TIER II : Syllabus – TGT (Science)

Matter-Nature and Behaviour

Gases, liquids, solids, plasma and Bose-Enstein condenstate, 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 Lussac's law, Avogadro law, atomic and molecular masses, average atomic mass, mole concept and molar masses, percentage composition.

Nature of matter:

Elements, compounds and mixtures. Heterogeneous and homogenous mixtures, colloids and suspensions. Physical and chemical changes (excluding separating the components of a mixture).

Particle nature and their basic units:

Atoms and molecules, Law of Chemical Combination, Chemical formula of common compounds, Atomic and molecular masses.

Structure of atoms:

Electrons, protons and neutrons, Valency, Atomic Number and Mass Number, Isotopes and Isobars, Discharge tube experiments.

Chemical reactions:

Chemical equation, Balanced chemical equation, implications of a balanced chemical equation, types of chemical reactions: combination, decomposition, displacement, double displacement, precipitation, endothermic exothermic reactions, oxidation and reduction.

Acids, bases and salts:

Their definitions in terms of furnishing of H+ and OH– ions, General properties examples and uses, neutralization, concept of pH scale Numericals ,
Importance of pH in everyday life; preparation and uses of Sodium Hydroxide, Bleaching powder, Baking soda, Washing soda and Plaster of Paris.

Metals and non metals:

Properties of metals and non-metals; Reactivity series; Formation and properties of ionic compounds; Basic metallurgical processes; Corrosion and its prevention.

Carbon compounds:

Covalent bonding in carbon compounds. Versatile nature of carbon. Homologous series. , difference between saturated hydro carbons and unsaturated hydrocarbons. Chemical properties of carbon compounds Alcohols: Preparation and properties. Qualitative analysis of alcohols, iodoform test, effect of alcohols on living beings.
Carboxylicacids: Preparation and properties.
, soaps and detergents. Concept of hybridization and shapes of molecules structural formula and molecular models. isomerism, IUPAC nomenclature of organic compounds.

Periodic Classification of Elements

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

Tissues, Organs, Organ System, Organism:

Structure and functions of animal and plant tissues (only four types of tissues in animals;

Meristematic and Permanent tissues in plants).

Life processes:

'Living Being'. Basic concept of nutrition, respiration, transport and excretion in plants and animals.

Control and co-ordination in animals and plants:

Tropic movements in plants; Introduction of plant hormones; Control and co-ordination in animals: Nervous system; Voluntary, involuntary and re-flexaction; Chemical co- ordination: animal hormones.

Reproduction:

Reproduction in animals and plants (asexual and sexual) reproductive health – need and methods of family planning . Safe sex vs HIV/AIDS. Child bearing and women's health.

Heredity and Evolution:

Heredity; Mendel's contribution-Laws for inheritance of traits: Sex determination: brief introduction evolution. - Acquired and inherited traits., Homologus and Analogous organs. , What are fossils?.

Cell - Basic Unit of life :

Cell as a basic unit of life; prokaryotic and eukaryotic cells, multi cellular organisms; cell membrane and cell wall, cell organelles and cell inclusions; chloroplast, mitochondria, vacuoles, endoplasmic reticulum, Golgi apparatus; nucleus, chromosomes – basic structure, number.

Motion:

Distance and displacement, velocity; uniform and non-uniform motion along a straight line; acceleration, distance-time and velocity-time graphs for uniform motion and uniformly accelerated motion, elementary idea of uniform circular motion.

Force and Newton's laws :

Force and Motion, Newton's Laws of Motion, Action and Reaction forces, Inertia of a body, Inertia and mass, Momentum, Force and Acceleration.

Gravitation:

Gravitation; Universal Law of Gravitation, Force of Gravitation of the earth (gravity), Acceleration due to Gravity; Mass and Weight; Freefall.

Floatation:

Thrust and Pressure. Archimedes' Principle; Buoyancy.

Work, Energy and Power:

Work done by a Force, Energy, power; Kinetic and Potential energy; Law of conservation of energy).

Sound:

Nature of sound and its propagation in various media, speed of sound, range of hearing in humans; ultra sound; reflection of sound; echo.

Effects of Current

Electric current, potential difference and electric current. Ohm's law; Resistance, Resistivity,

Factors on which the resistance of a conductor depends. Series combination of resistors, parallel combination of resistors and its applications in daily life. Heating effect of electric current and its applications in daily life. Electric power, Interrelation between P, V, I and R.

Magnetic effects of current

Magnetic field, field lines, field due to a current carrying conductor, field due to current carrying coil or solenoid; Force on current carrying conductor, Fleming's Left Hand Rule, Electric Motor, Electromagnetic induction. Induced potential difference, Induced current. Fleming's Right Hand Rule, Electric Generator, Direct current. Alternating current: frequency of AC. Advantage of AC over DC. Domestic electric circuits.

Food Production

Plant and animal breeding and selection for quality improvement and management; Use of fertilizers and manures; Protection from pests and diseases; Organic farming.

Natural Phenomena

Reflection of light by curved surfaces; Images formed by spherical mirrors, centre of curvature, principal axis, principal focus, focal length, mirror formula (Derivation not required), magnification. Refraction; Laws of refraction, refractive index. Refraction of light by spherical lens; Image formed by spherical lenses; Lens formula (Derivation not required); Magnification. Power of a lens. Functioning of a lens in human eye, defects of vision and their corrections, applications of spherical mirrors and lenses. Refraction of light through a prism, dispersion of light, scattering of light, applications in daily life

Our environment:

Eco-system, Environmental problems, Ozone depletion, waste production and their solutions. Biodegradable and non-biodegradable substances.
Global warming and green house effect, acid rain, particulate pollutants, smog, formation of photochemical smog.
Water pollution-oxygen demand, chemical oxygen demand, international standard of drinking water, processing of drinking water.

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, Noninfectious.
- Prevention of diseases
- Smmunisation