D.A.V. MULTIPURPOSE PUBLIC SCHOOL, SECTOR-15, SONEPAT
SYLLABUS (2026-2027)

CLASS : CLASS XI (SCIENCE)

Subject	Month	Chapter No. & Name	Vocabulary / Terms
English	April	HORNBILL CH-1 THE PORTRAIT OF A LADY	mantelpiece ,prophet , puckered,inaudible ,monotonous , monopoly ,seclusion, veritable,bedlam ,hobble
		POEM -1 A PHOTOGRAPH	paddling ,terrible, transient ,snapshot ,laboured, ease,circumstance ,silence
		SNAPSHOTS CH-1 THE SUMMER OF BEAUTIFUL WHITE HORSE Sec A- Note-Making and Summarizing Writing Skills-Classified Advertisement-Situation Vacant	hallmarks ,magnificence ,tribe, longing , poverty-stricken , vineyard , streak ,descendant, furious, trot, vagrant , capricious , got to set, dawned on, parlour ,Assyrian,talk out,fame ,suspicious,Garoghlanian
		HORNBILL	Set sail, honing, seafaring, gales, atrocious, jib, donned, stern, impending, lashed, ominous, aft,

		CH-2 WE'RE NOT AFRAID TO DIE…….TOGETHER	torrent, boom, taut, starboard, slashed, deflect, Mayday calls, rigging
	May	POEM-2 THE LABURNUM TOP	Laburnum, quite still, leaves yellowing, Goldfinch, twitching, chirrup, startlement, sleek, abrupt, chittering, tremor of wings, trillings, tremble, stoke, infinite
		WRITING SKILLS- FOR SALE (CLASSIFIED ADVERTISEMENT)	
		U.T.1 **(11th May)**	HORNBILL CH-1, 2 POEMS- 1, 2 SNAPSHOTS CH-1
	June	**Summer Break**	
	July	HORNBILL CH-3 DISCOVERING TUT…..THE SAGA CONTINUES	Forensic, casket grey, scudded across, gilded, archaeologist,antiquity, ransacked, artefacts, resurrection, funerary treasures, resins, anatomy, diagnostic imaging, inventory, wacky, eerie, radiology, pall-bearer, vertebrae, death rattle
		POEM-3 THE VOICE OF THE RAIN	Shower, translate, eternal, impalpable, bottomless, vague, drought, atomies, latent, reck'd
		SNAPSHOTS CH-2	Poignant, chink, fleetingly, jamb, lugging, crick, reprovingly, confronted, endure, errand, cumbersome, apprehend, smuggy, severed, resolve

		THE ADDRESS WRITING SKILLS-SPEECH GRAMMAR- TENSES	
		U.T. 2 **(10th July)**	HORNBILL CH-3 POEM-3 SNAPSHOTS CH-2 WRITING SKILLS-CLASSIFIED ADVERTISEMENTS & SPEECH
	August	HORNBILL POEM-4 CHILDHOOD	Cease, preach, infant
		SNAPSHOTS CH-3 MOTHER'S DAY	Sinister, cockney, dubiously, apologetically, flustered, bewildered, muttering, dominating, complacently, indignantly, half-witted, off-colour, solemn, pompous, appealingly
		PRACTICE OF READING SKILLS WRITING SKILLS- DEBATE & POSTER	
		Half Yearly Syllabus	HORNBILL CH-1,2 & 3 POEMS-1,2,3 & 4 SNAPSHOTS CH-1,2 & 3 COMPLETE SECTION-READING, SEC-GRAMMAR & WRITING SKILLS
	September	**Half Yearly Exam** **8th September**	

	October	HORNBILL CH- 4 THE ADVENTURE	Browse through, venture, terminus,suburban, carriages, converge, expansionist, blow by blow account, avidly, acumen, morale booster, astute, relegated, de facto, figurehead, transition, doctored, melee, catastrophe, amok
		CH-5 SILK ROAD	Ducking, clambered, nibbling, arid, en masse, manoeuvre, plumes, billowed, veering, swerve, glinting, meanders, daubed, swathe, petered out, slither, lurching, festooned, paraphernalia, cavernous
		SNAPSHOTS CH-4 BIRTH	Contemplation, perceptive, listless, premonition, midwife, overwrought, sordid, idyllic, resuscitate, dilemma,ebbing, flaccid, consternation, blanched,draggled
	November	HORNBILL POEM-5 FATHER TO SON	Stranger, understanding, design, prodigal, home, house, globe, land, anger, grief, longing
		SNAPSHOTS CH-5 THE TALE OF MELON CITY	Placid, proclaim, triumphally, edify, thoroughfare, frown, gallows, summons, ordain, amendments, scaffold, culprit, decree, heralds, laissez faire
		U.T.3 **(21st October)**	HORNBILL CH- 4 & 5 POEM-5 SNAPSHOTS CH- 4 & 5
	December	REVISION- WRITING SKILLS GRAMMAR TOPICS	

		READING SKILLS	
		U.T.4 **(2nd December)**	HORNBILL CH-1,2 &3 POEMS-1,2 &3
	January	**Revision & Preboard** **(2nd January,2027)**	
	February	Final Exam	
	March	Final Exam	
Physics	**April**	Chapter No 2 Name of the Chapter:Units and Dimensions	1. Physical Quantity: Measurable Quantity 2. Fundamental Quantity: A quantity that cannot be defined in terms of other quantities, like length, mass, and time. 3. Derived Quantity: A quantity obtained by combining fundamental quantities 4.. Unit: A standard used for measurement 5. SI Unit: International System of Units 6. Dimension: Representation of a physical quantity, by symbols like [L], [M], [T] for length, mass, and time respectively. 7. Significant Figures: Reliable digits in a measurement 8. Dimensional Analysis: A method to check the consistency of equations by examining their dimensions. 9. Errors: Difference between true value and measured value 10. Accuracy and Precision: How close the measured value is to the true value is accuracy and to what resolution or limit, the quantity is measured by an instrument is precision. 11. Order of magnitude: By using powers of ten,numbers are made simpler

		Chapter No.3 Name of the Chapter: Motion in a straight line	1.Position: location of an object at a specific time 2. Instantaneous velocity: Velocity of an object at a specific moment in time 3. Motion in 1D ,2D& 3D: Movement of an object along one, two or three axes respectively. 4. Frame of reference: a system of coordinates used to measure motion and position 5. Inertial frame of reference:A frame of reference in which object remains at rest or in uniform motion 6. Non inertial frame of reference: a frame of reference that is accelerating or deaccelerating 7. Relative velocity:VBA Velocity of an object B relative to an observer A 8. Point mass object: If an object cover distances much larger than its own size 9. Reaction time: Time which a person takes to observe, think and act 10. Hang Time: Time for which a person while jumping hangs in the air.
	May	Chapter No.4 Name of the Chapter: Motion in a plane	1.Scalars: those quantities which have only magnitudes but no direction. For example, mass 2. Vectors: those quantities which have magnitude as well as direction. For example, displacement, velocity, acceleration, force, momentum etc. 3. Unit vector: Unit vector of a given vector is a vector of unit magnitude and has the same direction as that of the given vector. 4. Equal vectors: have equal magnitude and same direction. 5. Negative vectors: vector of a magnitude but acting in opposite direction to thought of the given vector.

			6. Collinear vectors: Vectors acting along parallel straight lines7. coplanar vectors: Vectors acting in the same plane 8. localised Vectors: Whose initial point is fixed 9. Non localized vectors: whose initial point is not fixed10. Resultant vector: A single vector which produces the same effect as is produced by individual vectors together 11.Trajectory: The path a projectile takes through the air 12. Angle of projection: The angle between the initial velocity vector and the horizontal axis 13. Time of flight: The total time a projectile is in motion14. Maximum height: The highest vertical position along a projectile's trajectory 15. Horizontal range: The horizontal distance traveled by a projectile 16. Angular Displacement:It is defined as the angle turned by a rotating particle per unit time. 17. Angular Velocity: It is defined as the rate of change in angular displacement of a particle in a circular motion. 18. Angular Acceleration:It is defined as the rate of change of angular velocity of the rotating particle. 19. Centripetal acceleration: the acceleration of a body traversing a circular path. 20. Tangential acceleration: is the rate at which the velocity of an object changes while moving in a circular path. It's also known as linear acceleration.
		U.T.1 **(11th May)**	Chapter:2Units and Measurements Chapter:3 Motion in a straight line

	June	**Summer Break**	
	July	Chapter No. 5 Name of the Chapter: Laws of Motion	1.Inertia: inability of a body to change by itself 2. Apparent Weight: the perceived weight of an object, which can be different from its actual weight 3. Impulse:a sudden force equal to change in momentum 4. Concurrent forces: the forces acting at a point 5. Friction: opposing force when one bodies actually moving over the surface of another body or trying to move 6. Limiting friction: Maximum value of static friction 7. Centripetal force: foods required to move a body uniformly in a circle 8. Centrifugal force: reaction of centripetal force 9. Banking of road: Outer edge of the road is raised suitably above the inner edge 10. Equilibrium: A state where all forces acting on an object are balanced, resulting in no net force.11. Contact force: A force that acts when two objects are in direct contact. 12.Normal force: The force exerted by a surface perpendicular to the surface of contact. 13.Tension: The pulling force exerted by a string or rope.
		Chapter No.6 Name of the Chapter:Work,Power and Energy	1. Work done: The amount of energy transferred when a force acts on an object over a distance. 2. Force: A push or pull acting on an object. 3.Displacement: The change in position of an object.

			4. Kinetic energy: The energy possessed by an object due to its motion. 5. Potential energy: The energy stored in an object due to its position or configuration. 6. Gravitational potential energy: Potential energy stored due to an object's position in a gravitational field. 7. Elastic potential energy: Potential energy stored in a deformed elastic object. 8. Power: The rate at which work is done. 9. Joule (J): The SI unit of energy. 10. Watt (W): The SI unit of power. 11. Work-energy theorem: States that the net work done on an object is equal to the change in its kinetic energy. 12. Conservation of energy: The principle stating that energy cannot be created or destroyed, only transformed from one form to another. 13. Mechanical energy: The sum of kinetic energy and potential energy in a system. 14. Conservative field: what do this independent of the path followed by the body 15.Collisions: when a body strikes against another body,they are said to collide.
		U.T. 2 **(16th July)**	Chapter:4 Motion in a plane Chapter: 5 Laws of motion
	August	Chapter No.7 Name of the Chapter: System of particles and rotational motion	**1.Center of Mass:** The point where the entire mass of a system of particles is considered to be concentrated. **2.Torque:** A twisting force that causes rotation, calculated as the product of force and the perpendicular distance from the axis of rotation.

			3.Moment of Inertia: A measure of an object's resistance to rotational motion, similar to mass in linear motion, calculated as the sum of the product of each particle's mass and the square of its distance from the axis of rotation. **4.Angular Momentum:** The rotational equivalent of linear momentum, calculated as the product of the moment of inertia and the angular velocity. **5.Rotational Kinetic Energy:** The energy possessed by a rotating object, calculated as half the moment of inertia times the square of the angular velocity. 6.**Conservation of Angular Momentum:In the absence of external torques, the total angular momentum of a system remains constant.** **7.Angular Displacement:** **The angle through which an object rotates** **8.Rotational Kinematics:** **The study of the motion of rotating objects, including concepts like angular velocity, angular acceleration, and angular displacement.** **9.Rigid Body:** **A body that is considered to remain undeformed during motion, which is a useful idealization for many problems.**
		Chapter No.8 Name of the Chapter: Gravitation	**1.Newton's Law of Universal Gravitation:** This law states that every particle in the universe attracts every other particle with a force directly proportional to the product of their masses and inversely proportional to the square of the distance between their centers. **2.Gravitational Constant (G):**This is a fundamental constant in physics that appears in Newton's law of universal gravitation. It's value is G ≈ 6.674 × 10^-11 N m²/kg².

			3.Gravitational Potential Energy: This is the energy possessed by an object due to its position in a gravitational field. **4.Escape Velocity:**This is the minimum speed an object needs to escape the gravitational pull of a celestial body, meaning it will not be pulled back by the body's gravity. **5.Orbital Velocity:**This is the speed at which an object must travel to stay in a stable orbit around a celestial body.
		Half Yearly Syllabus	Chapter:2-8
	September	**Half Yearly Exam** **8th September**	
	October	Chapter No.9 Name of the Chapter: Mechanical Properties of solids	1. Stress: The force applied per unit area on a body. 2. Strain: The fractional change in length or volume of a body due to applied stress. 3. Elasticity: The property of a material to regain its original shape after a deforming force is removed. 4. Young's modulus: A measure of a material's stiffness, calculated as the ratio of stress to strain within the elastic limit. 5. Poisson's ratio: The ratio of lateral strain to longitudinal strain when a material is stretched. 6. Modulus of rigidity: A measure of a material's resistance to shearing stress. 7. Bulk modulus: A measure of a material's resistance to uniform compression. 8. Deforming force: The external force applied to a body causing deformation. 9.Plastic deformation: Permanent deformation of a material beyond its elastic limit. 10.Hooke's Law: A law stating that within the elastic limit, stress is directly proportional to strain. 11. Elastic potential energy: The energy stored in a deformed elastic material.

		Chapter No.10 Name of the Chapter:Mechanical Properties of fluids	**1.Pressure:** Pressure is the force exerted by a fluid per unit area, a fundamental property influencing fluid behavior. **2.Density:** Density is the mass of a fluid per unit volume, another key property that affects fluid behavior. **3.Viscosity:** Viscosity is a measure of a fluid's resistance to flow, essentially its "thickness" or internal friction. **4.Surface Tension:** Surface tension is the tendency of a liquid's surface to minimize its area, causing it to behave like a stretched membrane. **5. Pascal's Law:** This law states that pressure applied to an enclosed fluid is transmitted undiminished to every part of the fluid and the walls of the container. **6.Archimedes' Principle:**This principle states that the buoyant force on an object immersed in a fluid is equal to the weight of the fluid displaced by the object. **7.Bernoulli's Principle:**This principle describes the relationship between the speed, pressure, and height of a fluid in motion, stating that as fluid speed increases, pressure decreases. **8.Equation of Continuity:**This equation states that for a steady, incompressible flow, the mass flow rate (or volume flow rate) at any point in a pipe or channel is constant. **9.Atmospheric Pressure:** Atmospheric pressure is the pressure exerted by the Earth's atmosphere, a factor in many fluid mechanics problems. **10.Reynolds Number:** This dimensionless number helps predict the flow regime of a fluid (laminar or turbulent) based on the ratio of inertial forces to viscous forces.

			11.Stokes' Law: This law describes the force exerted on a small sphere moving through a viscous fluid, important for understanding the motion of small particles in fluids.
		U.T.3 **(21st October)**	Chapter: 9,10 & 11
	November	Chapter No. 11 Name of the Chapter:; Thermal Properties of matter	1. Temperature: A measure of the average kinetic energy of the particles in a substance, indicating how hot or cold it is. 2. Heat: The transfer of thermal energy between objects due to a temperature difference. 3. Specific heat capacity: The amount of heat required to raise the temperature of a unit mass of a substance by one degree Celsius. 4. Thermal expansion: The change in size of a substance when its temperature changes. 5. Linear expansion: The increase in length of a solid when heated. 6. Thermal conductivity: A material's ability to transfer heat through conduction. 7. Conduction: Heat transfer through direct contact between molecules. 8. Convection: Heat transfer through the movement of a fluid. 9. Radiation: Heat transfer through electromagnetic waves. 10. Calorimetry: The process of measuring the amount of heat transferred using the principle of heat exchange. 11. Coefficient of linear expansion: A constant that describes how much a material expands per degree Celsius increases in temperature. 12.Newton's law of cooling: A law stating that the rate of heat loss of a body is proportional to the temperature difference between the body and its surroundings.

		Chapter No.12 Name of the Chapter:Thermodynamics	1.System: The part of the universe under consideration. 2.Surroundings: Everything outside the system. 3.Thermal equilibrium: When there is no net flow of heat between two systems in contact. 4.Thermodynamic equilibrium: A system where all macroscopic properties remain constant over time. 5. Heat: Transfer of energy due to a temperature difference. 6. Work: Energy transferred by a force acting through a distance. 7. Internal Energy: The total energy stored within a system, including kinetic and potential energy of its particles. 8. First Law of Thermodynamics: States that the change in internal energy of a system is equal to the heat added to the system minus the work done by the system. 9. Adiabatic process: A process occurring without heat exchange with the surroundings. 10. Isothermal process: A process occurring at constant temperature.
	December	Chapter No.13 Name of the Chapter:Kinetic theory of gases	1. Kinetic energy: The energy a particle possesses due to its motion, which is directly proportional to its temperature in the kinetic theory of gases. 2. Average kinetic energy: The average kinetic energy of all particles in a gas at a given temperature. 3. Molecular speed: The speed at which individual gas molecules are moving. 4. Random motion: The unpredictable and constantly changing direction of movement of gas particles.5. Elastic collision: A collision where no kinetic energy is lost, meaning the particles bounce off each other with the same energy they had before the collision.

			6.Pressure: The force exerted by gas particles colliding with the walls of their container. 7.Temperature: A measure of the average kinetic energy of the particles in a gas. 8. Volume: The space occupied by a gas. 9.Maxwell-Boltzmann velocity distribution: A statistical distribution showing the range of velocities of gas molecules at a given temperature. 10.Law of equipartition of energy: A principle stating that the average kinetic energy per degree of freedom of a molecule is equal to 1/2 kT, where k is the Boltzmann constant and T is temperature. 11. Absolute zero: the lowest temperature possible. At a temperature of absolute zero there is no motion and no heat. Absolute zero occurs at a temperature of 0 kelvin, or -273.15 degrees Celsius, or at -460 degrees Fahrenheit. 12. The degrees of freedom: It refers to the number of ways a molecule in the gas phase may move, rotate, or vibrate in space. 13. Free path:The distance between two consecutive collisions.A straight path with a constant velocity. 14. Mean free path:The average path that molecules take between collisions.
		Chapter No.14 Name of the chapter: Oscillations	1. Oscillation-A single complete to-and-fro motion of an object about a fixed point. 2. Amplitude: The maximum displacement of an oscillating object from its mean position. 3. Time Period (T): The time taken to complete one oscillation. 4. Frequency (f): The number of oscillations completed per unit time.5. Simple Harmonic Motion (SHM): A type of oscillatory motion where the restoring force is directly proportional to the displacement from the mean position, resulting in a sinusoidal motion.

			6. Restoring Force: The force that acts to bring an object back towards its equilibrium position. 7. Mean Position: The equilibrium position of an oscillating object. 8.Displacement: The distance of an object from its mean position at any given time. 9.Phase: The state of an oscillating object at a particular time, often represented by an angle in the sinusoidal function. 10.Angular Frequency (ω): A measure of how fast an object oscillates, represented in radians per second. 11.Periodic Motion: Any motion that repeats itself after a fixed interval of time. 12.Damped Oscillations: Oscillations where the amplitude gradually decreases over time due to energy dissipation. 13. Undamped oscillations:Oscillations where the amplitude remains constant and is independent of time. 14. Spring constant of spring: define as force per unit extension or compression of the spring.
		Chapter No. 15 Name of the chapter: Waves	1. Wavelength: The distance between two consecutive crests (or troughs) of a wave. 2. Amplitude: The maximum displacement of a wave from its equilibrium position. 3. Frequency: The number of waves passing a fixed point per unit time, measured in Hertz (Hz). 4. Period: The time taken for one complete wavelength to pass a fixed point. 5. Wave speed: The distance traveled by a wave per unit time. 6. Crest: The highest point of a wave. 7. Trough: The lowest point of a wave. 8. Transverse wave: A wave where the vibrations are perpendicular to the direction of wave propagation (e.g., light waves).

			9. Longitudinal wave: A wave where the vibrations are parallel to the direction of wave propagation (e.g., sound waves). 10.Superposition principle: When two waves meet, the resultant wave is the sum of the individual waves at each point. 11.Interference: The phenomenon where two waves overlap, creating areas of constructive interference (increased amplitude)and destructive interference (decreased amplitude). 12. Nodes:Nodes are points on a standing wave where the wave has zero amplitude. 13. Antinodes: Points on a standing wave where the wave has maximum amplitude. Antinodes occur midway between nodes. 14. Beats:Two waves with similar frequencies moving in the same direction meet at a point. The interference of the sound waves creates beats.
		U.T.4 **(2nd December)**	Thermal Properties of Matter Thermodynamics
	January	**Revision & Preboard** **(2nd January,2027)**	
	February	Final Exam	
	March	Final Exam	

Maths	**April**	Ch- 1 SETS	Sets, Set builder form, Roaster form, subset, superset, power set, universal set, cardinal number, equal sets, equivalent sets ACTIVITY: To represent the operations using venn diagrams.
		Ch- 2 RELATION AND FUNCTIONS	Relation, cartesian product, domain, range, co-domain, function ACTIVITY: To understand relation & functions by mapping students to the subjects they are enrolled in.
		Ch- 4 COMPLEX NUMBERS AND QUADRATIC EQUATIONS	Complex numbers, conjugate, modulus, reciprocal, iota, additive inverse, multiplicative inverse ACTIVITY: To observe relationship between position of original number and its conjugate by plotting
	May	Ch-3 TRIGONOMETRIC FUNCTIONS	Trigonometry, degree, radian, (various trigonometric identities & properties) ACTIVITY: Relation between degree and radian
		Ch- 5 LINEAR INEQUALITIES	Inequality, linear inequality, linear inequality in one variable, solution set, strict inequality, slack inequality, solution ACTIVITY: To apply linear inequality in solving real life problem like preparing budget of birthday party
		U.T.1 **(11th May)**	Ch-1 Sets Ch -2 Relations & functions
	June	**Summer Break**	

	July	Ch- 6 PERMUTATIONS & COMBINATIONS	Permutation, factorial, combination, arrangement, alike, consecutive, repetition, consonants ACTIVITY: To understand permutation in real life scenario. Eg- You have bookshelf with space for 3 books. You have total of 5 books to choose from, but you need to arrange only three of them on shelf.
		Ch- 7 BINOMIAL THEOREM	Expansion, coefficient, successive, index, equidistant,binomial theorem, binomial expression, terms in binomial expansion ACTIVITY: Pascal triangle
		U.T. 2 **(10th July)**	Ch-3 Trigonometric functions
	August	CH-8 SEQUENCE & SERIES	Progression, sequence, series, geometric progression, arithmetic progression, arithmetic mean, geometric mean, finite series, infinite series. ACTIVITY: Hypothetical scenario(Bacteria culture doubling every hour)
		CH-14 PROBABILITY	Experiment, random experiment, outcome, sample space, sample point, event, equally likely outcome, mutually exclusive events, exhaustive cases, probability ACTIVITY: Tossing a coin once, twice, thrice, four times and noting the outcomes.
		Half Yearly Syllabus	CH - 1,2,3,4,5,6,7,8,14

	September	**Half Yearly Exam** **8th September**	
	October	Ch- 9 STRAIGHT LINES	Straight line, slope, intercept, collinear, inclination, equation of lines in various forms, distance formula, condition of concurrency, perpendicular distance, distance between parallel lines ACTIVITY: The pen & desk activity (parallel vs perpendicular)
		CH-10 CONIC SECTIONS	Conic sections, circles, ellipse, parabola, hyperbola, focus, directrix, eccentricity ACTIVITY: Provide students with equation of circle, ellipse, parabola, hyperbola and ask them to plot points and sketch graphs.
		U.T.-3 **(21st Oct)**	Ch-9 Straight lines
	November	Ch- 12 LIMITS & DERIVATIVES	Limit, left hand limit, right hand limit, existence of limit, derivative ACTIVITY: To show that limits exist in real world scenario like speed of car slowing down before stopping.
		Ch- 11 INTRODUCTION TO 3D	3d geometry, point, coordinate axes, coordinate plane, octants, centroid of triangle, mid point formula ACTIVITY: To help students visualise 3D coordinates using their body. Choose one student to be (0,0,0). Assign 3 students as x, y, z axis stretching their arms.

		Ch- 13 STATISTICS	Statistics, data, ungrouped data, grouped data, discrete, continuous, mean deviation, variance, standard deviation ACTIVITY: To calculate mean, variance and standard deviation from the test scores of 5 students in a class.
	December	**U.T.4** **(2nd December)**	Ch-12 Limits & Derivatives
	January	**Revision & Preboard** **(2nd January,2027)**	Full syllabus
	February	Final Exam	
	March	Final Exam	

Chemistry	**April**	Chapter No.1 Chapter: Some Basic Concepts of Chemistry.	1. **Chemistry:** Branch of science which deals with the study of composition, structure and properties of matter and the changes which the matter undergoes under different conditions and the laws which govern these changes. 2. **Elements:** They consist of only one type of atoms, they are simplest substances, cannot be broken into simpler substances. 3. **Compounds:** When two or more atoms of different elements combine together in a fixed ratio, the molecule of a compound is formed. 4. **Mixtures:** It contains particles of two or more pure substances which are present in any ratio, their composition is not fixed. 5. **Physical Properties:** Those properties which can be observed without changing the composition of a substance. 6. **Chemical properties:** Those properties which can be observed on changing the composition of a substance. 7. **Law of Constant Proportions:** A chemical compound is always found to be made up of the same elements combined together in the same fixed proportion by mass. 8. **Law of Multiple Proportions:** When two elements combine to form two or more chemical compounds, then the masses of one of the elements which combine with a fixed mass of the other, bear a simple ratio to one another.

			9. **Gay Lussac's Law of Gaseous Volumes:** When gases react together, they always do so in volumes which bear a simple ratio to one another and to the volumes of the products, if these are also gases, provided all measurements of volumes are done under similar conditions of temperature and pressure. 10. **Avogadro's Law:** Equal volumes of all gases under similar conditions of temperature and pressure contain equal number of molecules. 11. **Atomic mass:** average relative mass of its atoms as compared with an atom of carbon-12 taken as 12. 12. **Molecular mass:** Number of times the molecule of the substance is heavier than $1/12^{th}$ the mass of an atom of carbon-12 isotope. 13. **Mole:** A mole is a unit of measurement used to express amounts of a substance. It represents Avogadro's number, which is approximately 6.022×10^{23} particles (atoms, molecules, ions, etc.) of that substance. 14. **Empirical Formula:** The formula which represents the simplest whole number ratio of various atoms present in a compound. 15. **Molecular formula:** The formulae which shows the exact number of different types of atoms present in a compound. 16. **Limiting reagent:** the reactant which is entirely consumed when a reaction goes to completion. It is present in smaller amount

			than calculated by balanced chemical equation. 17. **Molarity:** Number of moles of solute dissolved per litre of solution. **Molarity = Moles of solute/ Volume of solution in litres or dm^3** 18. **Molality:** Number of moles of the solute per 1000 gram of the solvent. **Molality = Moles of solute/ Mass of the solvent in kg** 19. **Mole fraction of component:** Ratio of number of moles of a component to the number of moles of all the components. 20. **Stoichiometry of Chemical reactions:** One of the most important aspects of a chemical equation is that when it is written in the balanced form, it gives quantitative relationships between the various reactants and products in terms of moles, masses, molecules and volumes. This is called stoichiometry. The coefficient of the balanced chemical equation are called stoichiometric coefficient. Activity: To verify the law of conservation of mass. To understand mole as a unit for counting particles. Stoichiometry Puzzle.

	May	Chapter No. 2 Name of the Chapter: Structure of Atom	1. **Earlier Models of atoms:** Thomson's Model of Atom, Rutherford's Model, Bohr's Model of Atom. 2. **Isotopes:** Such atoms of the same elements having the same atomic number but different mass number. 3. **Isobars:** Such atoms of different elements having different atomic numbers but same mass numbers. 4. **Isotones:** Such atoms of different elements which contain the same number of neutrons. 5. **Isoelectronic**s: The species (atoms or ions) containing the same number of electrons. 6. **Wavelength:** distance between any two consecutive crests or troughs. 7. **Frequency:** number of waves passing through a point in one second. 8. **Velocity:** linear distance travelled by the wave in one second. 9. **Black body radiations:** If the substance being heated is a black body (which is a perfect absorber and perfect radiator of energy, i.e., which can emit and absorbs all frequencies), the radiations emitted is called black body radiation. 10. **Photoelectric effect:** When radiations with frequency greater than a certain minimum frequency strikes the surface of a metal, the electrons are ejected from the surface of the metal. This phenomenon is called

			photoelectric effect. The electrons emitted are called photoelectrons. 11. **Emission spectra:** when the radiation emitted from some source, e.g., from the sun or by passing electric discharge through a gas at low pressure or by heating some substance to high temperature etc. is passed directly through the prism and then received on the photographic plate, the spectrum obtained is called emission spectrum. 12. **Absorption spectra:** absorption spectrum is obtained when the white light is first passed through the substance and the transmitted light is analysed in the spectroscope. 13. **Absorption spectrum of hydrogen:** When hydrogen gas is taken in the discharge tube, series of lines obtained and the regions in which they lie are as under: **Lyman, Balmer, Paschen, Brackett, Pfund.** 14. **Zeeman Effect:** The splitting of spectral lines in strong magnetic field. 15. **Stark Effect:** The splitting of spectral lines in electric field. 16. **De Broglie Equation:** Every particle can be considered to be associated with a wavelength and wave properties. The wavelength of moving particles or objects can be calculated with the help of de Broglie equation. 17. **Heisenberg's Uncertainty Principle:** It is impossible to measure simultaneously the position and momentum of a small particle with absolute accuracy or certainty.

			18. **Orbital:** Three-dimensional space around the nucleus within which the probability of finding an electron of given energy is maximum. 19. **Quantum Numbers:** Set of four numbers with the help of which we can get complete information about all the electrons in an atom, i.e., location, energy, the type of orbital occupied, shape and orientation of that orbital, etc. 20. **Pauli Exclusion Principle:** No two electrons in an atom can have the same set of four quantum numbers. 21. **Aufbau Principle:** In the ground state of the atoms, the orbitals are filled in order of their increasing energies. 22. **Hund's Rule of Maximum Multiplicity:** Electron pairing in p, d and f orbitals cannot occur until each orbital of a given subshell contains one electron each or is singly occupied. Activity: To understand Bohr's atomic model and energy level (material required: Chart, circular diagrams). Act as Dalton, Thomson, Rutherford, and Bohr explaining their models. To study shapes of orbitals using Charts or 3D models. To learn the order of filling of orbitals. Conduct a competition where students arrange orbitals in correct order.
		U.T.1 **(11th May)**	Chapter-1 Chapter: Some Basic Concepts of Chemistry

	June	**Summer Break**	
	July	Chapter No. 3 Classification of Elements and Periodicity in Properties	1. **Modern Periodic Law:** The Physical and chemical properties of elements, are periodic functions of their atomic numbers. 2. **Periods:** The horizontal rows of periodic table. 3. **Groups:** The vertical columns of periodic table. **4. S-block Elements:** Elements in which the last electron enters the s-orbital of their respective outermost shells. **General outer shell electronic configuration of s-block elements: ns^{1-2} where n = 2-7.** 5. **P-Block Elements:** Elements in which the last electron enters any one of the three p-orbitals of their respective outermost shells**. General outer shell electronic configuration of p-block elements: ns^2np^{1-6} where n = 2-7.** 6. **d-Block Elements:** Elements in which the last electron enters any one of the five d-orbitals of their respective penultimate shells. **General outer shell electronic configuration of d-block elements: (n-1) d^{1-10} ns^{0-2}, where n = 4-7.** 7. f-Block Elements: Elements in which the last electron enters any one of the seven f-orbitals of their respective ante-penultimate shells. **General outer shell electronic configuration of f-block elements: (n-2) f^{0-14} (n-1) d^{0-2} ns^2 where n = 6-7.** 8. **Atomic radius:** The distance from the centre of the nucleus to the point upto which

			the density of the electron cloud (i.e., probability of finding the electron) is maximum. 9. **Covalent Radius: It** is defined as one-half the distance between the nuclei of two covalently bonded atoms of the same element in a molecule. 10. **Van der Waals radius:** It is defined as the one half the distance between the nuclei of two identical non-bonded isolated atoms or two adjacent identical atoms belonging to two neighbouring molecules of an element in the solid state. 11. **Metallic radius:** It is defined as one-half the internuclear distance between the two adjacent metal ions in the metallic lattice. 12. **Ionic radii:** Ionic radius may be defined as the effective distance from the centre of the nucleus of the ion upto which it exerts its influence on its electronic cloud. 13. **Ionization Enthalpy:** The minimum amount of energy required to remove the most loosely bound electron from an isolated gaseous atom so as to convert it into a gaseous cation. 14. **Successive ionization enthalpies:** The ionization enthalpies required to remove first, second, third etc. electrons from an isolated gaseous atom. 15. **Electron gain Enthalpy:** Energy released when a neutral isolated gaseous atom accepts an extra electron to form the gaseous negative ion, i.e., anion.

			16. **Electronegativity:** Tendency of its atom to attract the shared pair of electrons towards itself in a covalent bond. 17. **Periodicity in properties:** The repetition of similar properties after a definite interval. 18. **Representative Elements:** the element of group 1 (alkali metals), group 2 (alkaline earth metals) and group 13 to 18 constitute the representative elements. They are elements of s-block and p-block. 19. **Screening effect:** The decrease in force of attraction exerted by nucleus on valency electrons due to presence of electrons in inner shells. 20. **Diagonal relationship:** Some elements of the second period show similarities with the elements of the third period placed diagonally to each other, though belonging to different groups. For example, lithium (of group 1) resembles magnesium (of group 2) and beryllium (of group 2) resembles aluminium (of group 13) and so on. Activity:To understand the arrangement of elements based on atomic number. Students are given shuffled element cards and ask to arrange them in correct order in a blank periodic table. Conduct a quiz with questions related to groups, periods, and properties.
		Chapter: 4 Chemical Bonding and Molecular Structure	1. **Chemical Bond:** The force which holds the atoms together within a molecule.

			2. **Electrovalent or Ionic Bond:** When a bond is formed by complete transference of electrons from one atom to another. 3. **Covalent Bond:** The bond is formed between the two atoms by mutual sharing of electrons between them. 4. **VSEPR Theory (Valence Shell Electron Pair Repulsion Theory):** The electron pairs surrounding the central atom repel one another and move so far apart from one another that there are no further repulsions between them. As a result, the molecule has minimum energy and maximum stability. 5. **Bond Length:** average distance between the centres of the nuclei of the two bonded atoms in a molecule corresponding to minimum energy and maximum stability. 6. **Valence Bond theory of covalent bond: In terms of lowering of energy:** when two atoms approach each other, new forces of attraction and repulsion come into play (electron-nuclei, electron-electron and nuclei-nuclei). If forces of attraction are greater than forces of repulsion, energy is released and a bond is formed. If forces of repulsion are greater, no bond is formed. **In terms of orbital overlap:** A covalent bond is formed by partial overlap of two half-filled atomic orbitals containing electrons with opposite spins. There may be s-s overlap or s-p overlap or p-p overlap. **7. Bond Angle:** The angle between the lines representing the directions of bonds, i.e., the orbitals containing the bonding electrons.

			8. **Dipole moment:** The product of magnitude of negative or positive charge (q) and the distance (d) between the centres of positive and negative charges is called dipole moment. 9. **Hybridization:** mixing of the atomic orbitals belonging to the same atom but having slightly different energies so that a redistribution of energy takes place between them resulting in the formation of new orbitals of equal energies and identical shapes. 10. **Types Of hybridization:** The type of hybridization depends upon the number and types of orbitals mixed together. Thus, we have sp, sp^2, sp^3, dsp^2, sp^3d, d^2sp^3 and sp^3d^3 etc. 11. **Coordinate or Dative Bond:** When in the formation of a bond, the electron pair (lone pair) is donated by one atom but shared by both the atoms so as to complete their octets, the bond formed is called coordinate bond or dative bond. 12. **Resonance:** In case of certain molecules, a single Lewis structure cannot explain all the properties of the molecule. The molecule is then supposed to have many structures, each of which can explain most of the properties of the molecule but none can explain all the properties of the molecule. The actual structure is in between of all these contributing structures and is called resonance hybrid and the different individual structures are called resonating structures or canonical forms. This phenomenon is called resonance.

			13. **Resonance Energy:** The difference in the energy of the resonance hybrid and the most stable contributing structure (having least energy). 14. **Sigma Bond:** The bond which is formed by the head on overlapping of half-filled atomic orbitals along the inter nuclear axis. 15. **Pi Bond:** The bond which is formed by the sideways or lateral overlapping of half-filled atomic orbitals in a direction perpendicular to the inter-nuclear axis. 16. **Molecular Orbital Theory:** molecular orbital gives electron probability distribution around a group of nuclei in a molecule. They are filled in the same way as atomic orbitals. Molecular orbitals are formed by linear combination of atomic orbitals. 17. **Bonding Molecular Orbital:** A molecular orbital that is formed by addition overlap (i.e., when the lobes of atomic orbitals overlap with the same sign) of two atomic orbitals. 18. **Anti-bonding Molecular Orbitals:** A molecular orbital which is obtained by the subtraction overlap (i.e., when the lobes of atomic orbitals overlap with the opposite sin) of two atomic orbitals. 19. **Bond order:** half of the distance between the number of electrons present in the bonding and the antibonding orbitals. 20. **Hydrogen Bonding:** When a molecule contain H-atom linked to a highly electronegative atom small in size (F, O, N), this atom attracts the shared pair electrons more and acquires slight negative charge

			while H atom acquires slight positive charge. The -ve end of one molecule then attract the +ve end of the other molecule. As a result, a weak bond is formed between them. This called hydrogen bond. Activity: To understand the formation of different types of chemical bonds (ionic and covalent) and visualise molecular shapes using models. (with the help of clay or thermocol balls, toothpicks or sticks, chart paper) The hybridisation Card Game activity.
		U.T. 2 **(10th July)**	Chapter-2 Structure of Atom Chapter-3 Classification of Elements and Periodicity in Properties
	August	Chapter No. 5 Name of the Chapter: Chemical Thermodynamics	1. **Thermodynamics:** The branch of science which deals with the study of different forms of energy and the quantative relationship between them. 2. **System:** The part of the universe chosen for thermodynamic consideration. 3. **Surroundings:** The remaining portion of the universe, excluding the system. 4. **Open system:** The system which can exchange matter and energy with surrounding. 5. **Closed System:** It can exchange energy but not matter with surrounding. 6. **Isolated System:** It can neither exchange energy nor matter with the surroundings.

			7. **State function:** A physical quantity is said to be state function if its value depends upon the state of the system and does not depend upon the path by which this state has been attained. 8. **Extensive properties:** These are those which depend upon the quantity of the matter contained in the system. 9. **Intensive properties:** These are those properties which depend only upon the nature of the substance and are independent of the amount of the substance present in the system. 10. **Internal Energy:** It is the sum of all the forms of energies that a system can possess. 11. **First Law of Thermodynamics:** It states that energy can neither be created nor be destroyed. The total energy of universe remains constant. The energy of a system that is isolated from its surroundings is constant. 12. **Enthalpy:** It is defined as total heat content of the system. It is equal to the sum of internal energy and pressure-volume work. 13. **Bond Enthalpy:** amount of energy released when one mole of bonds are formed from the isolated atoms in the gaseous state or the amount of energy required to dissociate one mole of bonds present between the atoms in the gaseous molecules. 14. **Heat Capacity:** amount of heat required to raise the temperature of the system through 1°C.

			15. **Thermochemical Equations:** When a balanced chemical equation not only indicates the quantities of the different reactants and products but also indicates the amount of heat evolved or absorbed. 16. **Calorific value:** amount of heat in calories or joules produced from the complete combustion if one gram of the fuel or the food. 17. **Hess's Law of constant heat summation:** The total amount of heat evolved or absorbed in a reaction is the same whether the reaction takes place in one step or in a number of steps. 18. **Entropy:** measure of randomness or disorder of the system. 19. **Gibbs free energy:** maximum amount of energy available to a system during the process that can converted into useful work. 20. **Second Law of Thermodynamics:** The entropy of the universe is continuously increasing. Activity: To observe a reaction that releases heat to the surroundings. To observe a process that absorbs heat from the surroundings. To understand entropy as a measure of molecular disorder. To identify spontaneous Process.

		Chapter No. 6 Name of the Chapter: Equilibrium	1. **Equilibrium:** The state of a process in which the properties like temperature, pressure, concentration of the system do not show any change with the passage of time. 2. **Physical Equilibrium:** If the opposing processes involve only changes in physical state. 3. **Chemical Equilibrium:** The state at which there is no further change in the concentration of reactants and products. 4. **Henry's Law:** The mass of gas which is dissolved by a given mass of a liquid at constant temperature is directly proportional to the pressure of the gas, above the solvent. 5. **Equilibrium Constant:** Ratio of the products of the molar concentration of the substances produced to that of reacting substances raised to the power equal to the number of molecules of the substance in the balanced equation. 6. **Reaction Quotient:** Ratio of product of molar concentration of products to the product of molar concentration of reactants at any stage of reaction. 7. **Reversible reactions:** A reaction in which not only the reactants react to form the products under certain conditions but also the products react to form reactants under the same conditions. 8. **Law of mass action:** The rate at which a substance reacts is proportional to its active mass and hence the rate of a chemical reaction is proportional to the product of the active masses of the reactants.

			9. **Homogenous Equilibria:** When in an equilibrium reaction, all the reactants and the products are present in the same phase. 10. **Heterogenous** Equilibria: When in an Equilibrium reaction, the reactants and the products are present in two or more than two phases. 11. **Le Chatelier's Principle:** If a system in equilibrium is subjected to a change of concentration, temperature or pressure, the equilibrium shifts in a direction that tends to undo the effect of the change imposed 12. **Degree of dissociation or degree of ionization:** The fraction of the total number of molecules which dissociated into ions. 13. **Electrolyte:** A substance which dissociates into ions either in aqueous solution or in molten state. 14. **Arrhenius concept of Acids and Bases:** An acid is defined as a substance which contain hydrogen and which when dissolved into water gives hydrogen ions, A base is defined a s a substance which contains hydroxyl groups and which when dissolved in water gives hydroxide ions. 15. **Bronsted-Lowry Concept of Acids and Bases:** An acid is defined as a substance which has the tendency to give a proton a base is defined as a substance which has a tendency to accept a proton. 16. **Lewis concepts of Acids and Bases:** An acid is defined as substance (atom, ion or molecule) which is capable of accepting a pair of electrons and a base is defined as a

			substance which I capable of donating an unshared pair of electrons.' 17. **Ionic product of water:** Product of the molar concentration of H^+ ions and OH^- ions. 18. **pH:** pH may be defined as negative logarithm of hydronium ion concentration. 19. **Solubility product:** Product of the molar concentration of its ions in a saturated solution, each concentration raised to the power equal to the number of ions produced on dissociation of one molecule of the electrolyte. 20. **Common ion effect:** If to an ionic equilibrium, $AB \leftrightarrow A^+$ and B^-, a salt containing a common ion (e.g., AC or BD) is added, the equilibrium shifts in the backward direction. 21. **Buffer Solution:** A Solution which resists any change in its pH value (i.e., whose pH remains practically constant) even when a small amounts of the acid or the base are added to it. Activity: To Study the effect of change in concentration on equilibrium. To show buffer solution resists change in pH.
	September	**Half Yearly Exam** **8th September**	Chapter 1 to 6
	October	Chapter No. 7 Redox Reactions	1. **Redox reactions:** Those reactions in which oxidation and reduction takes place simultaneously.

			2. **Oxidation:** process in which one or more electrons are lost 3. **Reduction:** process in which one or more electrons are gained. 4. **Oxidation number of an element:** Charge which an atom of the element has in its ion or appears to have when present in the combined state with other atoms. 5. **Oxidation in terms of Oxidation number:** chemical change in which there occurs an increase in the oxidation number of an atom or atoms. 6. **Reduction in terms of Oxidation number:** chemical change in which there occurs a decrease in the oxidation number of an atom or atoms. 7. **Combination reaction:** A reaction in which two atoms or molecules combine together to form a third molecule. 8. **Decomposition reaction:** A reaction in which a molecule breaks down to form two or more components. 9. **Displacement reaction:** A reaction in which an atom or ion in a compound is replaced by an atom or ion of some other element. 10. **Disproportionation reaction:** A reaction in which the same species is simultaneously oxidized as well reduced. 11. **Electrochemical cell:** device to convert chemical energy produced in an indirect redox reaction into electrical energy.

			12. **Electrode potential:** The tendency of an electrode to lose or gain electrons. 13. **Oxidation Electrode:** the electrode at which oxidation (loss of electrons) occurs. 14. **Reduction Electrode:** The electrode at which reduction (gain of electrons) occurs. 15. **Electrochemical series**: The series of elements which have been arranged in the decreasing order of their reduction potential, i.e., reducing power goes on increasing, whereas oxidizing power goes on decreasing. Activity: To demonstrate the metal activity series using a redox reaction. To understand corrosion in terms of redox reaction. To understand redox reactions in Electrochemical cells.
		Chapter No. 8 Name of the Chapter: Organic Chemistry:Some Basic Principles and Techniques	1. **Organic Compounds:** Those compounds which contain carbon essentially, hydrogen mostly along with oxygen, nitrogen, sulphur, phosphorus and halogens. 2. **Organic Chemistry:** Chemistry of carbon compounds containing usually hydrogen and one or more additional elements like oxygen, nitrogen, sulphur, halogens, phosphorus, etc. 3. **Functional group:** an atom or a group of atoms present in a molecule which largely determines its chemical properties. 4. **Isomerism:** Two or more compounds having the same molecular formula but different chemical and physical properties.

			5. **Structural isomerism:** Compounds having the same molecular formula but different structures, i.e., different arrangement of atoms within the molecule are called structure isomers and the phenomenon is called structural isomerism. 6. **Stereoisomerism**: Those compounds that have the same composition and sequence of covalent bonds 7. **Reaction mechanism:** A sequential account of each step, describing details of electron movement, energetics during bond cleavage and bond formation, and the rates of transformation of reactants into products. 8. **Heterolytic cleavage:** The bonds breaks in such a manner that the shared pair of electrons remains with one of the atom or group of atoms which becomes negative charge and other becomes positively charged. 9. **Homolytic Bind Fission:** When a covalent bond breaks in such a way that each of the two atoms takes away one electron each. 10. **Electrophiles:** It is positively charged or neutral species which is electron deficient. 11. **Nucleophile:** It is negatively charged or neutral species with a lone pair of electrons. 12. **Inductive Effect:** The displacement of sigma electrons along a saturated carbon chain whenever an electron withdrawing (or electron donating) group is present at the end of the chain.

			13. **Electromeric Effect:** It involves the complete transfer of electrons of a multiple bond (double or triple bond) to one of the bonded atoms (usually more electronegative) in presence of an attacking reagent. 14. **Resonance Energy:** The difference in energy between the actual structure of resonance hybrid and the most stable structures having lowest energy. 15. **Resonance Effect:** The transfer of electrons from one part of conjugated system to the other due to the phenomenon of resonance. 16. **Hyperconjugation:** It is an electronic interaction, occurring between a double bond in a compound and carbon- hydrogen single bond in an attached alkyl group. Under certain circumstances, the double bond and the single C-H bond appear to behave rather like conjugated double bonds. Greater the number of alkyl groups, greater will be the hyperconjugation. 17. **Carbocations:** Chemical species bearing a positive charge on carbon and carrying six electrons in its valence shell. 18. **Carbanions:** Chemical species bearing a negative charge on carbon and possessing eight electrons in its valence shell. 19. **Free Radicals:** atom or a group of atoms having an odd or unpaired electron. 20. **Crystallization:** it is used to purify organic solids by dissolving them in a suitable solvent followed by filtration of hot solution and

			keeping the hot filtered solution undisturbed for crystals to grow. 21. **Distillation:** This method is used to separate(a) Volatile liquids from non-volatile impurities. (b) Liquids having sufficient difference in their boiling points. 22. **Chromatography:** The technique of separating the components of a mixture in which separation is achieved by the differential movement of individual components through a stationary phase under the influence of a mobile phase. Activity: “Electronic Tug-of-war” (Inductive effect) . To understand electronegativity, bond polarity, and the inductive effect. To understand tetravalency of carbon using ball and stick model.
		U.T.3 **(21st October)**	Chapter- 7 Redox Reactions Chapter-8 Organic Chemistry: Some Basic Principles and Techniques
	November	Chapter No. 9 Hydrocarbons	1. **Hydrocarbon:** A compound of carbon and hydrogen. 2. **Alkanes:** They are saturated hydrocarbons with general formula C_nH_{2n+2}, where ‘n’ is equal to 1, 2, 3, 4, …., e.g., CH_4, C_2H_6. 3. **Decarboxylation:** The process of removal of a molecule of CO2 from an organic compound. 4. **Conformation:** The infinite number of momentary arrangements of the atoms in space which result through rotation about a single bond.

			5. **Torsional strain:** The repulsive interaction between the electron clouds which affects the stability of a conformation. 6. **Dehydrohalogenation:** The process of removal of a molecule of a halogen halide (HCl, HBr or HI) from a haloalkane to form an alkene. 7. **Markovnikov's rule:** The addition of unsymmetrical reagents such as HX, H2O, HOX, etc. to unsymmetrical alkenes occurs in such a way that the negative part of addendum (i.e., adding molecule) goes to that carbon atom of the double which carries lesser number of hydrogen atoms. 8. **Anti-Markovnikov's rule:** In presence of peroxides such as benzoyl peroxide, the addition of HBr (but not of HCl or HI) to unsymmetrical alkenes occurs contrary to the Markovnikov's rule. 9. **Geometrical isomerism:** Stereoisomerism which have the same structural formula but differ in the spatial arrangement of atoms around double bond. 10. **Cis and trans isomer:** The isomer in which the two similar atoms/groups lie on the same side of the double bond is called cis-isomer. The isomer in which the two similar/groups lie on the opposite sides of the double bond is called trans -isomer. 11. **Polymerization reactions:** Polymerization is a process in which a large number of simple molecules combine to form a big molecule. The simple molecules are called monomers.

			12. **Directive influence of groups:** The ability of a group already present in the benzene ring to direct the incoming group to a particular position. Activity: Listing household items (plastic, gasoline, wax, pani etc.) and identifying which hydrocarbon type (alkane, alkene, benzene derivative) they originate from. To study addition reactions in alkenes using bromine water. To study oxidation of hydrocarbons.
	December	**U.T.4** **(2nd December)**	Chapter-9 Hydrocarbons
	January	**Revision & Preboard** **(2nd January,2027)**	Full Syllabus
	February	Final Exam	
	March	Final Exam	
Biology	**April**	**Chapter No. -1** **The Living World**	1. **Nomenclature:** The process of naming an organism such that it is known by the same name all over the world is known as nomenclature. 2. The taxonomic hierarchy consists of the following groups: Species → Genus → Family → Order → Class → Phylum/Division → Kingdom. 3. **Classification** – it is the process of assigning creatures in specific classes or groups considering some defined characters. These groups are known as taxa

			4. **Taxonomy** – it is the process of identification, nomenclature and organisation of life forms considering the inner and outer cell structure, biological data and advancement process 5. **Systematics** – investigating life forms in association with identification, nomenclature, arrangement and evolutionary correspondence. Linnaeus used Systema Naturae as the title of his publication **6. Taxonomic Categories- It depicts the rank or level in the hierarchical arrangement in ascending order. The seven mandatory categories as listed below:** **Kingdom > Division > Class > Order > Family > Genus > Species** 7. Kingdom – includes different phyla of animals and different plant divisions. 8. Division/Phylum – incorporates related classes as a division in plants and phylum in animals 9. Class – Many orders related to each other are incorporated into a class. 10. Order – includes a few related families 11. Family – it is an assembly of related genera 12. Genus – a gathering of related animal categories having similar characters 13.Species – the essential unit in classification, species refers to the individuals from any animal group that are firmly related, obtained from a typical ancestor which can interbreed to produce offsprings which are fertile themselves.

		Chapter No.- 2 **Biological Classification**	1. **Heterocyst:** Heterocysts are specialised cells found in eubacteria (true bacteria) that help in fixing atmospheric nitrogen. Example – *Nostoc* and *Anabaena*. 2. **Planktons:** Planktons are minute microscopic organisms that are found floating passively with the water currents. 3. **Dikaryon:** Dikaryon is an intervening stage found in fungi where two compatible fungi hyphae fuse together to form a condition of n+n, i.e., two nuclei in one cell. Normally, the nuclei fuse together to give rise to diploid cells, but sometimes an intervening dikaryon is formed that eventually fuses to become a diploid cell. 4. **Viroids:** Viroids are small infectious agents that have a free RNA that is devoid of any protein coat. It is smaller than a virus, has a low molecular weight and was first discovered when it caused potato spindle tuber disease. 5. **Zoospore:** Zoospores are motile, asexual and flagellated structures that help in locomotion and asexual reproduction in fungi. 6. **Aplanospore:** Aplanospores are asexual, non motile spores. They do not have flagella. 7. **Types of Gametic Fusion** ● **Isogamy:** The gametes that fuse are similar in shape, size and all other characteristics. ● **Anisogamy:** The gametes are totally dissimilar from each other in every aspect. ● **Oogamy:** It is a specific type of fusion where the female gamete is large and

			non-motile and the male gamete is small and motile.
		Chapter No.-3 **Plant Kingdom**	1. **Artificial system-** based on only a few morphological characteristics, e.g. **Linnaeus** classified plants based on the structure and number of stamens present. 2. **Natural system-** based on morphological as well as anatomical characters such as cellular ultrastructure, embryology, phytochemistry, etc. Examples include **Bentham and Hooker** classification, they divided plants based on the presence and absence of flowers and seeds into Phanerogamia and Cryptogamia respectively. 3. **Phylogenetic system-** based on evolutionary and genetic relationship of plants, e.g. **Whittaker** 4. **Numerical taxonomy-** a statistical method using computers, gives equal importance to various different characters 5. **Cytotaxonomy-** based on cytological information such as chromosome structure, number, etc. 6. **Chemotaxonomy-** based on chemical constituents **7. Antheridium and Archegonium:** Antheridium and archegonium are male and female sex organs found in bryophytes, respectively. 8. **Sporophylls:** Sporophylls are structures found in pteridophytes that bear sporangia on leaf-like appendages. 9. **Prothallus:** The thalloid, heart shaped gametophytic body found in pteridophytes is known as prothallus. It is heart-shaped, haploid and bears both the antheridium and archegonium.

			10. **Strobili/Cones:** Strobili or cones are reproductive structures that are borne on bryophytes. 11. **Embryo Sac:** Embryo sac is a 7-celled and 8-nucleated structure that is found in the ovary of angiosperms.
	May	**Chapter No.-4** **Animal Kingdom**	1. **Metamerism:** In animals, the body is externally and internally divided into segments with repetition of organs, this phenomenon is known as metamerism. For example, earthworms. 2. **Metagenesis:** The alternation of generation between polyp and medusa in cnidarians is referred to as metagenesis. 3. **Monoecious & Dioecious:** In animals, monoecious organisms are those that reside both the male and female sex organs in the same body. They are also known as hermaphrodites. Conversely, dioecious animals are those that have separate sexes. . 4. **Notochord:** Notochord is a mesodermally derived solid structure that separates the alimentary canal from the nerve cord. Animals that possess the notochord are known as chordates and those that do not have a notochord are referred to as non-chordates. 5. **Cellular level of organisation:** cells arranged as loose aggregates, present in Porifera (sponges) 6. **Tissue level of organisation:** cells performing the same function form tissues, present in coelenterates 7. **Organ level of organisation:** tissues grouped together to form an organ, which performs particular function, e.g. Platyhelminthes 8. **Organ system level of organisation:** afew organs coordinatively perform a

			certain physiological function, e.g. Annelids, Arthropods, Molluscs, Echinoderms and Chordates 9. **Open circulatory system:** cells and tissue directly receive the blood pumping out of the heart 10. **Closed circulatory system:** blood is circulated through arteries, veins and capillaries 11. **Diploblastic:** embryo with two germinal layers called external ectoderm and internal endoderm, e.g. Porifera, Cnidaria 12. **Triploblastic:** embryo with three germinal layers, mesoderm between ectoderm and endoderm, e.g. Platyhelminthes to Chordates 13. **Asymmetrical:** no line of symmetry in the body, e.g. sponges 14. **Radial symmetry:** any plane passing through centre divides the body in two symmetrical halves, e.g. coelenterates, ctenophores 15. **Bilateral symmetry:** a plane divides the body in symmetrical left and right halves, e.g. annelids, arthropods, etc. 16. Echinoderms exhibit radial as well as bilateral symmetry at different stages of their life 17. Body cavity between the body wall and gut wall, lined by mesoderm is called **coelom** 18. **Acoelomates:** body cavity is absent, e.g. Platyhelminthes 19. **Pseudocoelomates:** mesoderm is present as scattered pouches, e.g. Aschelminthes 20. **Coelomates:** having coelom (body cavity) e.g. from Annelida to Chordata 21. Earthworm's body shows metameric segmentation 22. Animals with notochord are called chordates, animals without notochord are

			called non-chordates, e.g. Porifera to Echinodermata.
		Chapter No.-5 **Morphology of Flowering Plants**	1. **Morphology**: The branch of biology that deals with the study of the structure and form of organisms, including plants. 2. **Root**: The underground part of a plant that anchors it to the soil, absorbs water and minerals, and stores food. 3. **Taproot**: A primary root that grows thick and deep, giving rise to lateral roots (e.g., radish, carrot). 4. **Fibrous Root**: A type of root system in which numerous thin roots arise from the base of the stem (e.g., grasses). 5. **Stem**: The central axis of a plant that supports leaves, flowers, and fruits and conducts water, nutrients, and food. 6. **Node**: The region of the stem where leaves, branches, or flowers are attached. 7. **Internode**: The segment of the stem between two nodes. 8. **Leaf**: The flattened structure of a plant responsible for photosynthesis and gas exchange. 9. **Petiole**: The stalk that connects the leaf to the stem. 10. **Laminar**: The broad, flat part of the leaf where photosynthesis takes place. 11. **Veins**: The vascular structures within the leaf that transport water, nutrients, and food. 12. **Venation**: The pattern of veins in the leaf, which can be parallel, reticulate, or dichotomous. 13. **Inflorescence**: The arrangement of flowers on a plant stem. 14. **Flower**: The reproductive organ of angiosperms that contains male (stamen) and female (pistil) reproductive structures.

			15. **Calyx**: The outermost whorl of a flower, made up of sepals, which protect the developing flower. 16. **Corolla**: The second whorl, consisting of petals, which attract pollinators. 17. **Androecium**: The male reproductive organ of a flower, consisting of stamens that produce pollen. 18. **Gynoecium**: The female reproductive organ of a flower, consisting of carpels (or pistils), which contain the ovary, style, and stigma. 19. **Stamen**: The male reproductive part of a flower, made up of the anther (which produces pollen) and filament. 20. **Pistil (Carpel)**: The female reproductive part of a flower, which includes the stigma (for receiving pollen), style (a tube-like structure), and ovary (contains the ovules). 21. **Pollination**: The transfer of pollen from the anther to the stigma, enabling fertilization. 22. **Fertilization**: The process in which male gametes (sperm) fuse with female gametes (egg) to form a zygote. 23. **Fruit**: The mature ovary of a flower that contains seeds. 24. **Seed**: The fertilized and matured ovule, which contains the embryo plant and is capable of germination. 25. **Monocot**: A type of angiosperm with one cotyledon (seed leaf) (e.g., grasses, lilies). 26. **Dicot**: A type of angiosperm with two cotyledons (seed leaves) (e.g., roses, beans). 27. **Complete Flower**: A flower that has all four whorls—calyx, corolla, androecium, and gynoecium.

			28. **Incomplete Flower**: A flower missing one or more whorls, like only having calyx and corolla but not androecium or gynoecium. 29. **Unisexual Flower**: A flower that contains either male (stamens) or female (pistils) reproductive organs, not both. 30. **Bisexual Flower**: A flower that contains both male (stamens) and female (pistils) reproductive organs. 31. **Accessory Structures**: Extra parts of a plant that assist in reproduction, such as petals and sepals. 32. **Pollinators**: Organisms, like insects or birds, that assist in the transfer of pollen from one flower to another. 33. **Perianth**: The collective term for the calyx and corolla. 34. **Chasmogamous Flowers**: Flowers that open to allow pollination. 35. **Cleistogamous Flowers**: Flowers that do not open and self-pollinate.
		U.T.1 **(11th May)**	**CH-1, THE LIVING WORLD** **CH-2, BIOLOGICAL CLASSIFICATION,** **CH-3, PLANT KINGDOM**
	June	**Summer Break**	
	July	**Chapter No.-6** **Anatomy of Flowering Plants**	**Anatomy**: The branch of biology that deals with the internal structure of organisms, including plants. 2. **Tissues**: A group of cells that are similar in structure and work together to perform a specific function.

			3. **Cuticle**: A waxy, protective layer covering the epidermis of leaves and stems, which helps in reducing water loss. 4. **Epidermis**: The outermost layer of cells that covers the plant body. It protects the plant and helps in water retention. 5. **Stomata**: Pores present in the epidermis of leaves and stems, through which gas exchange (CO_2 and O_2) and transpiration (water vapor loss) occur. 6. **Guard Cells**: Specialized cells that surround each stoma and control its opening and closing to regulate water loss and gas exchange. 7. **Cortex**: The region of a plant between the epidermis and the vascular tissue, involved in storage and sometimes in the conduction of water and nutrients. 8. **Endodermis**: The innermost layer of the cortex in roots, which controls the flow of water and dissolved substances into the vascular bundle. 9. **Vascular Bundles**: Bundles of xylem and phloem tissues responsible for the transport of water, nutrients, and food throughout the plant. 10. **Vascular Cylinder**: The central region of a root or stem that contains vascular tissues (xylem and phloem). 11. **Cambium**: A type of lateral meristem that is responsible for the secondary growth of the plant, forming new xylem and phloem cells. 12. **Heartwood**: The central, older, and non-functional part of a woody stem, providing support.

			13. **Sapwood**: The outer part of the wood, which is active in the conduction of water and minerals. 14. **Pericycle**: A layer of cells in the root, just inside the endodermis, from which lateral roots arise. 15. **Pith**: The central region of stems, made up of parenchyma cells that store food. 16. **Ray Cells**: Cells that form radial rows in the xylem and phloem, helping in the lateral transport of water and nutrients. 17. **Lenticels**: Small, spongy openings in the bark of stems and roots that allow gas exchange. 18. **Secondary Growth**: The growth in thickness of a plant, primarily occurring in woody plants due to the activity of the cambium. 19. **Collenchyma**: Tissue that provides mechanical support to growing parts of the plant and is found in the petioles and young stems. 20. **Sclerenchyma**: Dead tissue that strengthens and supports the plant, containing lignin in its cell walls. 21. **Phloem Parenchyma**: Parenchyma cells present in the phloem that assist in the storage and transport of food. **22. Exarch and Endarch:** The xylem that is formed before is known as protoxylem and the one that is formed later is referred to as metaxylem. On the basis of arrangement of protoxylem and metaxylem there are two types of vascular bundles – endarch and exarch. **23. Endarch** is the condition when the protoxylem is situated at the centre and the

			metaxylem is situated at the periphery, normally seen in plant stems. **24. Exarch** condition is observed when the protoxylem is present at the periphery and metaxylem is present in the centre as seen in plant roots. **25. Conjoint Vascular Bundle:** When the xylem and phloem lie on the same radius, they are referred to as conjoint vascular bundles. If cambium is found between the xylem and phloem, they are referred to as an open-type bundle. On the other hand, if cambium is absent between the xylem and phloem, it is referred to as a closed bundle. **26. Adaxial and abaxial:** When epidermis is found on the upper surface of leaves, it is considered as the adaxial surface. On the other hand, when epidermis is found on the lower surface of leaves, it is referred to as the abaxial surface. **27. Bark:** Bark is a non-technical term for the layer present beyond vascular cambium. It includes secondary phloem and periderm (it consists of phellogen, phelloderm and phellem).
		Chapter No.-7 **Structural Organisation in Animals**	**Epithelial Tissue** Definition**: Epithelial tissues are layers of cells that cover the body surface, line cavities, and form glands.** ● **Example in Frogs**: The skin of the frog is made of epithelial tissue, which helps in protection and absorption. **2. Connective Tissue** ● **Definition**: Connective tissue supports, binds, and connects other tissues or organs.

			• **Example in Frogs**: Blood, bone, cartilage, and lymph are types of connective tissues in frogs.
			
			3. Muscle Tissue
			• **Definition**: Muscle tissue is responsible for movement and contraction.
			• **Types in Frogs**:
			  ○ **Skeletal Muscle**: Voluntary muscles that help in locomotion.
			  ○ **Smooth Muscle**: Involuntary muscles found in organs.
			  ○ **Cardiac Muscle**: Muscles that make up the heart.
			
			4. Nervous Tissue
			• **Definition**: Nervous tissue conducts electrical impulses for coordination and response.
			• **Example in Frogs**: The brain, spinal cord, and nerves are made of nervous tissue that help in the frog's response to stimuli.
			
			5. Integumentary System
			• **Definition**: This refers to the skin and its structures.
			• **Example in Frogs**: The skin helps in respiration (cutaneous respiration), excretion, and protection.
			
			6. Digestive System
			• **Components in Frogs**:
			  ○ **Mouth**: Intake of food.
			  ○ **Esophagus**: Food passage.
			  ○ **Stomach**: Digestion of food.
			  ○ **Intestine**: Absorption of nutrients.
			  ○ **Rectum & Anus**: Excretion of waste.
			
			7. Circulatory System

			● **Definition**: Responsible for transporting blood, nutrients, gases, and wastes. ● **Frog's Circulatory System**: ○ **Heart**: 3-chambered heart (2 atria, 1 ventricle). ○ **Blood Vessels**: Arteries, veins, and capillaries. **8. Respiratory System** ● **Definition**: The system responsible for gas exchange (oxygen and carbon dioxide). ● **Frog's Respiratory System**: Includes both lungs and skin. Frogs can respire through their skin (cutaneous respiration) and lungs (pulmonary respiration). **9. Excretory System** ● **Definition**: The system that removes waste products from the body. ● **Frog's Excretory System**: ○ **Kidneys**: Filter blood and produce urine. ○ **Ureters**: Carry urine to the bladder. ○ **Bladder**: Stores urine. ○ **Cloaca**: Excretes waste products from both the excretory and digestive systems. **10. Reproductive System** ● **Definition**: The system involved in producing offspring. ● **Frog's Reproductive System**: ○ **Male Frogs**: Testes, vas deferens, seminal vesicles, and cloaca. ○ **Female Frogs**: Ovaries, oviducts, and cloaca. **11. Endocrine System**

			• **Definition**: Consists of glands that secrete hormones to regulate various body functions.
			• **Example in Frogs**: The thyroid gland, pituitary gland, and adrenal glands help regulate growth, metabolism, and stress responses.
			
			12. Skeletal System
			• **Definition**: Provides structural support and protects internal organs.
			• **Frog's Skeletal System**: Includes the vertebral column, limbs, and skull, which help in movement and protection.
			
			13. Nervous System
			• **Components in Frogs**:
			  ○ **Central Nervous System (CNS)**: Brain and spinal cord.
			  ○ **Peripheral Nervous System (PNS)**: Nerves extending from the CNS to the limbs and organs.
			
			14. Metamorphosis
			• **Definition**: The process by which a frog undergoes developmental changes from larva (tadpole) to adult.
			• **Stages**: Egg → Tadpole → Juvenile Frog → Adult Frog.
			
			15. Vascular System
			• **Definition**: The network of blood vessels (arteries, veins, and capillaries) responsible for blood circulation.
			• **Frog's Vascular System**: Has a three-chambered heart, with a double circulatory system (pulmonary and systemic).
			
			16. Lymphatic System

			• **Definition**: This system helps in fluid balance and immunity. • **Example in Frogs**: The lymphatic vessels help in transporting lymph and defending the body against infection.
		Chapter No - 8 **Cell- The Unit Of Life**	1.**Cell**: The structural and functional unit of life. It is the smallest unit that exhibits the characteristics of life. **2.Cell Theory**: A fundamental theory stating that all living organisms are composed of cells, and the cell is the basic unit of structure and function. **3.Prokaryotic Cell**: A type of cell that lacks a true nucleus and membrane-bound organelles. Example: Bacteria. **4.Eukaryotic Cell**: A cell that has a true nucleus and membrane-bound organelles. Example: Plant and animal cells. **5. Plasma Membrane**: A semi-permeable membrane that surrounds the cell, controlling the entry and exit of substances. **6.Cytoplasm**: The jelly-like substance that fills the cell and contains the cell's organelles. 1. **Nucleus**: The membrane-bound organelle that contains the cell's genetic material (DNA). 2. **Nucleolus**: A structure inside the nucleus responsible for producing ribosomes. 3. **Mitochondria**: Organelles known as the powerhouses of the cell,

			responsible for energy production through cellular respiration. 4. **Endoplasmic Reticulum (ER)**: A network of membranes involved in protein and lipid synthesis. There are two types: Rough ER (with ribosomes) and Smooth ER (without ribosomes). 5. **Ribosomes**: Tiny structures responsible for protein synthesis. 6. **Golgi Apparatus**: An organelle involved in modifying, sorting, and packaging proteins and lipids for transport. 7. **Lysosomes**: Organelles that contain digestive enzymes to break down waste materials and cellular debris. 8. **Chloroplasts**: Organelles found in plant cells that contain chlorophyll and are involved in photosynthesis. 9. **Vacuole**: A membrane-bound space within the cytoplasm used for storing substances such as water, nutrients, or waste. 10. **Cell Wall**: A rigid outer layer found in plant cells, fungi, and bacteria that provides structural support and protection. 11. **Centrioles**: Cylindrical structures involved in cell division (found in animal cells). 12. **Plasmids**: Small circular DNA molecules found in prokaryotic cells (especially bacteria), capable of independent replication.

			13. **Diffusion**: The process by which molecules move from an area of higher concentration to an area of lower concentration. 14. **Osmosis**: The movement of water molecules across a semi-permeable membrane from an area of lower solute concentration to higher solute concentration. 15. **Active Transport**: The process of moving molecules against a concentration gradient, requiring energy. 16. **Cell Division**: The process by which a parent cell divides into two or more daughter cells, including mitosis and meiosis. 17. **Chromosomes**: Thread-like structures composed of DNA and proteins that carry genetic information.
		U.T. 2 **(10th July)**	**CH-5 , MORPHOLOGY OF FLOWERING PLANTS** **CH-6; ANATOMY OF FLOWERING PLANTS**
	August	**Chapter No.-9** **Biomolecules**	1. **Biomolecules:** Organic molecules that are essential for life processes, including carbohydrates, proteins, lipids, and nucleic acids. 2. **Carbohydrates:** Organic compounds made up of carbon, hydrogen, and oxygen. They serve as a primary energy source. Examples: Glucose, Sucrose, Starch, Cellulose.

			3. **Monosaccharides:** The simplest form of carbohydrates, consisting of a single sugar unit. Example: Glucose, Fructose. 4. **Disaccharides:** Carbohydrates made up of two monosaccharide units joined by a glycosidic bond. Example: Sucrose, Maltose. 5. **Polysaccharides:** Carbohydrates made up of many monosaccharide units. They serve as energy storage or structural components. Examples: Starch, Glycogen, Cellulose. 6. **Proteins:** Large, complex molecules made up of amino acids. They play crucial roles in the body, including enzymes, structural components, and hormones. 7. **Amino Acids:** The building blocks of proteins. There are 20 different amino acids that form proteins through peptide bonds. 8. **Peptide Bond:** The covalent bond formed between the amino group of one amino acid and the carboxyl group of another amino acid, linking them in a protein chain. 9. **Enzyme:** A type of protein that accelerates or catalyzes biochemical reactions without being consumed in the process. Example: Amylase, Lipase. 10. **Lipids:** A group of organic compounds that are hydrophobic or insoluble in water. They serve as energy storage, insulation, and components of cell membranes. Examples: Fats, Oils, Phospholipids, Steroids. 11. **Fatty Acids:** Carboxylic acids with long hydrocarbon chains. They can be saturated

			(no double bonds) or unsaturated (with one or more double bonds). 12. **Triglycerides:** The most common form of lipids, composed of three fatty acids linked to a glycerol molecule. 13. **Phospholipids:** Lipid molecules that form the basic structure of cell membranes. They consist of two fatty acids, a glycerol backbone, and a phosphate group. 14. **Nucleic Acids:** Biomolecules that carry genetic information. There are two types: DNA (Deoxyribonucleic acid) and RNA (Ribonucleic acid). 15. **DNA:** A nucleic acid that stores genetic information in the cell and carries instructions for growth, development, and reproduction. 16. **RNA:** A nucleic acid that helps in protein synthesis by translating the genetic code from DNA to produce proteins. 17. **Nucleotides:** The basic building blocks of nucleic acids (DNA and RNA). They consist of a sugar molecule, a phosphate group, and a nitrogenous base (Adenine, Thymine, Cytosine, Guanine for DNA; Adenine, Uracil, Cytosine, Guanine for RNA). 18. **Double Helix:** The structure of DNA, consisting of two strands of nucleotides coiled around each other, held together by hydrogen bonds between complementary bases. 19. **Vitamins:** Organic compounds that are essential for the proper functioning of the body. They are required in small amounts and often act as coenzymes.

			20. **Minerals:** Inorganic substances that play a key role in cellular functions, including enzyme activity, nerve transmission, and muscle function. 21. **Glycosidic Bond:** A covalent bond that links monosaccharides to form disaccharides or polysaccharides. 22. **Hydrolysis:** A chemical reaction in which water is used to break down a compound, such as breaking a bond in a disaccharide to form two monosaccharides. 23. **Condensation (Dehydration) Reaction:** A reaction in which two molecules join together, releasing a molecule of water. 24. **Primary Structure of Proteins:** The linear sequence of amino acids in a protein chain. 25. **Secondary Structure of Proteins:** The coiling or folding of the protein chain into structures like alpha helices or beta sheets, stabilized by hydrogen bonds. 26. **Tertiary Structure of Proteins:** The overall 3D shape of a protein formed by the folding of the secondary structure. 27. **Quaternary Structure of Proteins:** The arrangement of multiple protein subunits into a functional complex. 28. **ATP (Adenosine Triphosphate):** A molecule that stores and transfers energy in cells, used in various biochemical processes like muscle contraction, protein synthesis, and cell division.

			29. **Peptidoglycan:** A polymer that forms part of the bacterial cell wall, providing structural support. 30. **Isoenzymes:** Different forms of an enzyme that catalyze the same reaction but may vary in their structure or properties.
		Chapter No.-10 **Cell Cycle and Cell Division**	Cell Division: The process by which a parent cell divides to form two or more daughter cells. It is essential for growth, reproduction, and tissue repair. 2. Mitosis: A type of cell division where a single parent cell divides into two genetically identical daughter cells. It is responsible for growth, development, and repair in multicellular organisms. 3. Meiosis: A type of cell division that reduces the chromosome number by half, resulting in four genetically different daughter cells. It is involved in the production of gametes (sperm and eggs). 4. Interphase: The phase of the cell cycle where the cell prepares for division. It includes three sub-phases: ● **G1 phase** (Gap 1): The cell grows and carries out normal functions. ● **S phase** (Synthesis): DNA replication occurs, doubling the chromosome number. ● **G2 phase** (Gap 2): The cell continues to grow and prepares for mitosis. 5. Prophase: The first stage of mitosis (or meiosis), where the chromatin condenses into visible chromosomes, and the nuclear

			envelope breaks down. In meiosis, homologous chromosomes undergo pairing. 6. Metaphase: The second stage of mitosis (or meiosis), where chromosomes align at the metaphase plate (equatorial plane) of the cell. 7. Anaphase: The third stage of mitosis (or meiosis), where the sister chromatids (in mitosis) or homologous chromosomes (in meiosis) are pulled to opposite poles of the cell. 8. Telophase: The final stage of mitosis (or meiosis), where nuclear envelopes re-form around the separated chromosomes, and the chromosomes begin to de-condense. 9. Cytokinesis: The process that follows telophase, where the cytoplasm divides, resulting in the formation of two separate daughter cells. 10. Chromosome: A structure made of DNA and proteins, containing genetic material. Chromosomes are visible during cell division and ensure the accurate distribution of genetic material. 11. Chromatid: One of the two identical halves of a chromosome, which are joined together by a centromere. 12. Centromere: The region where two sister chromatids are held together and where spindle fibers attach during cell division. 13. Spindle Apparatus: A structure made of microtubules that helps in the movement of chromosomes during cell division. 14. Centrosome: The organelle that organizes the microtubules and forms the spindle fibers during cell division. It contains a pair of centrioles in animal cells. 15. Gametes: Reproductive cells (sperm and egg in animals, pollen and ovules in plants)

			produced through meiosis, which have half the chromosome number of the parent cell. 16. Diploid (2n): A cell that has two sets of chromosomes, one from each parent. Somatic cells are diploid. 17. Haploid (n): A cell that has only one set of chromosomes. Gametes are haploid. 18. Crossing Over: A process during meiosis where homologous chromosomes exchange segments of genetic material, leading to genetic variation. 19. Independent Assortment: The random distribution of chromosomes during meiosis, contributing to genetic variation in the offspring. 20. Zygote: The fertilized egg formed when two haploid gametes (sperm and egg) fuse during fertilization. 21. Karyotype: The complete set of chromosomes in a cell, arranged and displayed in a standard format, often used to identify genetic disorders. 22. Chromatin: The uncondensed form of DNA found in the nucleus during interphase. It condenses to form visible chromosomes during cell division. 23. Synapsis: The pairing of homologous chromosomes during prophase I of meiosis, which is essential for crossing over. 24. Tetrad: A structure formed during meiosis when two homologous chromosomes pair up, each consisting of two sister chromatids. 25. Reductional Division: The first division in meiosis (meiosis I), where the chromosome number is halved, resulting in haploid cells. 26. Equational Division: The second division in meiosis (meiosis II), which is similar to mitosis,

			where the sister chromatids are separated, but the chromosome number remains haploid. 27. Non-disjunction: The failure of homologous chromosomes or sister chromatids to separate properly during cell division, leading to an abnormal number of chromosomes in the daughter cells. 28. Cell Cycle: The series of events that take place in a cell leading to its division and duplication. It includes interphase (G1, S, G2) and the mitotic phase (M phase, which includes mitosis and cytokinesis). 29. Apoptosis: Programmed cell death, which plays a role in removing damaged or unnecessary cells during development and cell turnover. 30. Cyclins and Cyclin-Dependent Kinases (CDKs): Proteins involved in the regulation of the cell cycle. Cyclins activate CDKs, which drive the cell cycle forward by phosphorylating target proteins.
		Half Yearly Syllabus	**CH-1 TO CH-10**
	September	**Half Yearly Exam** **8th September**	
	October	**Chapter No.11** **Photosynthesis in Higher Plant**	**Photosynthesis** The process by which green plants, algae, and some bacteria convert light energy into chemical energy in the form of glucose, using carbon dioxide and water. **2. Autotrophs**

			Organisms that produce their own food through photosynthesis (e.g., green plants, algae). **3. Chlorophyll** A green pigment present in chloroplasts that absorbs light energy required for photosynthesis. **4. Chloroplast** The organelle in plant cells where photosynthesis occurs. **5. Light Reaction (Light-dependent phase)** The first phase of photosynthesis that occurs in the thylakoid membrane, where light energy is converted into ATP and NADPH. **6. Dark Reaction (Light-independent phase / Calvin Cycle)** The second phase of photosynthesis that occurs in the stroma of the chloroplast, where ATP and NADPH are used to fix carbon dioxide into glucose. **7. Photolysis** The splitting of water molecules using light energy, producing oxygen, protons, and electrons. **8. Electron Transport Chain (ETC)** A series of proteins in the thylakoid membrane that transfer electrons, leading to ATP and NADPH formation. **9. ATP (Adenosine Triphosphate)**

			The energy currency of the cell, produced during the light reaction. **10. NADPH (Nicotinamide Adenine Dinucleotide Phosphate)** An energy-rich molecule that provides electrons for the dark reaction. **11. Carbon Fixation** The conversion of atmospheric CO_2 into organic compounds during the Calvin cycle. **12. C3 Pathway (Calvin Cycle)** A photosynthetic pathway where the first stable compound is a 3-carbon molecule (3-PGA). **13. C4 Pathway** A modified pathway in some plants (e.g., maize, sugarcane) that helps in efficient CO_2 fixation under high temperature and low CO_2 conditions. **14. CAM (Crassulacean Acid Metabolism)** A photosynthetic adaptation in desert plants (e.g., cacti) to conserve water by opening stomata at night. **15. RuBisCO (Ribulose-1,5-bisphosphate carboxylase-oxygenase)** An enzyme that catalyzes the first step of the Calvin cycle, fixing CO_2 into an organic molecule. **16. Photorespiration-**A process in which RuBisCO fixes oxygen instead of CO_2, leading to energy loss.

			17. Stomata -Microscopic pores on leaves that regulate gas exchange (CO_2, O_2) and water loss. **18. Thylakoid** Membrane-bound compartments inside the chloroplast where the light reactions occur. **19. Grana-**Stacks of thylakoids in the chloroplast. **20. Stroma-**The fluid-filled space in the chloroplast where the Calvin cycle occurs.
		Chapter No.-13 **Plant Growth and Development**	1. **Growth-**An irreversible increase in size, volume, or mass of a plant due to cell division and enlargement. **2. Development-**The process that includes growth, differentiation, and maturation of a plant. **3. Differentiation-**The process by which cells become specialized for specific functions. **4. Dedifferentiation-**The process by which mature cells regain the ability to divide and form new tissues (e.g., formation of callus). **5. Redifferentiation-**The process where dedifferentiated cells regain their specialized function. **6. Meristem-**A group of undifferentiated cells capable of continuous division, responsible for plant growth. **7. Apical Meristem-**Meristem found at the tips of roots and shoots, responsible for primary growth (length increase). **8. Lateral Meristem-**Meristem found in the vascular cambium and cork cambium, responsible for secondary growth (increase in girth).

			9. Intercalary Meristem-Meristem located between mature tissues, helping in regrowth (e.g., in grasses). **10. Phases of Growth** ● **Lag Phase**: Slow growth phase. ● **Log Phase (Exponential Phase)**: Rapid growth phase. ● **Stationary Phase**: Growth slows down due to resource limitations. **11. Growth Curve** A **sigmoid (S-shaped) curve** that represents different phases of growth. **12. Conditions for Growth** Essential factors like water, oxygen, nutrients, and temperature affecting plant growth. **13. Plant Hormones (Phytohormones)** Chemical substances that regulate plant growth and development. ● **Auxins**: Promote cell elongation, apical dominance, root formation (e.g., IAA, IBA). ● **Gibberellins**: Promote stem elongation, seed germination, breaking dormancy. ● **Cytokinins**: Promote cell division, delay senescence (aging). ● **Abscisic Acid (ABA)**: Inhibits growth, induces dormancy, helps in stress response.

			● **Ethylene**: Promotes fruit ripening and leaf abscission (shedding). **14. Photoperiodism-**The response of plants to different day lengths, affecting flowering: ● **Short-day Plants**: Flower when days are shorter than a critical period (e.g., rice). ● **Long-day Plants**: Flower when days are longer than a critical period (e.g., wheat). ● **Day-neutral Plants**: Flowering is not affected by day length (e.g., tomato). **15. Vernalization-**The process where cold temperatures promote flowering in some plants (e.g., wheat, cabbage). **16. Seed Dormancy-**A state where seeds do not germinate even under favorable conditions due to physiological barriers. **17. Seed Germination** The process by which a seed develops into a new plant. Types include: ● **Epigeal Germination**: Cotyledons come above the ground (e.g., beans). ● **Hypogeal Germination**: Cotyledons remain underground (e.g., peas). **18. Senescence-**The aging process in plants leading to the death of tissues or organs. **19. Abscission-**The shedding of leaves, flowers, or fruits, often regulated by ethylene. **20. PGRs (Plant Growth Regulators)**

			A broader term for all substances (natural or synthetic) that influence plant growth and development.
	November	**Chapter No.-14** **Breathing and Exchange of Gases**	**Breathing (Pulmonary Ventilation)** The process of inhalation (taking in oxygen) and exhalation (releasing carbon dioxide). **2. Respiration** The biochemical process of breaking down glucose to release energy in the form of ATP. It includes breathing, gas exchange, and cellular respiration. **3. External Respiration** The exchange of gases between the environment and the lungs. **4. Internal Respiration** The exchange of gases between blood and body tissues. **5. Cellular Respiration** The process inside cells where oxygen is used to break down glucose, releasing ATP. **6. Respiratory System** The organs involved in breathing, including the **nasal cavity, pharynx, larynx, trachea, bronchi, bronchioles, and lungs**. **7. Alveoli** Microscopic air sacs in the lungs where gas exchange occurs. **8. Diaphragm**

			A dome-shaped muscle that helps in breathing by contracting and relaxing. **9. Intercostal Muscles** Muscles between the ribs that assist in expanding and contracting the chest cavity during breathing. **10. Inspiration (Inhalation)** The process of taking in air due to the expansion of the chest cavity and lowering of pressure in the lungs. **11. Expiration (Exhalation)** The process of releasing air due to the contraction of the chest cavity and increase in lung pressure. **12. Tidal Volume (TV)** The amount of air inhaled or exhaled in a normal breath (≈500 mL in an adult). **13. Inspiratory Reserve Volume (IRV)** Extra air that can be inhaled beyond the tidal volume (≈2500-3000 mL). **14. Expiratory Reserve Volume (ERV)** Extra air that can be exhaled beyond the tidal volume (≈1000-1100 mL). **15. Residual Volume (RV)** The air remaining in the lungs after maximum exhalation (≈1100-1200 mL). **16. Vital Capacity (VC)**

			The maximum amount of air a person can exhale after a deep inhalation (TV + IRV + ERV). **17. Total Lung Capacity (TLC)** The total volume of air the lungs can hold (VC + RV). **18. Respiratory Quotient (RQ)** The ratio of CO_2 produced to O_2 consumed during respiration. **19. Hemoglobin** A protein in red blood cells that carries oxygen from the lungs to body tissues. **20. Oxyhemoglobin** The compound formed when oxygen binds to hemoglobin in the lungs. **21. Carbaminohemoglobin** The compound formed when carbon dioxide binds to hemoglobin in the blood. **22. Bohr Effect** A phenomenon where an increase in CO_2 and acidity (low pH) reduces hemoglobin's affinity for oxygen, facilitating oxygen release to tissues. **23. Haldane Effect** The process by which oxygen binding to hemoglobin reduces its affinity for carbon dioxide, promoting CO_2 release in the lungs. **24. Partial Pressure (pO_2 and pCO_2)**

			The pressure exerted by oxygen (pO_2) and carbon dioxide (pCO_2) in the blood, affecting gas exchange. **25. Hypoxia** A condition where oxygen supply to tissues is insufficient. **26. Asphyxia** A severe oxygen deficiency causing suffocation and potential unconsciousness. **27. Emphysema** A chronic lung disease where alveoli are damaged, reducing gas exchange efficiency (common in smokers). **28. Pneumonia** A lung infection that inflames alveoli, filling them with fluid, reducing oxygen absorption. **29. Asthma** A condition where airways become inflamed and narrowed, making breathing difficult. **30. Regulation of Respiration** Controlled by the **medulla oblongata and pons** in the brain-stem, which respond to CO2 levels to regulate breathing rate.
		U.T.3 **(21st October)**	**CH-11; PHOTOSYNTHESIS** **CH-12; RESPIRATION IN PLANTS**

		Chapter No.-15 **Body Fluids and Their Circulation**	● Blood – A connective tissue that transports nutrients, gases, and waste. ● Plasma – The liquid component of blood containing proteins, ions, and hormones. ● Formed Elements – Cells and cell fragments in blood, including RBCs, WBCs, and platelets. ● Erythrocytes (RBCs) – Red blood cells responsible for oxygen transport. ● Leukocytes (WBCs) – White blood cells that fight infections. ● Platelets (Thrombocytes) – Cell fragments that help in blood clotting. ● Haemoglobin – Oxygen-carrying pigment in RBCs. ● Lymph – A fluid similar to plasma but without RBCs, involved in immune response. 2. Blood Groups and Clotting ● ABO Blood Group System – Classification of blood based on A and B antigens. ● Rh Factor – An antigen found on RBCs; Rh-positive and Rh-negative types. ● Agglutination – Clumping of RBCs due to antigen-antibody reaction. ● Blood Clotting (Coagulation) – Process of blood solidifying to prevent excessive bleeding.

			● Fibrinogen – A protein that helps in clot formation. ● Thrombin – An enzyme that converts fibrinogen to fibrin in clotting. 3. Circulatory Pathways ● Open Circulatory System – Blood is not confined within vessels (e.g., Arthropods). ● Closed Circulatory System – Blood flows within vessels (e.g., Humans). ● Pulmonary Circulation – Blood flow between heart and lungs for oxygenation. ● Systemic Circulation – Blood flow between heart and body tissues. ● Double Circulation – Blood passes through the heart twice per cycle (in mammals). 4. Human Heart and Its Functioning ● Heart – A muscular organ that pumps blood. ● Atria (Auricles) – Upper chambers of the heart. ● Ventricles – Lower chambers of the heart. ● Valves – Structures that prevent backflow of blood (Bicuspid, Tricuspid, Semilunar valves). ● Sinoatrial (SA) Node – The pacemaker of the heart that initiates contraction.

			● Atrioventricular (AV) Node – Conducts impulses from atria to ventricles. ● Cardiac Cycle – Sequence of events in one heartbeat. ● Systole – Contraction phase of the heart. ● Diastole – Relaxation phase of the heart. ● Heart Rate – Number of heartbeats per minute (~72 bpm in humans). 5. Blood Vessels ● Arteries – Thick-walled vessels that carry blood away from the heart. ● Veins – Thin-walled vessels that carry blood toward the heart. ● Capillaries – Microscopic vessels for exchange of gases and nutrients. ● Blood Pressure – The force exerted by blood on vessel walls. ● Systolic Pressure – Pressure during heart contraction (~120 mmHg). ● Diastolic Pressure – Pressure during heart relaxation (~80 mmHg). 6. Disorders of Circulatory System ● Hypertension (High Blood Pressure) – Persistently high arterial blood pressure. ● Atherosclerosis – Hardening of arteries due to plaque formation.

			● Coronary Artery Disease (CAD) – Narrowing of coronary arteries affecting heart function. ● Heart Failure – Inability of the heart to pump blood effectively. ● Stroke – Blockage or rupture of blood vessels in the brain.
		Chapter : 16 **Excretory Products and Their Elimination**	Excretory Products ● Ammonia: A highly toxic nitrogenous waste requiring large amounts of water for excretion; primarily excreted by aquatic animals. citeturn0search9 ● Urea: A less toxic nitrogenous waste produced in the liver from ammonia; excreted by mammals, terrestrial amphibians, and marine fishes. citeturn0search9 ● Uric Acid: A minimally toxic, water-insoluble nitrogenous waste excreted by reptiles, birds, land snails, and insects. citeturn0search9 2. Modes of Excretion ● Ammonotelism: Excretion of ammonia; common in bony fishes, aquatic amphibians, and aquatic insects. citeturn0search9 ● Ureotelism: Excretion of urea; characteristic of mammals, many terrestrial amphibians, and marine fishes. citeturn0search9

			● Uricotelism: Excretion of uric acid; observed in reptiles, birds, land snails, and insects. citeturn0search9 3. Human Excretory System ● Kidneys: Primary excretory organs that filter blood to form urine. ● Ureters: Tubes transporting urine from the kidneys to the urinary bladder. ● Urinary Bladder: A sac-like organ that stores urine until excretion. ● Urethra: The duct through which urine is expelled from the body. 4. Nephron Structure ● Nephron: The functional unit of the kidney responsible for urine formation. ● Glomerulus: A network of capillaries involved in the filtration of blood. ● Bowman's Capsule: A cup-like structure encasing the glomerulus; initiates filtration. ● Proximal Convoluted Tubule (PCT): The segment where reabsorption of water, ions, and nutrients occurs. ● Loop of Henle: A U-shaped tube that concentrates urine and conserves water. ● Distal Convoluted Tubule (DCT): The segment involved in selective secretion and absorption of ions.

			● Collecting Duct: Channels urine from nephrons to the renal pelvis. 5. Urine Formation Processes ● Glomerular Filtration: The process of filtering blood plasma into the Bowman's capsule. ● Tubular Reabsorption: The process of reclaiming water and essential solutes from the filtrate back into the blood. ● Tubular Secretion: The addition of waste products from the blood into the tubular fluid. 6. Regulation of Kidney Function ● Antidiuretic Hormone (ADH): A hormone that promotes water reabsorption in the kidneys, reducing urine volume. ● Renin-Angiotensin-Aldosterone System (RAAS): A hormone system regulating blood pressure and fluid balance. ● Atrial Natriuretic Peptide (ANP): A cardiac hormone that reduces blood volume and pressure by inhibiting sodium reabsorption. 7. Disorders of the Excretory System ● Uremia: A condition characterized by elevated urea levels in the blood due to kidney dysfunction. ● Renal Failure: The inability of the kidneys to filter waste products from the blood effectively.

			● Kidney Stones: Hard deposits formed in the kidneys from minerals and salts. ● Glomerulonephritis: Inflammation of the glomeruli, affecting kidney function.
		Chapter :17 **Locomotion and Movement**	Types of Movement ● Amoeboid Movement – Movement using pseudopodia, seen in Amoeba and WBCs. ● Ciliary Movement – Movement using cilia, seen in the respiratory tract and oviduct. ● Muscular Movement – Movement caused by muscle contraction, seen in vertebrates. 2. Human Muscular System ● Muscle – A contractile tissue responsible for movement. ● Skeletal Muscles – Voluntary, striated muscles attached to bones. ● Smooth Muscles – Involuntary, non-striated muscles found in internal organs. ● Cardiac Muscles – Involuntary, striated muscles found in the heart. 3. Structure of Muscle ● Sarcolemma – The plasma membrane of muscle fibers. ● Sarcoplasm – The cytoplasm of muscle cells.

			● Sarcoplasmic Reticulum – A specialized endoplasmic reticulum that stores calcium. ● Myofibrils – Long protein filaments in muscle cells responsible for contraction. ● Actin (Thin Filament) – A protein involved in muscle contraction. ● Myosin (Thick Filament) – A motor protein that interacts with actin for muscle contraction. ● Sarcomere – The structural and functional unit of muscle fibers. ● Z-line – The boundary of a sarcomere. ● H-zone – The region of a sarcomere where only myosin filaments are present. 4. Mechanism of Muscle Contraction ● Sliding Filament Theory – Explains muscle contraction as actin filaments sliding over myosin filaments. ● Neuromuscular Junction – The synapse between a nerve and muscle fiber. ● Acetylcholine (ACh) – A neurotransmitter that triggers muscle contraction. ● ATP (Adenosine Triphosphate) – The energy molecule required for muscle contraction. 5. Skeletal System

			● Exoskeleton – A hard external covering for support (e.g., arthropods). ● Endoskeleton – An internal skeleton made of bones and cartilage (e.g., vertebrates). ● Axial Skeleton – Includes the skull, vertebral column, ribs, and sternum. ● Appendicular Skeleton – Includes limb bones, pectoral, and pelvic girdles. 6. Human Skeletal System ● Cranium – The skull protecting the brain. ● Vertebral Column – The backbone consisting of 33 vertebrae. ● Intervertebral Discs – Cartilage between vertebrae for flexibility and shock absorption. ● Rib Cage – Protects the heart and lungs; consists of 12 pairs of ribs. ● Sternum – The breastbone connecting ribs. ● Pectoral Girdle – The shoulder girdle connecting arms to the body. ● Pelvic Girdle – The hip bones supporting the lower body. 7. Joints and Their Types ● Fibrous Joints – Immovable joints (e.g., skull sutures).

			● Cartilaginous Joints – Partially movable joints (e.g., between vertebrae). ● Synovial Joints – Freely movable joints with synovial fluid. Types of Synovial Joints: ● Ball and Socket Joint – Allows movement in all directions (e.g., shoulder, hip). ● Hinge Joint – Allows movement in one direction (e.g., elbow, knee). ● Pivot Joint – Allows rotational movement (e.g., between atlas and axis in the neck). ● Gliding Joint – Allows sliding movements (e.g., wrist, ankle). 8. Disorders of the Muscular and Skeletal System ● Myasthenia Gravis – Autoimmune disorder causing muscle weakness. ● Muscular Dystrophy – Genetic disorder leading to muscle degeneration. ● Tetany – Muscle spasms due to calcium deficiency. ● Arthritis – Inflammation of joints causing pain and stiffness. ● Osteoporosis – Bone weakening due to calcium deficiency. ● Gout – Joint inflammation due to uric acid deposition.

		Chapter -18 **Neural Control and Coordination**	Nervous System ● Neuron – Structural and functional unit of the nervous system. ● Neuroglia – Supporting cells of the nervous system that provide nourishment and protection. ● Central Nervous System (CNS) – Consists of the brain and spinal cord. ● Peripheral Nervous System (PNS) – Composed of cranial and spinal nerves. ● Autonomic Nervous System (ANS) – Involuntary part of the nervous system, divided into sympathetic and parasympathetic systems. 2. Structure of Neuron ● Cell Body (Soma) – Contains the nucleus and cytoplasm. ● Dendrites – Short, branched structures that receive impulses. ● Axon – Long fiber that transmits nerve impulses. ● Myelin Sheath – Fatty layer that insulates axons for faster conduction. ● Schwann Cells – Produce myelin sheath in PNS. ● Nodes of Ranvier – Gaps in the myelin sheath that facilitate saltatory conduction.

			● Synapse – Junction between two neurons for signal transmission. 3. Types of Neurons ● Sensory (Afferent) Neurons – Transmit signals from sense organs to CNS. ● Motor (Efferent) Neurons – Carry commands from CNS to effectors (muscles/glands). ● Interneurons (Association Neurons) – Connect sensory and motor neurons in CNS. 4. Nerve Impulse Conduction ● Resting Potential – Neuron at rest with a negative charge inside (-70 mV). ● Action Potential – Rapid depolarization and repolarization of a neuron's membrane. ● Depolarization – Influx of Na^+ ions making the inside positive. ● Repolarization – Efflux of K^+ ions restoring negative charge. ● Refractory Period – Time during which a neuron cannot fire a new impulse. 5. Synaptic Transmission ● Chemical Synapse – Uses neurotransmitters (e.g., Acetylcholine, Dopamine, Serotonin). ● Electrical Synapse – Direct passage of ions through gap junctions.

			6. Human Brain ● Forebrain – Includes the cerebrum, thalamus, and hypothalamus. ○ Cerebrum – Largest part, responsible for voluntary actions, intelligence, memory. ○ Thalamus – Relay center for sensory impulses. ○ Hypothalamus – Controls homeostasis, hunger, thirst, emotions. ● Midbrain – Reflex center for vision and hearing. ● Hindbrain – Includes pons, cerebellum, and medulla oblongata. ○ Cerebellum – Controls balance and coordination. ○ Medulla Oblongata – Regulates heartbeat, breathing, and reflex actions. 7. Spinal Cord ● Gray Matter – Contains neuron cell bodies. ● White Matter – Composed of myelinated nerve fibers. ● Reflex Arc – Involuntary pathway of reflex actions (e.g., knee-jerk reflex). 9. Disorders of the Nervous System

			● Alzheimer's Disease – Memory loss due to neuron degeneration. ● Parkinson's Disease – Loss of dopamine-producing neurons, causing tremors. ● Epilepsy – Sudden electrical disturbances in the brain leading to seizures.
	December	**Chapter - 19** **Chemical Coordination and Integration**	Endocrine System – A system of glands that release hormones directly into the bloodstream to regulate body functions. 2. Hormones – Chemical messengers secreted by endocrine glands that regulate physiological processes. 3. Endocrine Glands – Ductless glands that release hormones into the bloodstream (e.g., pituitary, thyroid, adrenal glands). 4. Exocrine Glands – Glands that secrete substances through ducts (e.g., sweat glands, salivary glands). 5. Mixed Glands – Glands that have both endocrine and exocrine functions (e.g., pancreas, gonads). 6. Hypothalamus – A part of the brain that controls the endocrine system by regulating the pituitary gland. 7. Pituitary Gland (Hypophysis) – The master gland of the endocrine system, divided into the anterior and posterior pituitary. *Anterior Pituitary Hormones: Growth Hormone (GH) – Stimulates body growth. *Prolactin (PRL) – Stimulates milk production.

			*Thyroid-Stimulating Hormone (TSH) – Regulates thyroid function. *Adrenocorticotropic Hormone (ACTH) – Stimulates adrenal cortex. *Gonadotropins: *Follicle-Stimulating Hormone (FSH) – Regulates gamete production. *Luteinizing Hormone (LH) – Stimulates ovulation and testosterone secretion. *Posterior Pituitary Hormones: Oxytocin – Induces labor and milk ejection. *Vasopressin (Antidiuretic Hormone, ADH) – Regulates water balance in kidneys. 8. Pineal Gland – A small gland that secretes melatonin, regulating sleep-wake cycles. 9. Thyroid Gland – A gland in the neck that produces: ● Thyroxine (T4) and Triiodothyronine (T3) – Regulate metabolism. ● Calcitonin – Lowers blood calcium levels. 10. Parathyroid Glands – Small glands that release parathyroid hormone (PTH) to increase blood calcium levels. 11. Pancreas – A mixed gland that produces: ● Insulin (by Beta cells) – Lowers blood sugar. ● Glucagon (by Alpha cells) – Increases blood sugar.

			12. Adrenal Glands – Glands above the kidneys that produce: ● Adrenal Medulla Hormones: *Adrenaline (Epinephrine) – Increases heart rate, part of the "fight or flight" response. *Noradrenaline (Norepinephrine) – Helps regulate blood pressure. ● Adrenal Cortex Hormones: *Glucocorticoids (e.g., Cortisol) – Regulate metabolism and stress response. *Mineralocorticoids (e.g., Aldosterone) – Maintain electrolyte balance. *Androgens – Regulate secondary sexual characteristics. 13. Gonads – Reproductive organs that secrete sex hormones: ● Testes (Males): Produce testosterone, responsible for male secondary sexual traits. ● Ovaries (Females): Produce estrogen (regulates menstrual cycle) and progesterone (supports pregnancy). 14. Thymus Gland – Produces thymosins, which help in T-cell development for immunity. 15. Feedback Mechanism – A regulatory system that maintains hormone levels through: ● Negative Feedback – Inhibits hormone release when levels are high (e.g., TSH and thyroxine).

			• Positive Feedback – Enhances hormone release when needed (e.g., oxytocin during childbirth). 16. Disorders of the Endocrine System • Gigantism & Dwarfism – Due to excess or deficiency of GH. • Diabetes Mellitus – Caused by insulin deficiency, leading to high blood sugar. • Goiter – Enlargement of the thyroid due to iodine deficiency. • Addison's Disease – Adrenal cortex failure leading to low cortisol levels. • Cushing's Syndrome – Excess cortisol causing weight gain and high blood sugar.
		U.T.4 **(2nd December)**	CH-14, BREATHING AND EXCHANGE OF GASES. CH-15; BODY FLUIDS AND CIRCULATION, CH-16, EXCRETORY PRODUCTS AND THEIR ELIMINATION.
	January	**Revision & Preboard** **(2nd January,2027)**	**CH-1 TO CH-19**
	February	Final Exam	**CH-1 TO CH-19**
	March	Final Exam	
Informatics Practices		Chapter No. 1 Name of the Chapter	Central Processing Unit (CPU), Microprocessor Arithmetic Logic Unit (ALU) ,Very Large Scale Integration (VLSI), Control Unit (CU) Data Storage, Evolution of Computers, Data Retrieval

	April	Computer System	Von Neumann Architecture, Data Deletion and Recovery, Memory (Primary & Secondary), Device Drivers, Random Access Memory (RAM) , System Utilities, Read Only Memory (ROM) Customized Software, Free and Open Source Software (FOSS), Cache Memory, Storage Devices (HDD, SSD, USB, CD/DVD), Proprietary Software, Software (System & Application Software)
		CH. 7: Database Concept	Database ,File System, Relational Data Model, Meta-data, Database Management System (DBMS) Data Redundancy, Data Inconsistency, Primary Key, Foreign Key , Candidate Key, Data Constraint, Normalization, Entity-Relationship Model , Data Manipulation, SQL (Structured Query Language) ,Domain
	May	CH. 8: Introduction to SQL **(Structured Query Language)**	Alias (AS keyword in SQL),Create database, DISTINCT Clause, Create Table, BETWEEN Operator, Alter Table, IN Operator , Use Command, LIKE Operator (Pattern Matching) IS NULL / IS NOT NULL, DDL (Data Definition Language) , DML (Data Manipulation Language). Constraints (NOT NULL, UNIQUE, DEFAULT). INSERT Statement , .SELECT Statement, UPDATE Statement, DELETE Statement, WHERE Clause , ORDER BY Clause
		U.T.1 **(11th May)**	Chapter-1(Computer System)
	June	**Summer Break**	
		Introduction to SQL **(Structured Query Language)**	

	July	**(contd.)**	
		Ch 3: **Introduction to Python**	Interpreter ,Keywords, Indentation, Debugging, Variables , If..else Statements,Operators , Mutable Data, Immutable Data, Loops, Debugging
		U.T. 2 **(10th July)**	Ch-7 & 8
	August	Ch 4: Working with List, Dictionaries and Numpy	Traversing a List, Manipulating Dictionaries Membership operation, update() in dict, List Methods , clear(), Dictionary , del(), key-value pair, Numpy, ndarray
		Half Yearly Syllabus	Ch 1,7,8,3, 4(till completed)
	September	**Half Yearly Exam** **8th September**	
	October	Ch 4: Working with List, Dictionaries and Numpy(contd.)	
		Ch 2: Introduction to Emerging Trends	Artificial Intelligence Machine Learning Natural Language Processing Augmented Reality (AR) Virtual Reality (VR) Big Data Internet of Things (IoT) Cloud Computing Blockchain Technology Grid Computing

		U.T.3 **(21st October)**	Ch 3: **Introduction to Python**
	November	Revision	Practical of Python
	December	**U.T.4** **(2nd December)**	**Ch 4: Working with List, Dictionaries and Numpy**
	January	**Revision & Preboard** **(2nd January,2027)**	Whole Syllabus
	February	Final Exam	
	March	Final Exam	
Typography	**April**	Chapter No. 1(Main Book) **Name of the Chapter** Introduction to Typography	1. Serif 2. Sans-serif 3. Kerning 4. Leading 5. Tracking 6. Typeface 7. Font Weight 8. Alignment 9. Typography Hierarchy 10. Readability

		Chapter No.1 (Employability Skills) **Name of the Chapter** Communication Skills	1.Listening 2.Speaking 3.Body Language 4.Eye Contact 5.Clarity 6.Confidence 7.Politeness 8.Gestures 9.Tone 10.Expression
		Chapter No.2 (Main Book) **Name of the Chapter** Keyboard Operations	1.Function Keys (F1–F12) 2.Shortcut Keys 3.Home Row Keys 4.Caps Lock 5.Backspace 6.Delete Key 7.Arrow Keys 8.Num Lock 9.Insert Key 10.Escape (Esc) Key
	May	Chapter No. 2 **Name of the Chapter** **(Employability Skills)** Self Management Skills	1. Self-Awareness 2. Time Management 3. Goal Setting 4. Self-Motivation 5. Discipline 6. Stress Management 7. Decision Making 8. Confidence 9. Adaptability 10. Responsibility
		Chapter No. 3 **Name of the Chapter**	1. Computer Basics 2. Internet Usage 3. Email Communication 4. Typing Skills 5. MS Office 6. Cyber Security 7. File Management

		(Employability Skills) ICT Skills	8. Digital Literacy 9. Online Collaboration 10. Data Handling
		U.T.1 **(11th May)**	**Ch1: Introduction to typography (Main Book)** **Ch 2: Keyboard Operations (Main Book)** **Ch 1: Communication Skills (Employability Skills)**
	June	**Summer Break**	
	July	Chapter No. 3 (Main Book) **Name of the Chapter** Hardware Devices	1.CPU (Central Processing Unit) 2.RAM (Random Access Memory) 3.Hard Drive (HDD/SSD) 4.Motherboard 5.Power Supply Unit (PSU) 6.Cooling System 7.Input Devices 8,Output Devices 9. Monitor !0. Pen Drive
		U.T. 2 **(10th July)**	**Ch 3: Hardware Devices (Main Book)** **Ch 2: Self Management Skills (Employability Skills)** **Ch 3: ICT Skills (Employability Skills)**
	August	Chapter No. 4 (Main Book) **Name of the Chapter** Operating System	1.Start Menu 2.Taskbar 3.File Explorer 4.Control Panel 5.Recycle Bin 6.Windows Defender 7.Shortcut 8.Alt + Tab 9.Windows Update 10.Safe Mode
			1. Creativity 2. Innovation 3. Leadership

		Chapter No. 4 **Name of the Chapter** **(Employability Skills)** Entrepreneur Skills	4. Risk-Taking 5. Problem-Solving 6. Decision-Making 7. Communication 8. Time Management 9. Networking 10. Business Planning
		Half Yearly Syllabus	**Main Book** **Ch1: Introduction to typography** **Ch 2: Keyboard Operations** **Ch 3: Hardware Devices** **Ch 4: Operating System** **Employability Skills** **Ch 1: Communication Skills** **Ch 2: Self Management Skills** **Ch 3: ICT Skills** **Ch 4: Entrepreneur Skills**
	September	**Half Yearly Exam** **8th September**	
	October	Chapter No. 5 (Main Book) **Name of the Chapter** MS-office Introduction	1.Microsoft Office 2.Cloud Storage 3.Template 4.Clipboard 5.Hyperlink 6.Review Tab 7.Save As 8.Export 9.Collaboration 10.File Formats
		Chapter No. 5 **Name of the Chapter**	1. Sustainability 2. Renewable Energy 3. Waste Management 4. Eco-Friendly Practices

		(Employability Skills) Green skills	5. Energy Conservation 6. Recycling 7. Water Conservation 8. Pollution Control 9. Biodiversity Protection 10. Climate Awareness
		Chapter No 6 (Main Book) **Name of the Chapter** MS-word basics	1.Ribbon 2.Clipboard 3.Font Style 4.Alignment 5.Indentation 6.Tables 7.Header & Footer 8.Bullets & Numbering 9.Track Changes 10.Mail Merge
	November	Chapter No 6(Main Book) **Name of the Chapter** MS-word basics (Continue)	1.Ribbon 2.Clipboard 3.Font Style 4.Alignment 5.Indentation 6.Tables 7.Header & Footer 8.Bullets & Numbering 9.Track Changes 10.Mail Merge
		U.T.3 **(21st October)**	**Ch 5: MS-office Introduction (Main Book)** **Ch 5: Green skills (Employability Skills)**
	December	**Revision**	

		U.T.4 **(2nd December)**	**Ch 6: MS-word basics**
	January	**Revision & Preboard** **(2nd January,2027)**	
	February	**Final Exam**	
	March	**Final Exam**	
Physical Education	**April**	Unit -1 Changing Trends and career in Physical education	Physical Education, Post-Independence, Wearable Gear, Technological Advancements, Career Options, Khelo India, Fit India Movement, Playing Surface, Sports Equipment, Professional Athlete
	May	Unit-2 Olympic Value Education	Olympism, Excellence, Friendship, Respect, Fair Play, Olympic Motto, Olympic Symbols, IOC (International Olympic Committee), NOC (National Olympic Committee), Olympic Anthem
		U.T.1 **(11th May)**	Unit 1 & 2
	June	**Summer Break**	

	July	Unit-3 Yoga	Yoga, Ashtanga Yoga, Shatkarma, Pranayama, Meditation, Hatha Yoga, Asanas, Stress Management, Holistic Health, Mindfulness
		Unit-4 Physical Education and Sports CWSN	Disability, Disorder, Intellectual Disability, Physical Disability, Adaptive Physical Education, Counselor, Occupational Therapist, Physiotherapist, Speech Therapist, Special Educator
		U.T. 2 **(10th July)**	Unit-3 & Unit-4
	August	Unit 5 Physical fitness, Health and wellness	Wellness, Health, Physical Fitness, Cardiovascular Endurance, Muscular Strength, Flexibility, Body Composition, Traditional Sports, Leadership, First Aid
		Unit 6 Test Measurements and Evaluation	Test, Measurement, Evaluation, BMI, Waist-Hip Ratio, Skin Fold , Measurement, Somato Types, Endomorphy, Mesomorphy, Ectomorphy
		Half Yearly Syllabus	
	September	**Half Yearly Exam** **8th September**	
		Unit 7 Fundamentals of anatomy and Physiology and kinesiology in Sports	Anatomy, Physiology, Skeletal System, Bones, Joints, Muscles, Circulatory System, Heart, Respiratory System, Function

	October	Unit 8 Fundamentals of Kinesiology and Biomechanics in Sports	Kinesiology, Biomechanics, Kinetics, Kinematics, Flexion, Extension, Abduction, Adduction, Axis, Planes
	November	Unit 9 Psychology and Sports	Psychology, Sports Psychology, Developmental Stages, ,Adolescent Problems, Team Cohesion, Attention, Resilience, Mental Toughness, Motivation , Confidence
		Unit 10 Training and doping in sports	Training, Doping, Overload, Adaptation, Recovery, Warm-up, Limbering Down, Skill, Technique, Tactics
		U.T.3 **(21st October)**	Unit 7, 8
	December	Chapter No. Name of the Chapter	
		U.T.4 **(2nd December)**	Unit 9, 10
	January	**Revision & Preboard** **(2nd January,2027)**	
	February	Final Exam	
	March	Final Exam	

Painting	**April**	**Theory:** Unit 1 **(A)Six limbs of Indian Painting** **(B) fundamentals of Visual Arts:** 1. Elements of Art 2. Principles of Art **Practical:** Fundamental Drawing, Shading and object Studies (Still Life)	**Rupabheda, Pramanam, Bhava, Lavanya Yojanam, Sadrishyam, Varnikabhang, Realism, Impressionism. Expressionism, Abstract, Limbs, Intensity, Vanishing point, Aesthetics, Stylization, visual, Performing Arts, Perspective, Traditional, Modern**
	May	**Theory:** **Unit- 1** (B) Pre-Historic Rock-Paintings (C) Art of Indus Valley **Practical:** Nature Study, Colour theory, Introduction of human forms	**Prehistoric period, Cult, Superimposition, excavation, Paleolithic, Mesolithic, Chalcolithic, Terracotta, Chariot, Depiction, Schematic, Medieval, Crudeness, Ancestors, Aboriginal, Bloodshed, Scattered, Gaiety, Vivid, Dwellers, Indigenous, Debris, Great Bath, Bronze Casting, Pictographic Script, Terracotta, Abstraction,Binders, Mythology, communal Dance, Motif, Granary, Grid layout, Ornamentation, Iconic, Ceremonial**
		U.T.1 **(11th May)**	**Six limbs of Indian Painting** **Fundamentals of Visual Arts**
	June	**Summer Break**	

	July	Unit- 2 **Theory:** **Unit- 2** Buddhist, Jain and Hindu Art (3rd century B.C. to 8th century A.D.) **Practical:** Nature Study, Colour theory, Introduction of human forms	**Sculpture, Relief Sculpture, Chakra, Refinement, Posterity, Stucco, Greco-Roman Technique, Stupa, Bodhisattva, Mandala, Tantric Art, Tirthankara, Torana, Inscriptions, Chaityas, Viharas, Reign, Jatakas, Vajarpani, Padampani, Urna, Ushnisha, Sanghati, Iconography, Halo, Gandharva, Padmasana, Vajraparyanksana Mudra , Tri-ratna, Scriptures**
		U.T. 2 **(10th July)**	**Pre-Historic Rock-Paintings**
	August	**Theory:** **Unit- 3** Temple Sculpture, Bronzes and artistic aspects of Indo Islamic Architecture (A) Artistic aspects of Indian Temple Sculpture	**Garbhagriha, Gopuram, Kalasha, Kumbha, Mandapa, Vimana, Amalka, Antrala, Jagati, Voluminous, Celestial, Penance, Kim-Purusha, Gana, Sadashiv, Maheshmurti, Vaikuntha, Cymble, Kalasha, Iconography, Dwarpala, Lalitsana, High Relief,**
		Half Yearly Syllabus	**Unit-1 & Unit-2** **Practical**
	September	**Half Yearly Exam** **8th September**	

	October	**Theory:** **Unit- 3** Temple Sculpture, Bronzes and artistic aspects of Indo Islamic Architecture (A) Bronze Sculpture (B) Artistic aspects of Indo-Islamic Architecture **Practical:** Composition, Thematic Painting Nature Study	**Bronze Casting, Cire-Perdue, Panch-loham, Prabha-Mandala, Shaivism, Equilibrium, Apasmara, Satva, Rajas, Tamas, Atibhanga, Gajahasta, Jwalmala, Kundalini, Enlightenment, Creative Forces, Natraja** **Indo-Islamic, Inscription, Trabeate, Arcuate, Mortar, Arabesque, Jaali work, Pietra-Dura Technique, Foreshortening, Tessellation, Char Baag, Bulbous Dome, Cornices, Nakkarkhana, Gumbad, Whispering Gallery, Sarai, Arcuate system, Trabeated System, Minaret**
		U.T. 3 **(21st October)**	**Artistic aspects of Indian Temple Sculpture**
	November	**Practical:** Composition, Thematic Painting Nature Study **Revision**	
	December	**Practical:** Composition Planning, Thematic Painting and Portfolio Completion Revision	
		U.T.4 **(2nd December)**	**Bronze Sculpture** **Artistic aspects of Indo-Islamic Architecture**

	January	**Revision & Preboard** **(2nd January,2027**	**Revision- Unit-1, 2, 3** **Practical**
	February	Final Exam	**Unit-1, 2, 3** **Practical**
	March	Final Exam	
Psychology	**April**	Chapter No. 1 Name of the Chapter What is Psychology	Psychology, Behaviour, Mental processes, Introspection, Observation, Experiment, Cognition, Emotions, Perception, Scientific approach
		Chapter No. 2 Name of the Chapter Methods of enquiry in psychology.	Rrrr Research, Hypothesis, Variables,Observation, Correlation, Case Study, Sampling, Ethics, Reliability.
	May	Chapter No. 2 Name of the Chapter Methods of enquiry in psychology (cont.)	Research, Hypothesis, Variables, Observation, Correlation, Case Study, Sampling, Ethics, Reliability.
		Chapter No. 4 Name of the Chapter Human Development	Growth, Maturation, Development, Childhood, Adolescence, Adulthood, Socialization, Learning, Identity, Ageing.

		U.T.1 **(11th May)**	Chapter 1- What is Psychology Chapter 2- Methods of enquiry in psychology.
	June	**Summer Break**	
	July	Chapter No. 4 Name of the Chapter Human Development(cont.)	Growth, Maturation, Childhood, Adolescence, Adulthood, Socialization, Learning, Identity, Ageing
		Chapter No. 5 Name of the Chapter Sensory, Attentional and Perceptual Processes	Sensation, Perception, Attention, Illusions, Visual system, Auditory system, Gestalt principles, Selective attention, Adaptation.
		U.T. 2 **(10th July)**	Chapter 2- Methods of enquiry in psychology Chapter 4- Human development.
	August	Chapter No. 5 Name of the Chapter Sensory, Attentional and Perceptual Processes(cont.)	Sensation, Perception, Attention, Illusions, Visual system, Auditory system, Gestalt principles, Selective attention, Adaptation.
		Chapter No. 6 Name of the Chapter Learning	Classical conditioning, Operant conditioning, Reinforcement, Punishment, Habituation, Observational learning, Memory, Imitation, Behaviorism, Stimulus.

		Half Yearly Syllabus	Chapter 1- What is Psychology? Chapter 2- Methods of enquiry in psychology. Chapter 4- Human Development. Chapter 5- Sensory, Attentional and Perceptual Processes. Chapter 6- Learning
	September	**Half Yearly Exam** **8th September**	
	October	Chapter No. 7 Name of the Chapter Human Memory	Encoding, Storage, Retrieval, Short-term memory, Long-term memory,Forgetting, Mnemonics, Chunking, Recall, Recognition.
		Chapter No. 8 Name of the Chapter Thinking	Problem-solving,Decision-making, Creativity, Concept, Heuristics, Reasoning, Algorithm, Sight, Mental set, Language.
	November	Chapter No 9 Name of the Chapter Motivation and Emotion	Motivation, Drives, Needs, Instinct, Incentive, Arousal, Emotion, Expression, Stress, Goal
		U.T.3 **(21st October)**	Chapter 7- Human Memory Chapter 8- Thinking
	December	Chapter No. Name of the Chapter	Revision

		U.T.4 **(2nd December)**	Chapter 8- Thinking Chapter 9- Motivation and Emotion
	January	**Revision & Preboard** **(2nd January,2027)**	Revision
	February	Final Exam	
	March	Final Exam	

Note Exam date are tentative