Subject specific syllabus

SCIENCE

EFFECT OF CURRENT

Potential; potential difference ohms law; series combination of resistors, parallel combination of resistors; Power dissipation due to current; Inter relation between P, V, I and R. Magnetic field & magnetic lines, Magnetic field due to current carrying conductor; Fleming left hand rule, Electromagnetic Induction; Induced Potential Difference, Induced current; Direct current, Alternating current; Frequency of AC, Advantage of Electronic Motor & Electronic Generator.

LIGHT

Convergence and Divergence of light; Images formed by a Concave Mirror; related concepts, centre of curvature; principles axis, optic centre, focus, focal length, Refraction & laws of refraction. Images formed by a convex lens; functioning of vision and remedies. Applications of spherical mirrors and lenses. Appreciation of concept of refraction index; Twinkling of stars; Dispersion of light; Scattering of light.

SOURCES OF ENERGY

Different forms of Energy, Leading to different sources for human use: Fossil Fuels, solar energy; Biogas; Wind; Water and Tidal Energy; Nuclear Energy. Renewable versus non-renewable sources.

MOTION: FORCE AND NEWTON'S LAWS

Displacement, Velocity, uniform & non-uniform motion along a straight line, acceleration distancetime and velocity, Time graphs for uniform and uniformly accelerated motion; Equations of motion by graphical method; Elementary idea of uniform circular motion. Force and Motion; Newton's laws of motion Inertia of a body; Inertia and Mass, Momentum Force and acceleration, Elementary idea of conservation of momentum, Action and Reaction forces.

GRAVITATION: WORK, ENERGY AND POWER

Gravitation; Universal Law of Gravitation, Force of gravitation of the earth gravity, acceleration due to gravity; mass and weight; free fall. Work done by a force energy, power; Kinetic and Potential energy; law of conservation of energy.

FLOATATION

Thrust and Pressure, Archimedes Principle, Buoyancy, Elementary idea of relative density.

SOUND

Nature of Sound and its Propagation in various media, Speed of Sound, Range of hearing in Humans; Ultra Sound, Reflection of sound; Echo and SONAR; Structure of the Human Ear (Auditory aspect only).

MATTER-NATURE AND BEHAVIOUR: STATES OF MATTER

Gases, liquids, solids, plasma and Bose-Einstein condensate, types of intermolecular forces. Classification of matter into mixtures and pure substances. Henry's Law. Concentration of solutions. Colloids-phases of colloids, Tyndall effect, Brownian movement. Suspension. Properties of matter. Measurement of properties of matter-S.I. system of units, physical and chemical changes. Laws of chemical combination. Gay Loussac's law, Avogadro law, atomic and molecular masses, average atomic mass, mole concept and molar masses, percentage composition.

STRUCTURE OF ATOM

Dalton's atomic theory, Discharge tube experiments, J J Thomson's model of atom, Rutherford's model, Bohr's model of atom, electronic configuration, formation of ions, Characterization of elements as metals, metalloids, or non-metals, isotopes (their applications), isobars and isotones.

PERIODIC CLASSIFICATION OF ELEMENTS

Mendeleev's periodic law, Periodic properties of elements, trends in the periods and groups: Importance of the periodic table, position of hydrogen in the periodic table.

CHEMICAL SUBSTANCES

Nature and behavior of Acid, Basis and Salts: Classical definition of acids and bases, Bronsted-Lowry theory, Lewis's concept of acid and bases, relative strengths of acids and bases, logarithmic or p scalepH, pOH and pkw, ionic equilibria in a solution. Action of indicators on acids and bases, sources of acid and bases, Salt-Classification of salts and their pH.

CHEMICAL REACTIONS

Formulation of chemical equations, balancing chemical equations, types of chemical equations with examples.

METALS AND NON-METALS

Characters of metals and non-metals including all properties and applications. Occurrence of metals in nature: ores and minerals, enrichment of ores – metallurgical operations Corrosion: rusting of iron – prevention of corrosion.

CARBON COMPOUNDS

Position of carbon in the periodic table. Concept of hybridization and shapes of molecules structural formula and molecular models, types of reactions undergone by organic compounds, homologous series of compounds having different functional groups, isomerism, IUPAC nomenclature of organic compounds. Hydrocarbons – their classification formation of coal and petroleum. Industrial source, preparation and properties of alkanes. Alcohols: Preparation and properties. Qualitative analysis of alcohols, iodoform test, effect of alcohols on living beings. Carboxylic acids: Preparation and properties. Functional group analysis of carboxylic acid. Soaps, detergents, biodegradable detergents. Carbon fibers.

CONSERVATION OF NATURAL RESOURCES

Pollution of river water, Ganga action plan for improving quality of water,

(1) Need for sustainable management of natural resources. Development of non- conventional energy resources to prevent pollution and atmospheric conservation.

MAN MADE MATERIAL

Ceramics, cement, porcelain, glass, carbon fibers, soaps and detergents, polymers, fibers and plastics.

Life Processes

- What are life Processes
- Need for Nutrition
- Different modes of Nutrition in animals
- What is Photosynthesis
- Various steps of holozoic nutrition
- Aerobic and anaerobic respiration
- Transportation in Human beings
- Transportation in Plants
- Transportation in animals
- Excretion in animals including Human beings
- Excretion in Plants

Control & Co-Ordination

- Animals – nervous system
- Basic unit of Nervous System in animals
- Reflex action
- Human Brain
- Co-Ordination in plants
- Geotropism – Positive, Negative
- Hormones in animals
- Endocrine & Exocrine glands

Reproduction

- Importance of variation
- Modes of Reproduction used by single organisms
- Sexual Reproduction in plants and animals
- Reproduction in Human beings
- What happens when egg is not fertilised
- Modes of avoiding pregnancy (family planning)

Heredity and Evolution

- What is heredity?
- Medals Law of inheritance
- How is sex determined?
- Evolution & Classification
- Acquired and inherited traits
- Homologous and Analogous organs
- What are fossils?
- Human Evolution

The Human eye and the colourful world-

- Structure of eye
- Defects of eye and their correction

Natural resources

The fundamental unit of Life

- What are living organisms made of?
- Structure organization of cell

Tissues

- Define tissue
- Types of plant tissue and animal tissues

Diversity of living organisms

- Basis of Classification
- Classification & Evolution
- Hierarchy of classification – groups
- Plantae, Animalia
- Nomenclature

Why do we fall ill

- Health & its failure
- Diseases and their causes
- Types of diseases- Infectious, Non-infectious
- Prevention of diseases
- Immunization

NATURAL RESOURCES

1. Our Environment:

- Atmosphere, role of atmosphere in climate control, wind, rain, environmental pollution:
- Global warming and greenhouse effect, acid rain, particulate pollutants, smog, formation of photochemical smog.
- Formation of ozone and its break down ozone hole, causes of ozone hole formation, polar vortex, effects of depletion of ozone hole.
- Water pollution-oxygen demand, chemical oxygen demand, international standard of drinking water, processing of drinking water.
- Soil pollution: water recycling, strategies to control environmental pollution, its collection and proper methods of disposal.
- Biogeochemical cycles: water cycle, nitrogen cycle, carbon cycle and oxygen cycle.

2. Breath of life: Air, Air pollution

3. Water a wonderful liquid

4. Water pollution

5. Biochemical cycles, Nitrogen cycle, Carbon cycle. Oxygen cycle.

6. The greenhouse effect.

7. What is ozone layer. How does it protect the Earth. What are the causes of depletion of ozone layer. How can it affect day to day life of living organisms.

Improvement in Food Resources

1. Improvement in crop yield.

2. Animal Husbandry.

3. Need for Intercropping.

4. Cross Breeding.