its measurement, Pressure of liquids at different depths, Archimedes principle, its application, Pascal's principle, its applications.

7. Work, Energy:

Work (Scientific meaning, formula, positive, negative and zero work conditions etc), Types of mechanical energy (Potential energy and kinetic energy), Numerical expressions and examples of mechanical energy, Conservation of mechanical energy, Energy inside human body

8. Sound :

Sound - a form of energy, Production of sound, Structure of larynx and voice box, Structure and functioning of eardrum, Propagation of sound, Types of waves (longitudinal and transverse), Characteristics of sound waves (Wavelength, attitude, frequency and speed), Relation between frequency and time period, Characteristics of musical sound (pitch, loudness and quality), Audible range of frequencies. Reflection of sound, echo and reverberation. Uses of multiple reflection of sound (mega phone, horn, stethoscope, Designing of concert halls and Cinema halls), Applications of ultra sound (Industrial and medical applications), Sonar, working, Sound pollution (Measures, effects and control).

9. Heat:

Heat and temperature, Units of temperature (centigrade, Fahrenheit and Kelvin, conversion from centigrade to Fahrenheit and Viceversa conversion from centigrade to Kelvin and Vice versa), Expansion of liquids due to heat, Types of thermometers (mercury, alcohol, clinical, six maximum, minimum, thermometers), Temperature and Kinetic energy relation, Specific heat (formula, units) experiment and applications), Problems on method of mixtures. Evaporation and condensation, Boiling, Melting and freezing, Latent heat, Temperature, time graph

10. Light:

Light, Shadows and Images, Reflection of light by plane surfaces (laws of reflection, periscope, multiple images, kaleidoscope, characteristics of image formed by plane mirrors), Reflection of light by curved surfaces (Virtual images, real images, Ray diagram for concave and convex mirrors, formula of curved mirrors regarding focal length and magnification application of spherical mirrors. Refraction of light at plane surface (condition of Refraction, Refractive Index, Relative Refractive Index, factors as which refractive Index of Medium depend comparison between linear and optical density, Snell's law, Total Internal Reflection and its applications, Refraction through Glass slab, vertical and lateral shifts), Refraction through Curved Surfaces (When light enters into medium of Refractive Index ' n_2 ' from ' n_1 ' at curved surface with radius of curvature ' R ', Len's formula, (Len's makers formula, Different types of lenses and ray diagrams regarding concave and convex lenses), Human eye and colourful world. (Human eye, its structure and optical measurements, eye defects, Myopia, hypermetropia, pressbiopia and their corrections , Dispersion of light through prism. i-d curve, Rainbow, Scattering of light, and colour of sky)

11. Electricity:

Simple electric circuits, Conductors, Insulators, Type of cells (Dry and liquid), Electric symbols and uses, Series of parallel connection of cells and Bulbs, Heating effects of Electricity, Understanding of CFL, Fuse and MCBs, Electric current, potential difference and EMF, Drift velocity and working of a cell, Ohm's law

(Circuit, graph (I-V graph limitations and applications), Factors affecting Resistance of a material (Temperature, Material, length and Area of Cross section), Resistivity, series of parallel connections of resistances. Kirchhoff's laws (Junction law of loop law) Electric power (Calculation of House hold electricity and relating of Electric appliances)

12. Electro-Magnetism:

Types of Magnets, Properties of Magnets, Magnetic compass, Earth as a Magnet, Magnetic Induction, Oersted's experiment, Magnetic Field, Magnetic field due to currents (straight, circular coil, electric motor), Electromagnetic Induction (Faradays' law of Induction and its applications, magneto motive force and electric Generator, Lenz law)

13. Some Natural Phenomenon:

Electric charge, and Basic properties of electric charge, Types of charges and their interactions. Transfer of charge, lighting, lightning safety, lightning conductors. Earthquake, Tsunami, Causes and effects, Protective measures.

14. Stars and solar system:

Movement of the sun, Phases of Moon, Eclipses (Solar and lunar eclipses) types of Eclipses Movement of Stars (Constellation, pole star, Solar System, Artificial Satellites.

15. Separation of Substances:

Mixtures, Methods of separation—handpicking, winnowing, Sedimentation, decantation, Sieving, Filtration, sublimation, chromatography, Distillation and fractional distillation.

16. Changes around us:

Slow/fast changes, Temporary/permanent changes, Natural/man made changes, Physical/ chemical changes, Galvanization and corrosion, Rancidity, Oxidation / reduction

17. Matter:

States of matter, Properties of solids, liquids and gases, Effects of Temperature, pressure surface area and Humidity on change of states of matter. Homogeneous mixtures, Heterogeneous mixtures. Solutions – Types of Solutions – Concentration of solution. Expressing Concentration of Solutions, Suspension – Colloids, Separation of mixtures by sublimation evaporation and distillation. Separation of immiscible liquids. Understanding the nature of elements, Compounds and mixtures.

18. Metals and Non metals:

Physical properties of metals, Chemical properties of metals, Metal – non metal classification Reactivity of metals, Uses of metals, Minerals – ore, Occurrence of metals in nature, Examples of metals and non metal, Reactivity order of metals

19. Synthetic fibers and Plastics:

Natural / synthetic fibers, Identifying fibers – burning test, Synthetic fibers preparation and uses, Resin identification codes, Types of plastics, Plastics and environment, Biodegradable – non bio degradable, Reduce, Recycle, Re use and Recover – 4R principle.

20. Coal and petroleum:

Exhaustible and in exhaustible Resources, Fuels – Types, Uses of Coal and Petroleum and Coal products, Refining of petroleum, Petrochemical products in various sectors, Formation of coal and petroleum. Misuse of Energy resources and Consequences.

21. Combustion fuels and flame:

Combustion – Supporter combustion – Irruption Temperature. Types of Combustion. Fuels Fire control. Structure of flame – colors zone – Intensity.

22. Water:

Process of water filtration, Types of impurities, Diseases caused by impure water, Acid rain particular pollutants, Water pollution, Strategies to control water pollution.

23. Acids, Bases and Salts:

Indicators – Natural indicator, Acidic substances and Basic Substances, Neutral substances and Salt, Neutralization, Chemical properties of acids and Bases, Reaction of Metal oxides with base/ Reaction of non metals with acids. Electrical conductivity of acids and bases, Strength of acids and bases, Concentration acids and bases,

pH Scale Importance of pH in everyday life.,

pH of salts, Bleaching powder, washing soda and baking soda and their uses. Plaster of Paris.

Methodology: (3 Marks)

1. Definition, Nature, Structure and History of Science
2. Aims, Values , Instructional Objectives of teaching Science and Academic Standards in Science
3. Methods of Teaching Science
4. Teaching Learning Material in Teaching of Science - TLM in Science – Use of ICT.
5. Instructional Planning
6. Science Laboratory
7. Science Teacher - Changing Roles
8. Science Curriculum and its transaction, NCF-2005, SCF- 2011
9. Science Textbooks.
10. Evaluation - CCE - Formative Assessment, Summative Assessment - Designing and Administration- Analysis of Scholastic Achievement Test (SAT)

Biological Science

CONTENT (Marks: 12)

1. **Living world:-** What is Science, Living and Non living thing. Diversity in living organisms, Cell the basic unit of life, Cell its structure and functions, plant tissues, Animal tissues, Cell division, Plasma membrane, Habitat, Animal behavior, Movements in animals, Story of micro organisms, Fiber to Fabric, Production of food from plants and animals, Challenges in improving agricultural products, Why do we fall ill?
2. **Life Processes:-** Our food, Food components, Nutrition In plants, Plants – Parts and functions, Reproduction plants, seed dispersal, Organ systems in Man, Sense Organs, Animal Behavior - What do animals eat, Nutrition – Food Supplying System, Malnutrition, Respiration- The energy releasing system, Transportation – The circulatory system. Excretion – The wastage disposing system. Coordination – The linking system. Attaining the age of Adolescence, Reproduction – The generating system. Reproduction in animals, Reproductive health, Coordination in life processes, Heredity and evolution – from parent to progeny.
3. **Our Environment:-** Our Environment – Our concern. Biodiversity - Biodiversity and its Conservation, Diversity in living organism, Soil our life, Soil pollution, Forests our life, Natural resources. Renewable and non renewable resources. Not for Drinking, Not for Breathing, Different Eco systems, adaptations in different ecosystems. Global Environmental Issues, Green house effect, Global warming, Bio- geo – Chemical cycle.

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