



Topic 11th	Subtopic 11th	Topic Completion	Topic Revision	Topic MCQ		Topic 12th	Subtopic 12th	Topic Completion	Topic Revision	Topic MCQ
	Statement of parallel and perpendicular axes theorems and their applications.						Torque on a magnetic dipole (bar magnet) in a uniform magnetic field			
							Bar magnet as an equivalent solenoid, magnetic field lines			
UNIT VI: Gravitation	Kepler's laws of planetary motion.						Earth's magnetic field and magnetic elements			
	The universal law of gravitation						Para-, dia- and ferro-magnetic substances, with examples			
	Acceleration due to gravity and its variation with altitude and depth						Electromagnetic and factors affecting their strengths. Permanent magnets.			
	Gravitational potential energy					Electromagnetic	Electromagnetic induction			
	gravitational potential. Escape velocity, orbital velocity of a satellite						Faraday's law			
	Geostationary satellites.						Induced emf and current			
							Lenz's Law, Eddy currents. Self and mutual inductance			
UNIT VII: Properties of Bulk Matter	Elastic behavior, Stress-strain relationship						Alternating currents, peak and rms value of alternating current/ voltage			
	Hooke's law, Young's modulus, bulk modulus, shear, modulus of rigidity, poisson's ratio; elastic energy.						Reactance and impedance			
	Viscosity, Stokes' law, terminal velocity, Reynold's number, streamline and turbulent flow						LC oscillations (qualitative treatment only), LCR series circuit, resonance			
	Critical velocity, Bernoulli's theorem and its applications.						Power in AC circuits, wattles current			
	Surface energy and surface tension, angle of contact, excess of pressure, application of surface tension ideas to drops, bubbles and capillary rise.						AC generator and transformer			
	Heat, temperature, thermal expansion									
	thermal expansion of solids, liquids, and gases. Anomalous expansion					UNIT V: Electromagnetic Waves	Need for displacement current			
	Specific heat capacity: Cp, Cv- calorimetry						Electromagnetic waves and their characteristics (qualitative ideas only)			
	change of state – latent heat						Transverse nature of electromagnetic waves			
	Heat transfer- conduction and thermal conductivity, convection and radiation						Electromagnetic spectrum (radio waves, microwaves, infrared, visible, ultraviolet, x-rays, gamma rays) including elementary facts about their uses			
UNIT VIII: Thermodynamics	Qualitative ideas of Black Body Radiation, Wein's displacement law, and Green House effect.									
	Newton's law of cooling and Stefan's law.									
	Thermal equilibrium and definition of temperature (zeroth law of Thermodynamics)					UNIT VI: Optics	Reflection of light, spherical mirrors, mirror formula			
	Heat, work and internal energy						Refraction of light, total internal reflection and its applications optical fibres, refraction at spherical surfaces, lenses, thin lens formula, lens-maker's formula.			
UNIT IX: Behaviour of Perfect Gas and Kinetic Theor	First law of thermodynamics						Magnification, power of a lens, combination of thin lenses in contact combination of a lens and a mirror			
	Isothermal and adiabatic processes						Refraction and dispersion of light through a prism			
	Second law of the thermodynamics: Reversible and irreversible processes						Scattering of light- blue colour of the sky and reddish appearance of the sun at sunrise and sunset			
	Heat engines and refrigerators.						Optical instruments: Human eye, image formation and accommodation, correction of eye defects (myopia and hypermetropia) using lenses			
UNIT X: Oscillations and Waves	Equation of state of a perfect gas, work done on compressing a gas.						Microscopes and astronomical telescopes (reflecting and refracting) and their magnifying powers			
	Kinetic theory of gases: Assumptions, concept of pressure. Kinetic energy and temperature						Wave optics: Wavefront and Huygens' principle, reflection and refraction of plane wave at a plane surface using wavefronts			
	degrees of freedom, law of equipartition of energy (statement only) and application to specific heat capacities of gases						Proof of laws of reflection and refraction using Huygens' principle			
	concept of mean free path						Interference, Young's double hole experiment and expression for fringe width, coherent sources and sustained interference of light			
	Periodic motion-period, frequency, displacement as a function of time						Diffraction due to a single slit, width of central maximum			
	Periodic functions						Resolving power of microscopes and astronomical telescopes			
	Simple harmonic motion(SHM) and its equation						Polarisation, plane polarized light; Brewster's law, uses of plane polarized light and Polaroids			
	phase					UNIT VII: Dual Nature of Matter and Radiation	Photoelectric effect			
	oscillations of a spring-restoring force and force constant						Hertz and Lenard's observations			
	energy in SHM –Kinetic and potential energies						Einstein's photoelectric equation- particle nature of light.			
	simple pendulum-derivation of expression for its time period						Matter waves- wave nature of particles, de Broglie relation			
	free, forced and damped oscillations (qualitative ideas only), resonance						Davison-Germer experiment (experimental details should be omitted; only conclusion should be explained)			
	Wave motion. Longitudinal and transverse waves, speed of wave motion. Displacement relation for a progressive wave					UNIT VIII: Atoms and Nuclei	Alpha- particle scattering experiments; Rutherford's model of atom; Bohr model, energy levels, hydrogen spectrum			
	Principle of superposition of waves, reflection of waves, standing waves in strings and organ pipes, fundamental mode and harmonics						Composition and size of nucleus, atomic masses, isotopes, isobars; isotones			
	Beats						Radioactivity- alpha, beta and gamma particles/ rays and their properties			
	Dopplers effect						decay law			

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							Mass-energy relation, mass defect			
							binding energy per nucleon and its variation with mass number, nuclear fission and fusion			
						<b>UNIT IX: Electronic Devices</b>	Energy bands in solids (qualitative ideas only), conductors, insulators and semiconductors			
							semiconductor diode- I-V characteristics in forward and reverse bias, diode as a rectifier; I-V characteristics of LED, diode, solar cell, and Zener diode; Zener diode as a voltage regulator			
							unction transistor, transistor action, characteristics of a transistor; transistor as an amplifier (common emitter configuration) and oscillator			
							Logic gates (OR, AND, NOT, NAND and NOR)			
							Transistor as a switch			

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Some Basic Concepts of Chemistry	General Introduction:				UNIT I: Solid State	Classification of solids based on different binding forces; molecular, ionic covalent and metallic solids			
	Important and scope of chemistry.					amorphous and crystalline solids (elementary idea)			
	Laws of chemical combination					unit cell in two dimensional and three dimensional lattices			
	Dalton's atomic theory					calculation of density of unit cell			
	concept of elements					packing in solids			
	atoms and molecules					packing efficiency			
	Atomic and molecular masses					voids			
	Mole concept and molar mass					number of atoms per unit cell in a cubic unit cell			
	percentage composition and empirical and molecular formula					point defects			
	chemical reactions					electrical and magnetic properties			
	stoichiometry and calculations based on stoichiometry					Band theory of metals			
						conductors			
						semiconductors and insulators			
UNIT II: Structure of Atom	Atomic number, isotopes and isobars				UNIT II: Solutions	Types of solutions			
	Concept of shells and subshells					expression of concentration of solutions of solids in liquids			
	dual nature of matter and light					solubility of gases in liquids			
	de Broglie's relationship					solid solutions			
	Heisenberg uncertainty principle					colligative properties- relative lowering of vapour pressure			
	concept of orbital					Raoult's law,			
	quantum numbers					elevation of boiling point			
	shapes of s, p and d orbitals					depression of freezing point			
	rules for filling electrons in orbitals- Aufbau principle					osmotic pressure			
	Pauli exclusion principles and Hund's rule					determination of molecular masses using colligative properties abnormal molecular mass			
UNIT III: Classification of Elements and Periodicity in Properties	electronic configuration of atoms					Van Hoff factor			
	stability of half filled and completely filled orbitals				UNIT III: Electrochemistry	Redox reactions			
						conductance in electrolytic solutions			
						specific and molar conductivity variation of conductivity with concentration			
						kohlrausch's Law			
						electrolysis and Laws of electrolysis (elementary idea)			
						dry cell- electrolytic cells and Galvanic cells; lead accumulator			
						EMF of a cell			
						standard electrode potential			
						Relation between Gibbs energy change and EMF of a cell			
						fuel cells; corrosion			
UNIT IV: Chemical Bonding and Molecular Structure	Valence electrons, ionic bond, covalent bond				UNIT IV: Chemical Kinetics	Rate of a reaction (average and instantaneous)			
	bond parameters					factors affecting rates of reaction; concentration, temperature			
	Lewis structure					catalyst; order and molecularity of a reaction; rate law and specific rate constant			
	polar character of covalent bond								
	valence bond theory								
	resonance, geometry of molecules								
	VSEPR theory								



	Second law of thermodynamics					interhalogen compounds oxoacids of halogens (structures only)			
	Gibbs energy change for spontaneous and non-spontaneous process					Group 18 elements: General introduction			
	criteria for equilibrium and spontaneity					electronic configuration			
	Third law of thermodynamics- Brief introduction					oxidation states			
						trends in physical and chemical properties			
<b>UNIT VII: Equilibrium</b>	Equilibrium in physical and chemical processes					uses			
	dynamic nature of equilibrium								
	law of chemical equilibrium					<b>UNIT VIII: d and f Block Elements</b>			
	equilibrium constant					General introduction			
	factors affecting equilibrium- Le Chatelier's principle; ionic equilibrium- ionization of acids and bases					electronic configuration			
	strong and weak electrolytes					characteristics of transition metals			
	degree of ionization					general trends in properties of the first row transition metals- metallic character, ionization enthalpy, oxidation states, ionic radii, colour, catalytic property, magnetic properties, interstitial compounds, alloy formation			
	ionization of polybasic acids					Preparation and properties of K <sub>2</sub> Cr <sub>2</sub> O <sub>7</sub> and KMnO <sub>4</sub>			
	acid strength					Lanthanoids- electronic configuration,			
	concept of pH					oxidation states			
	Hydrolysis of salts (elementary idea)					chemical reactivity			
	buffer solutions					lanthanoid contraction and its consequences			
	Henderson equation					Actinoids: Electronic configuration			
	solubility product					, oxidation states and comparison with lanthanoids			
	common ion effect (with illustrative examples)								
						<b>UNIT IX: Coordination Compounds</b>			
<b>UNIT VIII: Redox Reactions</b>	Concept of oxidation and oxidation and reduction					Coordination compounds: Introduction,			
	redox reactions oxidation number					ligands			
	balancing redox reactions in terms of loss and gain of electron and change in oxidation numbers					coordination number			
						colour			
						magnetic properties and shapes			
<b>UNIT IX: Hydrogen</b>	Occurrence					IUPAC nomenclature of mononuclear coordination compounds			
	isotopes					isomerism (structural and stereo) bonding			
	preparation					Werner's theory VBT			
	properties and uses of hydrogen; hydrides ionic, covalent and interstitial; physical and chemical properties of water					CFT; importance of coordination compounds (in qualitative analysis, biological systems)			
	heavy water; hydrogen peroxide-preparation, reactions								
	uses and structure					<b>UNIT X: Haloalkanes and Haloarenes</b>			
						Haloalkanes: Nomenclature			
<b>UNIT X: s-Block Elements (Alkali and Alkaline earth metals)</b>	Group 1 and group 2 elements : General introduction					nature of C –X bond			
	electronic configuration					physical and chemical properties			
	occurrence					mechanism of substitution reactions			
	anomalous properties of the first element of each group					Optical rotation			
	diagonal relationship					Haloarenes: Nature of C-X bond			
						substitution reactions (directive influence of halogen for monosubstituted compounds only)			
						Uses and environment effects of – dichloromethane, trichloromethane, tetrachloromethane, iodoform, freons, DDT			

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	greenhouse effect and global warming-pollution due to industrial wastes								
	green chemistry as an alternative tool for reducing pollution								
	strategy for control of environmental pollution.								

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<b>Diversity in Living World</b>	What is living?					<b>Reproduction</b>	Reproduction in organisms: Reproduction, a characteristic feature of all organisms for continuation of species			
	Biodiversity						Modes of reproduction – Asexual and sexual			
	Need for classification						Asexual reproduction			
	Three domains of life						Modes-Binary fission, sporulation, budding, gemmule, fragmentation; vegetative propagation in plants			
	Taxonomy & Systematics						Sexual reproduction in flowering plants: Flower structure			
	Concept of species and taxonomical hierarchy						Development of male and female gametophytes			
	Binomial nomenclature						Pollination-types, agencies and examples			
	Tools for study of Taxonomy – Museums						Outbreeding devices			
	Zoos						Pollen-Pistil interaction			
	Herbaria						Double fertilization			
	Botanical gardens						Post fertilization events- Development of endosperm and embryo			
	Five kingdom classification						Development of seed and formation of fruit			
	salient features and classification of Monera						Special modes-apomixis, parthenocarp, polyembryony			
	Protista and Fungi into major groups						Significance of seed and fruit formation			
	Lichens						Human Reproduction: Male and female reproductive systems			
	Viruses and Viroids						Microscopic anatomy of testis and ovary			
	Salient features and classification of plants into major groups-Algae						Gametogenesis-spermatogenesis & oogenesis			
	Bryophytes						Menstrual cycle			
	Pteridophytes						Fertilisation, embryo development upto blastocyst formation, implantation			
	Gymnosperms and Angiosperms						Pregnancy and placenta formation (Elementary idea)			
	Angiosperms classification up to class						Parturition (Elementary idea)			
	characteristic features and examples						Lactation (Elementary idea)			
	Salient features and classification of animals-nonchordate up to phyla level and chordate up to classes level						Reproductive health: Need for reproductive health and prevention of sexually transmitted diseases (STD)			
<b>Structural Organisation in</b>	Morphology and modifications					<b>Genetics and Evolution</b>	Birth control-Need and Methods, Contraception and Medical Termination of Pregnancy (MTP)			
	Tissues						Amniocentesis			
	Anatomy and functions of different parts of flowering plants: Root, stem, leaf, inflorescence- cymose and racemose, flower, fruit and seed						Infertility and assisted reproductive technologies – IVF, ZIFT, GIFT (Elementary idea for general awareness)			
	Animal tissues						Heredity and variation: Mendelian Inheritance			
	Morphology						Deviations from Mendelism- Incomplete dominance, Co-dominance, Multiple alleles and Inheritance of blood groups, Pleiotropy			
<b>Cell Structure and Function</b>	Anatomy and functions of different systems (digestive, circulatory, respiratory, nervous and reproductive) of an insect (cockroach). (Brief account only)						Elementary idea of polygenic inheritance			
	Cell theory and cell as the basic unit of life						Chromosome theory of inheritance			
	Structure of prokaryotic and eukaryotic cell						Chromosomes and genes			
	Plant cell and animal cell						Sex determination-In humans, birds, honey bee			
	Cell envelope, cell membrane, cell wall						Linkage and crossing over			
	Cell organelles-structure and function						Sex linked inheritance- Haemophilia, Colour blindness			
	Endomembrane system-endoplasmic reticulum, Golgi bodies, lysosomes, vacuoles						Mendelian disorders in humans-Thalassemia			
	Mitochondria, ribosomes, plastids, micro bodies						Chromosomal disorders in humans			
	Cytoskeleton, cilia, flagella, centrioles (ultra structure and function)						Down's syndrome, Turner's and Klinefelter's syndromes			
	Nucleus-nuclear membrane, chromatin, nucleolus						Molecular basis of Inheritance: Search for genetic material and DNA as genetic material			
	Chemical constituents of living cells: Biomolecules-structure and function of proteins, carbohydrates, lipids, nucleic acids						Structure of DNA and RNA			
	Enzymes-types, properties, enzyme action						DNA packaging			
	B Cell division: Cell cycle, mitosis, meiosis and their significance						DNA replication			
<b>Plant Physiology</b>	Transport in plants: Movement of water, gases and nutrients						Central dogma			
	Cell to cell transport-Diffusion, facilitated diffusion, active transport						Transcription, genetic code, translation			
	Plant – water relations – Imbibition, water potential, osmosis, plasmolysis						Gene expression and regulation- Lac Operon			
	Long distance transport of water – Absorption, apoplast, symplast, transpiration pull, root pressure and guttation						Genome and human genome project			
							DNA finger printing			
							Evolution: Origin of life			

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	Transpiration-Opening and closing of stomata						Biological evolution and evidences for biological evolution from Paleontology, comparative anatomy, embryology and molecular evidence)			
							Darwin's contribution			
	Uptake and translocation of mineral nutrients-Transport of food, phloem transport, Mass flow hypothesis						Modern Synthetic theory of Evolution			
	Diffusion of gases (brief mention)						Mechanism of evolution-Variation (Mutation and Recombination) and Natural Selection with examples, types of natural selection			
	Mineral nutrition: Essential minerals, macro and micronutrients and their role						Gene flow and genetic drift			
	Deficiency symptoms						Hardy-Weinberg's principle			
	Mineral toxicity						Adaptive Radiation			
	Elementary idea of Hydroponics as a method to study mineral nutrition						Human evolution			
	Nitrogen metabolism-Nitrogen cycle, biological nitrogen fixation									
	Photosynthesis: Photosynthesis as a means of Autotrophic nutrition									
	Site of photosynthesis take place					Biology and Human Health	Health and Disease			
	pigments involved in Photosynthesis (Elementary idea)						Pathogens			
	Photochemical and biosynthetic phases of photosynthesis						parasites causing human diseases (Malaria, Filariasis, Ascariasis, Typhoid, Pneumonia, common cold, amoebiasis, ring worm)			
							Basic concepts of immunology-vaccines			
	Cyclic and non cyclic and photophosphorylation						Cancer, HIV and AIDS			
	Chemiosmotic hypothesis						Adolescence, drug and alcohol abuse			
	Photorespiration C3 and C4 pathways						Improvement in food production			
	Factors affecting photosynthesis						Plant breeding, tissue culture, single cell protein, Biofortification; Apiculture and Animal husbandry			
	Respiration: Exchange gases						Microbes in human welfare: In household food processing, industrial production, sewage treatment, energy generation and as biocontrol agents and biofertilizers			
	Cellular respiration-glycolysis, fermentation (anaerobic), TCA cycle and electron transport system (aerobic)									
	Energy relations- Number of ATP molecules generated					Biotechnology and Environmental Science	Principles and process of Biotechnology: Genetic engineering (Recombinant DNA technology)			
	Amphibolic pathways						Application of Biotechnology in health and agriculture: Human insulin and vaccine production, gene therapy			
							Genetically modified organisms-Bt crops			
	Respiratory quotient						Transgenic Animals			
	Plant growth and development: Seed germination						Biosafety issues-Biopiracy and patents			
	Phases of Plant growth and plant growth rate									
	Conditions of growth					Ecology and Environment	Organisms and environment: Habitat and niche			
	Differentiation, dedifferentiation and redifferentiation						Population and ecological adaptations			
	Sequence of developmental process in a plant cell						Population interactions-mutualism, competition, predation, parasitism			
	Growth regulators-auxin, gibberellin, cytokinin, ethylene, ABA						Population attributes-growth, birth rate and death rate, age distribution			
	Seed dormancy						Ecosystem: Patterns, components			
	Vernalisation						Productivity and decomposition			
	Photoperiodism						Energy flow			
Human Physiology	Digestion and absorption						Pyramids of number, biomass, energy			
	Alimentary canal and digestive glands						Nutrient cycling (carbon and phosphorous)			
	Role of digestive enzymes and gastrointestinal hormones						Ecological succession			
	Peristalsis						Ecological Services- Carbon fixation, pollination, oxygen release			
	digestion						Biodiversity and its conservation: Concept of Biodiversity			
	absorption and assimilation of proteins						Patterns of Biodiversity			
	carbohydrates and fats						Importance of Biodiversity			
	Caloric value of proteins						Loss of Biodiversity			
	carbohydrates and fats						Biodiversity conservation			
	Egestion						Hotspots, endangered organisms, extinction, Red Data Book, biosphere reserves, National parks and sanctuaries			
	Nutritional and digestive disorders – PEM, indigestion, constipation, vomiting, jaundice, diarrhea						Environmental issues: Air pollution and its control			
	Breathing and Respiration: Respiratory organs in animals (recall only)						Water pollution and its control			
	Respiratory system in humans						Agrochemicals and their effects			
	Mechanism of breathing and its regulation in humans-Exchange of gases						Solid waste management			
	transport of gases and regulation of respiration Respiratory volumes						Radioactive waste management			
	Disorders related to respiration-Asthma						Greenhouse effect and global warming			
	Emphysema						Ozone depletion			
	Occupational respiratory disorders									

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	Body fluids and circulation: Composition of blood, blood groups, coagulation of blood						Deforestation			
	Composition of lymph and its function						Any three case studies as success stories addressing environmental issues			
	Human circulatory system-Structure of human heart and blood vessels									
	Cardiac cycle, cardiac output, ECG, Double circulation									
	Regulation of cardiac activity									
	Disorders of circulatory system-Hypertension, Coronary artery disease, Angina pectoris, Heart failure									
	Excretory products and their elimination: Modes of excretion- Ammonotelism, ureotelism, uricotelism									
	Human excretory system-structure and function									
	Urine formation, Osmoregulation									
	Regulation of kidney function-Renin-angiotensin									
	Atrial Natriuretic Factor									
	ADH and Diabetes insipidus									
	Role of other organs in excretion									
	Disorders									
	Uraemia, Renal failure, Renal calculi, Nephritis									
	Dialysis and artificial kidney									
	Locomotion and Movement: Types of movement- ciliary, flagellar, muscular									
	Skeletal muscle- contractile proteins and muscle contraction									
	Skeletal system and its functions (To be dealt with the relevant practical of Practical syllabus)									
	Joints									
	Disorders of muscular and skeletal system-Myasthenia gravis									
	Tetany, Muscular dystrophy, Arthritis, Osteoporosis, Gout									
	Neural control and coordination: Neuron and nerves									
	Nervous system in humans-central nervous system, peripheral nervous system and visceral nervous system									
	Generation and conduction of nerve impulse									
	Reflex action									
	Sense organs									
	Elementary structure and function of eye and ear									
	Chemical coordination and regulation: Endocrine glands and hormones									
	Human endocrine system- Hypothalamus, Pituitary, Pineal, Thyroid, Parathyroid, Adrenal, Pancreas, Gonads									
	Mechanism of hormone action (Elementary Idea)									
	Role of hormones as messengers and regulators									
	Hypo-and hyperactivity and related disorders (Common disorders e.g. Dwarfism, Acromegaly, Cretinism, goiter, exophthalmic goiter, diabetes, Addison's disease)									
	(Imp: Diseases and disorders mentioned above to be dealt in brief.)									