

[For English/Hindi/Gujarati Medium Students]

PHYSICS

Test No. Topic Covered

01 Minor-1: Basic Mathematics Used In Physics & Vectors, Algebra :

Quadratic Equation (Roots of quadratic equation, Solution by Factorization and by Shridharacharya Formula, Properties of roots (real, equal, imaginary etc), Application of Quadratic equation in physics), Binomial Theorem and binomial approximation, Logarithm and Exponents (Laws of logarithms and exponents with applications / examples), Series (Arithmetic Progression and its general term and Sum, Sum of first n Natural numbers, Geometrical Progression and its general term and Sum, Sum of infinite GP), Componendo & Dividendo rule.

Trigonometry : Angle & its measurement (Sexagesimal and Circular system) , Trigonometric-ratios, Trigonometric identities , Four Quadrants & ASTC rule, T-ratios for general angles , Addition/subtraction Formulae, Small angle Approximation, Ranges of T-functions.

Co-ordinate Geometry : Define Origin, Axis or Axes, Co-ordinates of a point in a plane or space (2D or 3D), Distance Formula, Slope of a line and its interpretation, Graphs of commonly used functions (Straight line, Parabola, Circle, Ellipse , Hyperbola Including rectangular hyperbola , Sinusoidal functions (sine and cosine functions), Exponential functions.

Calculus : Differential calculus (Average rate of change and Instantaneous rate of change, Differentiation of commonly used functions, Rules of differentiation including Product and Quotient rules, Application of derivatives: Increasing and Decreasing nature, Maxima and Minima with geometrical/graphical explanation), Integral calculus (Integration is the reverse process of differentiation, Indefinite and Definite Integration, Integration of commonly used functions, Rules of Integration, Application of Integral calculus: Area under a curve and Average value of a continuous function in an interval).

Vectors: Definition of scalar and vector quantities, Graphical representation of vectors, Notation of

Vectors, Angle between two vectors , Types of Vectors (Unit vector, Null vector, Equal vectors and equality of vectors, opposite and Negative of a vector, Parallel and anti-parallel vectors, Co-planar vectors, axial vectors) , Position and displacement vectors , Addition/subtraction of two vectors (Triangle law, Parallelogram law), Addition of many vectors (Polygon law), Unit vectors and their significance (Representation of vector in terms of unit vector in plane and in space), Resolution of a Vector into components i.e. Cartesian Components in two and three dimensions and Direction Cosines , Multiplication or Division of a Vector by a Scalar (i.e. Real number), Scalar (Dot) product of two Vectors and component of a vector in the direction of another vector , Vector (Cross) product of two Vectors with its geometrical interpretation and Right hand rule for direction.

Unit, Dimensions And Measurements :

Classification of Physical Quantities according to their dependency i.e. Fundamental (or Base) and Derived quantities , Need for measurement (Units of measurement), Systems of units (FPS, CGS, MKS, SI system of units and Supplementary units, fundamental and derived units , Some idea about Practical and Improper units) , Standards of Length, mass and time measurements, Dimensions of physical quantities, Dimensional Formulae of important physical quantities, Dimensional analysis and its applications & its limitations, SI prefixes and general guidelines for using Symbols of SI units , Errors in measurement (Systematic, Random and Least count Errors), Absolute Error, Relative Error, Percentage Error and Combination of Errors , Significant figures and its rules for Arithmetic operations (i.e. addition, subtraction, multiplication and division) , Rounding off the uncertain digits.

EXPERIMENTAL SKILLS

1. Vernier calipers-its use to measure the internal and external diameter and depth of a vessel.
 2. Screw gauge-its use to determine thickness/ diameter of thin sheet/wire.
- 02 Minor-2 : Kinematics :** (Motion along a straight line and Motion in a Plane)

[For English/Hindi/Gujarati Medium Students]

Motion and Rest with introduction of frame of reference , Variables of Translatory Motion (Position/ Displacement / Path length(Distance) , Velocity/ Speed / Average Velocity / Average Speed, Acceleration / Average Acceleration) , Relation among various variables of motion and their applications to variable acceleration , Equations of Motion with constant acceleration (scalar and vector forms), Motion along a straight line, velocity-time and position-time graphs for uniformly accelerated motion (graphical treatment) , Motion under gravity, Free-fall , Motion in a plane with constant acceleration , Projectile Motion – Ground to Ground projection, Projection from a height (Horizontal projection) , Relative Motion in one-dimensions , Relative Velocity in two dimensions (Rain-Man problem, River-Boat Problem & wind based questions)

03 Minor-3: Laws Of Motion and Friction :

Intuitive concept of force , Basic or Fundamental forces in nature , The law of Inertia, Newton's first law of motion ,Momentum and Newton's second law of motion; impulse , Newton's third law of motion , Common forces in mechanics-Weight, Normal reaction, Friction, Contact force, Tension in string , Free Body diagram, Equilibrium of concurrent forces-Lami's theorem, Motion of bodies in contact or connected by strings, Pulley systems , Frame of Reference-Inertial and Non Inertial Frames. Pseudo Force and its applications , Cause of Friction, Static and Kinetic friction , Laws of friction, Limiting Static and Kinetic friction coefficients, Angle of Friction, Angle of Repose , Rolling friction.

04 Review Test - 1 : Syllabus of Test No. 1, 2 & 3

05 Minor-4 : Work, Energy & Power : Work done by a constant force (use of dot product) and variable force(use of definite integration i.e. area under the curve) , Kinetic energy , Work-energy theorem for a Constant and a Variable force, Concept of potential energy, conservative forces and non-conservative forces. Gravitational Potential Energy , Potential energy versus position graph and stable, unstable & neutral equilibrium , Spring force and Elastic

Potential energy of a spring, Conservation of mechanical energy (kinetic and potential energies) , Power (Instantaneous and Average power).

06 Minor-5 : Collision & Centre of Mass : Impulse of a force and Impulse-Momentum theorem, Idea about Impulsive forces.

Law of conservation of linear momentum and its applications, Elastic and inelastic collisions in one and two dimensions (Head-on and Oblique collisions), Coefficient of restitution and line of impact, Expression of loss in Kinetic energy in inelastic collision.

Centre of Mass of Discrete System : two-particle system and n-particle system, Centre of mass of continuous system : General formula, Centre of mass of symmetrical rigid bodies; centre of mass of uniform rod , Centre of mass of composite and truncated bodies, Motion of Centre of mass.

07 Semi Major Test - 1 : Syllabus of Test No. 1 to 6

08 Minor-6 : Circular Motion : Kinematics of circular motion (Variables of motion (Angular Displacement, Angular Velocity, Angular acceleration), Relations among Angular Variables for constant angular acceleration , General relation among angular variables) , Dynamics of uniform circular motion. Centripetal force, examples of circular motion (vehicle on level circular road, vehicle on banked road) , Dynamics of non-uniform circular motion (Motion in a vertical circle)

09 Minor-7: Rotational Motion :

Kinematics of Rotational Motion about a fixed axis: Comparison of linear and rotational motions, Moment of inertia, radius of gyration and its significance. Values of M.I. for simple geometrical objects (Ring, Rod and Disc with derivation and others with no derivation). Statement of parallel and perpendicular axes theorems and their applications, Moment of a force-torque, Equilibrium of rigid bodies, Angular momentum, Relation between torque and Angular momentum, Conservation of angular momentum with some examples , Pure Rolling or rolling motion on a smooth/rough horizontal surface.

[For English/Hindi/Gujarati Medium Students]

Expression for Rotational Kinetic Energy, Rolling motion on an inclined plane, Expression for acceleration and minimum friction coefficient.

EXPERIMENTAL SKILLS

1. Metre Scale - the mass of a given object by the principle of moments.

10 Minor-8 : Gravitation : The universal law of gravitation (Newton's law of Gravitation), Gravitational Field and its Intensity, Brief idea about Inertial and Gravitational mass, Acceleration due to gravity and its variation with altitude and depth. Idea about variation in g due to Shape and Rotation of earth, Gravitational potential energy and gravitational potential, Kepler's laws of planetary motion (The law of orbits, Areas and Periods), Motion of Planets and Satellites in Circular orbits, Orbital velocity of a satellite, Total Energy and Binding Energy of a satellite, Escape velocity and escape energy.

Properties Of Matter And Fluid Mechanics :

Elastic behavior, Stress-strain relationship, Hooke's law, Young's modulus, bulk modulus, shear modulus of rigidity, Poisson's ratio; elastic energy. Pressure, Pascal's law, Archimedes' Principle and Buoyancy. Floatation and Translatory equilibrium, Variation of Pressure with Depth, Atmospheric pressure and Gauge Pressure, Hydraulic Machines, Streamline and turbulent flow, Critical velocity and Reynolds's number, Principle of Continuity, Bernoulli's theorem and its applications. Speed of Efflux: Torricelli's law, Venturi-meter, Dynamic lift, Viscosity, Newton's law of viscous force, Stokes' law, terminal velocity, Surface energy and surface tension, angle of contact, excess of pressure, application of surface tension ideas to drops, bubbles and capillary rise. Detergent and surface tension

EXPERIMENTAL SKILLS

1. Young's modulus of elasticity of the material of a metallic wire.

2. Surface tension of water by capillary rise and effect of detergents.

3. Co-efficient of Viscosity of a given viscous liquid by measuring terminal velocity of a given spherical body.

11 Review Test - 2: Syllabus of Test No. 8, 9 & 10

12 Minor-9: Thermal Physics :

Temperature and Thermal Expansion :

(Temperature, Temperature scales, Brief idea about thermometers, Thermal expansion; thermal expansion of solids, liquids, and gases. Anomalous expansion)

Calorimetry : (Heat, Heat capacity, Specific heat capacity, Molar heat capacity, Water Equivalent, Heat of transformation – latent heat, Principle of Calorimetry, Heating curve, Phase diagram)

Heat Transfer Conduction : (Process, Steady State, Law of Conduction, Thermal conductivity, Thermal resistance, Series and Parallel combinations of rods, Growth of ice on ponds) , Convection: Process, Idea about Natural and Forced Convection, Radiation: Qualitative ideas of Black Body Radiation, Ideal Black Body, Absorptive Power, Emissive Power, Spectral Emissive Power, Kirchhoff's Law and its applications, Stefan's Law, Newton's law of cooling, Wien's displacement law and Green House effect, Solar constant.

Thermodynamics : Thermal equilibrium and definition of temperature (Zeroth law of Thermodynamics). Heat, work and internal energy. First law of thermodynamics. Cyclic, Isochoric, Isobaric, Isothermal and Adiabatic processes, Second law of the thermodynamics: Reversible and irreversible processes.

Kinetic Theory of Gases : Gas Laws, Equation of state of a perfect gas, Brief idea of van der Waals' equation and Critical temperature, Assumptions, Concept of pressure. Different types of speeds of gas molecules, Maxwell's velocity distribution curve, Kinetic energy and temperature; Degrees of freedom, Law of equipartition of energy (statement only) and application to specific heat capacities of gases; Concept of mean free path.

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EXPERIMENTAL SKILLS :

1. Specific heat capacity of a given (i) solid and (ii) liquid by method of mixtures.

13 Minor-10: Oscillations (SHM):

Periodic (Harmonic) motion and Oscillatory motion, Periodic motion-period, frequency, displacement as a function of time, Periodic functions, Simple harmonic motion (SHM) and its equation; Velocity, Acceleration and Phase, Oscillations of a spring-restoring force and force constant. Equivalent spring constant of Series and parallel combinations, Energy in SHM –Kinetic and Potential energies, Simple pendulum-derivation of expression for its time period, Superposition of two SHMs of Same Frequency in the same direction, Free, forced and damped oscillations (qualitative ideas only), resonance.

Wave Motion : Wave motion, Mechanical Waves, Longitudinal and transverse waves, Equation of Plane Progressive waves, Velocity of Transverse mechanical waves, Intensity of waves , Sound waves: Audible, Infrasonic and Ultrasonic waves , Speed of sound waves: Newton's formula and Laplace correction, Effect of temperature, Pressure and Humidity on speed of Sound waves , Some idea about description of sound waves as Displacement and Pressure waves, Characteristics of sound waves: Pitch, Loudness and Quality, Reflection and transmission of waves & Echo , Principle of superposition of waves, Interference and Beats, Stationary waves, Standing waves in strings and organ pipes, fundamental mode and harmonics. Resonance tube.

EXPERIMENTAL SKILLS

1. Simple Pendulum-dissipation of energy by plotting a graph between the square of amplitude and time.
2. Speed of sound in air at room temperature using a resonance tube,

14 Semi Major Test - 2: Syllabus of Test No. 8 to 13 Test No. 15 to 19 Full Syllabus**CHEMISTRY**

Test No. Topic Covered

01 Minor-1: Some Basic Concepts Of Chemistry -

Mole Concept : Matter and its nature, Dalton's atomic theory: Concept of atom, molecule, element and compound : Laws of chemical combination; Atomic and molecular masses, mole concept, molar mass, percentage composition, empirical and molecular formulae: Chemical equations and stoichiometry.

02 Minor-2: Classification of Elements and

Periodicity in Properties : Modern periodic law and present form of the periodic table. s, p, d and f block elements - periodic trends in properties of elements atomic and ionic radii. ionization enthalpy, electron gain enthalpy, valence, oxidation states and chemical reactivity.

Atomic Structure : Nature of electromagnetic radiation, photoelectric effect; Spectrum of the hydrogen atom. Bohr model of a hydrogen atom - its postulates, derivation of the relations for the energy of the electron and radii of the different orbits, limitations of Bohr's model; Dual nature of matter, de Broglie's relationship. Heisenberg uncertainty principle. Elementary ideas of quantum mechanics, quantum mechanics, the quantum mechanical model of the atom, its important features. Concept of atomic orbitals as one-electron wave functions: Variation of Ψ and Ψ^2 with r for 1s and 2s orbitals: various quantum numbers (principle, angular momentum and magnetic quantum numbers) and their significance; shapes of s, p, and d-orbitals, electron spin and spin quantum number: Rules for filling electrons in orbitals - Aufbau principle. Pauli's

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exclusion principle and Hund's rule, electronic configuration of elements, extra stability of half-filled and completely filled orbitals.

03 Minor-3: Chemical Bonding and Molecular Structure

Structure : Kossel - Lewis approach to chemical bond formation, the concept of ionic and covalent bonds.

Ionic Bonding : Formation of ionic bonds, factors affecting the formation of ionic bonds; calculation of lattice enthalpy.

Covalent Bonding : Concept of electronegativity. Fajan's rule, dipole moment : Valence Shell Electron Pair Repulsion (VSEPR) theory and shapes of simple molecules.

Quantum Mechanical Approach To Covalent Bonding

: Valence bond theory - its important features, the concept of hybridization involving s, p, and d orbitals; Resonance.

Molecular Orbital Theory - Its important features, LCAOs, types of molecular orbitals (bonding, anti bonding), sigma and pi-bonds, molecular orbital electronic configurations of homonuclear diatomic molecules, the concept of bond order, bond length, and bond energy. Elementary idea of metallic bonding. Hydrogen bonding and its applications.

04 Review Test - 1: Syllabus of Test No. 1, 2 & 3

05 Minor-4: Chemical Equilibrium : Meaning of equilibrium, the concept of dynamic equilibrium.

Equilibria Involving Physical Processes : Solid-liquid, liquid - gas and solid-gas equilibria, Henry's law. General characteristics of equilibrium involving physical processes.

Equilibrium Involving Chemical Processes : Law of chemical equilibrium, equilibrium constants (K_p

and K_c) and their significance, the significance of ΔG and ΔG° in chemical equilibrium, factors affecting equilibrium concentration, pressure, temperature, the effect of catalyst; Le Chatelier's principle.

06 Minor-5 : Ionic Equilibrium : Weak and strong electrolytes, ionization of electrolytes, various concepts of acids and bases (Arrhenius. Bronsted - Lowry and Lewis) and their ionization, acid-base equilibria (including multistage ionization) and ionization constants, ionization of water. pH scale, common ion effect, hydrolysis of salts and pH of their solutions, the solubility of sparingly soluble salts and solubility products, buffer solutions.

07 Semi Major Test - 1: Syllabus of Test No. 1 to 6

08 Minor-6: Thermodynamics : Fundamentals of thermodynamics: System and surroundings, extensive and intensive properties, state functions, types of processes.

The First Law of Thermodynamics : Concept of work, heat internal energy and enthalpy, heat capacity, molar heat capacity; Hess's law of constant heat summation; Enthalpies of bond dissociation, combustion, formation, atomization, sublimation, phase transition, hydration, ionization, and solution.

The Second Law of Thermodynamics :

Spontaneity of processes; ΔS of the universe and ΔG of the system as criteria for spontaneity. ΔG° (Standard Gibbs energy change) and equilibrium constant.

Redox Reactions : Concept of oxidation and oxidation and reduction, redox reactions, oxidation number, balancing redox reactions in terms of loss and gain of electron and change in oxidation numbers.

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09 Minor-7: Classification and Nomenclature :

Tetravalency of carbon: Shapes of simple molecules - hybridization (s and p) : Classification of organic compounds based on functional groups: and those containing halogens, oxygen, nitrogen and sulphur; Homologous series : **Nomenclature (Trivial and IUPAC).**

10 Minor-8: Isomerism :

Structural and Stereoisomerism

11 Review Test - 2: Syllabus of Test No. 8, 9 & 10**12 Minor-9: General Organic Chemistry :**

Covalent Bond Fission - Homolytic and heterolytic : free radicals, carbocations and carbanions; Stability of carbocations and free radicals, electrophiles, and nucleophiles.

Electronic Displacement in a Covalent Bond - Inductive effect, electromeric effect, resonance and hyperconjugation.

Common Types of Organic Reactions -

Substitution, addition, elimination and rearrangement.

13 Minor-10: Purification :

Purification - Crystallization, sublimation, distillation, differential extraction and chromatography-principles and their applications.

Qualitative Analysis - Detection of nitrogen, sulphur, phosphorus and halogens.

Quantitative Analysis (basic principles only) - Estimation of carbon, hydrogen, nitrogen, halogens, sulphur, phosphorus.

Calculations of empirical formulae and molecular formulae : Numerical problems in organic quantitative analysis.

Hydrocarbons : Classification, isomerism, IUPAC nomenclature, general methods of preparation, properties, and reactions.

Alkanes - Conformations: Sawhorse and Newman projections (of ethane): Mechanism of halogenation of alkanes.

Alkenes - Geometrical isomerism: Mechanism of electrophilic addition: addition of hydrogen, halogens, water, hydrogen halides (Markownikoffs and peroxide effect): Ozonolysis and polymerization.

Alkynes - Acidic character: Addition of hydrogen, halogens, water and hydrogen halides. Polymerization.

Aromatic Hydrocarbons - Nomenclature, benzene - structure and aromaticity: Mechanism of electrophilic substitution: halogenation, nitration.

Friedel - Craft's alkylation and acylation, directive influence of the functional group in mono-substituted benzene.

14 Semi Major Test -2: Syllabus of Test No. 8 to 13 Test No. 15 to 19 Full Syllabus

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BIOLOGY

Test No. Topic Covered

- 01 Minor-1: The Living World :** What is living ? ; Biodiversity; Need for classification; Taxonomy & Systematics; Concept of species and taxonomical hierarchy; Binomial nomenclature.
- Biological Classification :** Five kingdom classification; salient features and classification of Monera; Protista and Fungi into major groups; Lichens; Viruses and Viroids. Prokaryotic Cell (Bacteria).
- Animal Kingdom :** Salient features and classification of animals-nonchordate up to phyla level.
- 02 Minor-2: Plant Kingdom :** Salient features and classification of plants into major groups-Algae, Bryophytes, Pteridophytes, Gymnosperms (three to five salient and distinguishing features and at least two examples of each category).
- Animal Kingdom :** Salient features and classification of animals-chordate up to classes level (Three to five salient features and at least two examples).
- 03 Minor-3: Morphology of Flowering Plants :** Morphology and modifications, Tissues, Anatomy and functions of different parts of flowering plants: Root, Stem, Leaf, Inflorescence, Cymose and racemose, flower, Fruit and seed (To be dealt along with the relevant practical of the Practical Syllabus) & Families (Malvaceae, Cruciferae, leguminosae, compositae, gramineae).
- Anatomy of Flowering Plants :** Anatomy and function of different tissues, tissue system, internal structure of Root, Stem, Leaf, secondary Growth.
- 04 Review Test - 1 : Syllabus of Test No. 1, 2 & 3**
- 05 Minor-4 : Cell : The Unit Of Life :** Cell theory and cell as the basic Minor of life; Structure of prokaryotic and eukaryotic cell; Plant cell and animal cell; Cell envelope, cell membrane, cell wall; Cell organelles-structure and function; Endomembrane system-endoplasmic reticulum, Golgi bodies, lysosomes, vacuoles; mitochondria, ribosomes, plastids, micro bodies; Cytoskeleton, cilia, flagella, centrioles (ultra structure and function); Nucleus-nuclear membrane, chromatin, nucleolus.
- Cell Cycle & Cell Division :** Cell cycle, mitosis, meiosis and their significance.
- 06 Minor-5: Biomolecules With Enzymes :** Structure and function of proteins, carbohydrates, lipids, nucleic acids.
- Enzymes -** types, properties, enzyme action, classification and nomenclature of enzymes.
- Photosynthesis in Higher Plants :** Photosynthesis in Higher Plants as a means of Autotrophic nutrition; Site of photosynthesis take place; pigments involved in Photosynthesis (Elementary idea); Photochemical and biosynthetic phases of photosynthesis; Cyclic and non cyclic and photophosphorylation; Chemiosmotic hypothesis; Photorespiration C_3 and C_4 pathways; Factors affecting photosynthesis.
- 07 Semi Major Test- 1 : Syllabus of Test No. 1 to 6**
- 08 Minor-6: Respiration in Plants :** Exchange of gases; Cellular respiration-glycolysis, fermentation (anaerobic), TCA cycle and electron transport system (aerobic); The respiratory balance sheet, Energy relation - Number of ATP molecule generated, Amphibolic pathways; Respiratory quotient.
- Plant Growth and Development:** Seed germination; Phases of Plant growth and plant growth rate; Conditions of growth; Differentiation, dedifferentiation and redifferentiation; Sequence of developmental process in a plant cell; Growth regulators-auxin, gibberellin, cytokinin, ethylene, ABA.
- 09 Minor-7 : Structural Organisation in Animals :** Animal tissues; Morphology, anatomy and functions of different systems (digestive, circulatory, respiratory, nervous and reproductive) of an insect **Cockroach, Frog**.
- Breathing and Exchange of Gases :** Respiratory organs in animals (recall only); Respiratory system in humans; Mechanism of breathing and its regulation in humans-Exchange of gases, transport of gases and regulation of respiration; Respiratory volumes; Disorders related to respiration-Asthma, Emphysema, Occupational respiratory disorders.
- Body Fluids and Circulation :** Composition of blood. Composition of lymph and its function; blood groups, Coagulation of blood, blood corpuscles:
- Human Circulatory System -** Structure of human heart and blood vessels; Cardiac cycle, cardiac output. ECG. Double circulation: Regulation of cardiac activity; Disorders of circulatory system-Hypertension. Coronary artery disease, Angina pectoris, Heart failure.
- 10 Minor-8 : Excretory Products and Their Elimination :** Modes of excretion Ammonotelism, ureotelism, uricotelism; Human excretory system structure and function; Urine formation, Osmoregulation; Regulation of kidney function-

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Renin-angiotensin, Atrial Natriuretic Factor, ADH and Diabetes insipidus; Role of other organs in excretion; Disorders; Uraemia, Renal failure, Renal calculi, Nephritis; Dialysis, artificial kidney.

Locomotion and Movement: Types of movement-ciliary, flagellar, muscular; Skeletal muscle-contractile proteins and muscle contraction; Skeletal system and its functions (To be dealt with the relevant practical of Practical syllabus); Joints; Disorders of muscular and skeletal system-Myasthenia gravis, Tetany, Muscular dystrophy, Arthritis, Osteoporosis, Gout.

Chemical Coordination and Integration OR Regulation : Endocrine glands and hormones; Human endocrine system-Hypothalamus, Pituitary, Pineal, Thyroid, Parathyroid, Adrenal, Pancreas, Gonads; Mechanism of hormone action (Elementary Idea); Role of hormones as messengers and regulators, Hypo-and hyperactivity and related disorders (Common disorders e.g. Dwarfism, Acromegaly, Cretinism, goitre, exophthalmic goitre, diabetes, Addison's disease).

Neural Control and Coordination: Neuron and nerves; Nervous system in humans - central nervous system, peripheral nervous system and visceral nervous system; Generation and conduction of nerve impulse.

11 Review Test - 2: Syllabus of Test No. 8, 9 & 10

12 Minor-9 : Photosynthesis in Higher Plants : Photosynthesis in Higher Plants as a means of Autotrophic nutrition; Site of photosynthesis take place; pigments involved in Photosynthesis (Elementary idea); Photochemical and biosynthetic phases of photosynthesis; Cyclic and non cyclic and photophosphorylation; Chemiosmotic hypothesis; Photorespiration C_3 and C_4 pathways; Factors affecting photosynthesis.

Respiration in Plants : Exchange of gases; Cellular respiration-glycolysis, fermentation (anaerobic), TCA cycle and electron transport system (aerobic); The respiratory balance sheet, Energy relation - Number of ATP molecule generated, Amphibolic pathways; Respiratory quotient.

Plant Growth and Development : Seed germination; Phases of Plant growth and plant growth rate; Conditions of growth; Differentiation, dedifferentiation and redifferentiation; Sequence of developmental process in a plant cell; Growth regulators-auxin, gibberellin, cytokinin, ethylene, ABA.

Breathing and Exchange of Gases : Respiratory organs in animals (recall only); Respiratory system in

humans; Mechanism of breathing and its regulation in humans-Exchange of gases, transport of gases and regulation of respiration; Respiratory volumes; Disorders related to respiration-Asthma, Emphysema, Occupational respiratory disorders.

Body Fluids and Circulation : Composition of blood. Composition of lymph and its function; blood groups, Coagulation of blood, blood corpuscles.

Human Circulatory System - Structure of human heart and blood vessels; Cardiac cycle, cardiac output. ECG. Double circulation: Regulation of cardiac activity; Disorders of circulatory system-Hypertension. Coronary artery disease, Angina pectoris, Heart failure.

Locomotion and Movement: Types of movement-ciliary, flagellar, muscular; Skeletal muscle-contractile proteins and muscle contraction; Skeletal system and its functions (To be dealt with the relevant practical of Practical syllabus); Joints; Disorders of muscular and skeletal system-Myasthenia gravis, Tetany, Muscular dystrophy, Arthritis, Osteoporosis, Gout.

13 Minor-10: Structural Organisation in Animals : Animal tissues; Morphology, anatomy and functions of different systems (digestive, circulatory, respiratory, nervous and reproductive) of an insect **Cockroach, Frog.**

Excretory Products and Their Elimination : Modes of excretion Ammonotelism, ureotelism, uricotelism; Human excretory system structure and function; Urine formation, Osmoregulation; Regulation of kidney function-Renin-angiotensin, Atrial Natriuretic Factor, ADH and Diabetes insipidus; Role of other organs in excretion; Disorders; Uraemia, Renal failure, Renal calculi, Nephritis; Dialysis, artificial kidney.

Chemical Coordination and Integration OR Regulation : Endocrine glands and hormones; Human endocrine system-Hypothalamus, Pituitary, Pineal, Thyroid, Parathyroid, Adrenal, Pancreas, Gonads; Mechanism of hormone action (Elementary Idea); Role of hormones as messengers and regulators, Hypo-and hyperactivity and related disorders (Common disorders e.g. Dwarfism, Acromegaly, Cretinism, goitre, exophthalmic goitre, diabetes, Addison's disease).

Neural Control and Coordination: Neuron and nerves; Nervous system in humans - central nervous system, peripheral nervous system and visceral nervous system; Generation and conduction of nerve impulse.

14 Semi Major Test-2: Syllabus of Test No. 8 to 13 Test No. 15 to 19 Full Syllabus