

MHT CET 2018 Exam Pattern

Paper	Subjects	No. of MCQ's Based on		Marks
		Std. XI	Std. XII	
Paper I	Mathematics	10	40	100
Paper II	Physics	10	40	50
	Chemistry	10	40	50
Paper III	Biology (Botany)	10	40	50
	Biology (Zoology)	10	40	50

MHT CET Maths Syllabus

Std. XI - PART - 1

Unit 1- Measurement of Angles Need & concept, Revision of directed angle (+ve and -ve angles), zero angle, straight angle, angles in standard position, co-terminal angles, angles in quadrant & Mathematics & Statistics quadrant angles. Sexagesimal system, circular system, relation between degree measure and radian measure. Theorem: Radian is a constant angle. Length of an arc of a circle ($s = r \cdot \theta$, θ is in radians) (without proof). Area of the sector of a circle $A = \frac{1}{2} r^2 \theta$, θ is in radians.

Unit 2- Trigonometric functions Need & concept, Trigonometric functions with the help of standard unit circle, signs of trigonometric functions in different quadrants, trigonometric functions of particular angles ($0^\circ, 30^\circ, 45^\circ, 60^\circ, 90^\circ, 180^\circ, 270^\circ, 360^\circ$), domain and range of trigonometric functions, periodicity of functions, fundamental identities, graphs of trigonometric functions, Graph of $y = a \sin bx$, $y = a \cos bx$, trigonometric functions of negative angles.

Unit 3- Trigonometric functions of compound angles Introduction, trigonometric functions of sum and difference, trigonometric functions of multiple angles (up to double and triple angles only), trigonometric functions of half angles.

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Unit 4- Factorization Formulae Introduction, Formulae for conversion of sum or difference into products, formulae for conversion of product into sum or difference, trigonometric functions of angles of a triangle.

Unit 5- Locus Introduction, Definition and equation of locus, points of locus, shift of the origin.

Unit 6- Straight Line Revision. Inclination of a line, slope of a line, equation of lines parallel to coordinate axes, intercepts of a line, revision of different forms of equations of a line, slope-point

form, slope-intercept form, two point form, double intercept form, other forms of equations of a line, parametric form, normal form, general form, Theorem 1 : A general linear equation $Ax + By + C = 0$, provided A and B are not both zero, simultaneously, always represents straight line. Theorem 2 : Every straight line has an equation of the form $Ax + By + C = 0$, where A, B and C are constants (without proof), Reduction of general equation of a line into normal form, intersection of two lines, parallel lines, perpendicular lines, identical lines, condition for concurrency of three lines, angle between lines, distance of a point from a line, distance between two parallel lines, equations of bisectors of angle between two lines, family of lines, equation of a straight line parallel to a given line, equation of a straight line perpendicular to a given line, equation of family of lines through the intersection of two lines.

Unit 7- Circle and Conics : Revision, standard equation, center-radius form, diameter form, general equation, parametric equations of standard equation, Conics Nappes– Intersection of Nappes of a cone and Plane, introduction, focus-directrix property of parabola, ellipse, hyperbola, parabola, standard equation (different forms of parabola), parametric equations, ellipse, standard equation, hyperbola, standard equation, parametric equations. Application of conic section.

Unit 8-Vectors Definition, magnitude of a vector, free and localized vectors, types of vectors, zero vector, unit vector, equality at vectors, negative of a vector, collinear vectors, coplanar vectors, co-initial vectors, like and unlike vectors, scalar multiple of a vector, triangle law, parallelogram law, polygon law, properties of addition of vectors, three dimensional co-ordinate geometry, coordinate axes & coordinate planes in space, co-ordinates of a point in space, distance between two points in a space, unit vectors along axes, position vector of a point in a space, product of vectors, scalar product, definition, properties, vector product, definition, properties, simple applications, work done by force, resolved part of a force, moment of a force.

Unit 9- Linear Inequations Linear in equations in one variable – solution of linear in equation in one variable & graphical solution, solutions of system of linear in equations in one variable, Linear in equations in two variables – solution of linear in equation in one variable & graphical solution, solution of linear in equations in two variables & graphical solution, solutions of system of linear in equations in two variables, Replacement of a set or domain of a set, Transposition.

Unit 10- Determinants Revision, determinant of order three, definition, expansion, properties of determinants, minors & co-factors, applications of determinants, condition of consistency, area of a triangle, Cramer's rule for system of equations in three variables.

Unit 11- Matrices Introduction, concepts, notations, order, types of matrices – zero matrix, row matrix, column matrix, square matrix, determinant of a square matrix, diagonal matrix, scalar matrix, identity matrix, triangular matrices, singular & non-singular matrices, transpose of a matrix, symmetric & skew symmetric matrices, operations on matrices – equality, addition, subtraction, multiplication of a matrix by a scalar, simple properties, multiplication of matrices – definition, properties of matrix multiplication, properties of transpose of a matrix - $(A')' = A$, $(KA)' = KA'$, $(AB)' = B'A'$.

PART – 2

Unit 1- Sets, Relations and Functions Set – Revision, subset, proper improper subset and their properties, union, intersection, disjoint sets, empty set, finite & infinite sets, equal sets, equivalent sets, universal set, Venn diagrams, complement of a set, difference of two sets, power set, Relations – ordered pairs, equality of ordered pairs, Cartesian product of two sets, No. of elements in the Cartesian product of two finite sets, Cartesian product of the reals with itself, definition of relation, pictorial diagrams, domain, codomain and range of a relation, types of relations, one-one, many-one, binary equivalence relation, functions – function as a special kind of relation, pictorial representation of a function, domain, codomain and range of a function, equal functions, types of functions - constant function, identity function, one-one function, onto function, into function, even & odd functions, polynomial function, rational function, modulus function, signum & greatest integer, exponential function, logarithmic function, functions with their graphs, sum, difference, product, quotient of functions, scalar multiplication, composite function, inverse function, binary operations, real valued function of the real variable, domain and range of these functions.

Unit 2- Logarithms Introduction, definition, properties, laws of logarithms, change of base, characteristics & mantissa – method of finding characteristics, method of finding mantissa, method of finding antilogarithm.

Unit 3- Complex Numbers Introduction, need for complex numbers, definitions –(real parts, imaginary parts, complex conjugates, modulus, argument), algebra of complex numbers – equality, addition, subtraction, multiplication, division, powers and square root of a complex number, higher powers of i , De Moivre's formula – (without proof), square root of a complex number, properties of complex numbers – properties of addition of complex numbers, 1) Closure Property 2) Cumulative Law 3) Associative law 4) Existence of additive identity 5) Existence of additive inverse. Properties of product of complex numbers –Existence of multiplicative identity – Existence of multiplicative inverse, properties of conjugate & modulus of complex numbers, Argand Diagram – representation of a complex number as a point in plane, geometrical meaning of modulus and argument, polar representation of complex numbers, Fundamental theorem of algebra, cube roots of unity – solution of quadratic equations in the complex number system, cube roots of unity.

Unit 4- Sequences & Series Revision - sequence, A.P., Sum of first 'n' terms of A.P., properties of A.P., geometric progression – introduction, general term, sum of the first 'n' terms, (n terms from the end of G.P.) containing finitely many terms & sum to infinite terms, properties of G.P., H.P. as a special type of A.P, Means – arithmetic mean, geometric mean, harmonic mean, relation between A.M., G.M., H.M., Arithmetic-Geometric sequence, special series, sum of cube of first n natural numbers, sum of cube of first n odd natural nos., exponential & logarithmic series.

Unit 5- Permutations & combinations Introduction, fundamental principle of counting, factorial notation, permutations, when all r objects are distinct, when all r objects are not distinct, circular permutations, simple applications, combinations – definition, properties, relations between permutations and combinations, simple applications.

Unit 6- Mathematical Induction and Binomial Theorem Principle of mathematical induction, simple applications, binomial theorem – binomial theorem for positive integers, general term, particular term, properties of binomial coefficient with simple application, binomial theorem for any index (without proof), particular cases of binomial theorem, simple applications.

Unit 7- Limits Introduction of concept, meaning of $x \rightarrow a$, the limit of a function, fundamental theorem on limits, algebra of limits – standard limits, without proof, limits at infinity – concepts, simple problems.

Unit 8- Differentiation Definition : derivative, derivative at a point, geometrical significance of derivative, physical significance (velocity as a rate of change of displacement), derivatives from first principle - of trigonometric functions, logarithmic functions, algebraic functions, exponential functions, rules of differentiation – derivative of sum, difference, product and quotient.

Unit 9- Integration Definition of integration as antiderivative, geometrical interpretation of indefinite integrals, algebra of integrals – integrals of some standard functions, rules of integration.

Unit 10- Statistics Measures of dispersion – range, quartile & quartile deviation (for grouped and ungrouped data), comparison of two frequency distributions with same mean, mean deviation about mean, mean deviation about median (for grouped & ungrouped data), variance, standard deviation, effect of change of origin and scale on variance and standard deviation, combined variance and standard deviation, co-efficient of variation.

Unit 11- Probability Revision, types of events – events and algebra of events, axiomatic definition of probability, mutually exclusive and exhaustive events, mutually exclusive events, addition theorem – for any two events A and B, Result on complementary events. Conditional probability – definition, multiplication theorem, independent events, Baye's theorem, odds in favor and against.

Std. XII

PART – 1

Unit 1- Mathematical Logic Statements - Introduction, sentences and statement, truth value of statement, open sentences, compound statement, quantifier and quantified statements, logical connectives : conjunction, disjunction, negation, implication/ conditional, bi conditional, truth tables of compound statements, examples related to real life and mathematics, statement patterns and logical equivalence - tautology, contradiction, contingency, duality, negation of compound statement, contrapositive, converse, inverse, algebra of statements-idempotent law, associative law, commutative law, distributive law, identity law, complement law, involution law, De Morgan's laws, difference between converse, contrapositive, contradiction, application- introduction to switching circuits (simple examples).

Unit 2- Matrices Elementary transformation of a matrix revision of cofactor and minor, elementary row transformation, elementary column transformation, inverse of a matrix existence and uniqueness of inverse of a matrix, inverse by elementary transformation, adjoint method, application-solution of system of linear equations by – reduction method, inversion method.

Unit 3- Trigonometric functions Trigonometric equations-general solution of trigonometric equation of the type : $\sin \theta = 0$, $\cos \theta = 0$, $\tan \theta = 0$, $\sin \theta = \sin \alpha$, $\cos \theta = \cos \alpha$, $\tan \theta = \tan \alpha$, $\sin 2\theta = \sin 2\alpha$, $\cos 2\theta = \cos 2\alpha$, $\tan 2\theta = \tan 2\alpha$, $a \cos \theta + b \sin \theta = C$ solution of a triangle : polar coordinates, sine rule, cosine rule, projection rule, area of a triangle, application, Hero's formula, Napier Analogues, inverse trigonometric functions-definitions, domain, range, principle values, graphs of inverse trigonometric function, properties of inverse functions.

Unit 4- Pair of straight lines Pair of lines passing through origin combined equation, homogeneous equation, theorem-the joint equation of a pair of lines passing through origin and its converse, acute angle between the lines represented by $ax^2 + 2hxy + by^2 = 0$, condition for parallel lines, condition for perpendicular lines, pair of lines not passing through origin-combined equation of any two lines, condition that the equation $ax^2 + 2hxy + by^2 + 2gx + 2fy + c = 0$ should represent a pair of lines (without proof), acute angle between the lines, condition of parallel and perpendicular lines, point of intersection of two lines.

Unit 5- Circle Tangent of a circle-equation of a tangent at a point to 1) standard circle, 2) general circle, condition of tangency only for line $y = mx + c$ to the circle $x^2 + y^2 = a^2$, tangents to a circle from a point outside the circle, director circle, length of tangent segments, normal to a circle-equation of normal at a point.

Unit 6- Conics Tangents and Normals-equations of tangent and normal at a point for parabola, ellipse, hyperbola; condition of tangency for parabola; ellipse, hyperbola; tangents in terms of slope for parabola, ellipse, hyperbola, tangents from a point outside conics, locus of points from which two tangents are mutually perpendicular, Properties of tangents and Normals to conics.

Unit 7- Vectors Revision, Collinearity and co-planarity of vectors : linear combination of vectors, condition of collinearity of two vectors, conditions of co-planarity of three vectors, section formula : section formula for internal and external division, midpoint formula, centroid formula, scalar triple product : definition, formula, properties, geometrical interpretation of scalar triple product, application of vectors to geometry medians of a triangle are concurrent, altitudes of a triangle are concurrent, angle bisectors of a triangle are concurrent, diagonals of a parallelogram bisect each other and converse, median of trapezium is parallel to the parallel sides and its length is half the sum of parallel sides, angle subtended on a semicircle is right angle.

Unit 8- Three dimensional geometry Direction cosines and direction ratios: direction angles, direction cosines, direction ratios, relation between direction ratio and direction cosines, angle between two lines, condition of perpendicular lines.

Unit 9- Line Equation of line passing through given point and parallel to given vector, equation of line passing through two given points, distance of a point from a line, distance between two skew lines, distance between two parallel lines.

Unit 10- Plane Equation of plane in normal form, equation of plane passing through the given point and perpendicular to given vector, equation of plane passing through the given point and parallel to two given vectors, equation of plane passing through three non collinear points, equation of plane passing through the intersection of two given planes, angle between two planes, angle between line and plane, condition for the co-planarity of two lines, distance of a point from a plane.

Unit 11- Linear programming problems Introduction of L.P.P. definition of constraints, objective function, optimization, constraint equations, non-negativity restrictions, feasible and infeasible region, feasible solutions, Mathematical formulation-mathematical formulation of L.P.P. different types of L.P.P. problems, graphical solutions for problem in two variables, optimum feasible solution.

PART – 2

Unit 1- Continuity of a function at a point : left hand limit, right hand limit, definition of continuity of a function at a point, discontinuity of a function, types of discontinuity, algebra of continuous functions, continuity in interval-definition, continuity of some standard functions polynomial, rational, trigonometric, exponential and logarithmic function.

Unit 2- Differentiation Revision- revision of derivative, relationship between continuity and differentiability-left hand derivative and right hand derivative (need and concept), every differentiable function is continuous but converse is not true, Derivative of composite function-chain rule, derivative of inverse function, derivative of inverse trigonometric function : Derivative of implicit function definition and examples, derivative of parametric function – definition of parametric function , exponential and logarithmic function derivative of functions which are expressed in one of the following form a) product of functions, b) quotient of functions, c) higher order derivative, second order derivative d) $[f(x)] [g(x)]$

Unit 3- Applications of derivative Geometrical application-tangent and normal at a point, Rolle's theorem, and Mean value theorem and their geometrical interpretation (without proof), derivative as a rate measure-introduction, increasing and decreasing function, approximation, Maxima and minima introduction of extreme and extreme values, maxima and minima in a closed interval, first derivative test, second derivative test.

Unit 4- Integration Indefinite integrals-methods of integration, substitution method, integrals of the various types, integration by parts (reduction formulae are not expected), integration by partial fraction-factors involving repeated and non-repeated linear factors, non-repeated quadratic factors, definite integral-definite integral as a limit of sum, fundamental theorem of integral calculus, evaluation of definite integral 1) by substitution, 2) integration by parts, properties of definite integrals.

Unit 5-Applications of definite integral Area under the curve: area bounded by curve and axis (simple problems), area bounded by two curves, volume of solid of revolution-volume of solid obtained by revolving the area under the curve about the axis (simple problems).

Unit 6-Differential equation Definition-differential equation, order, degree, general solution, particular solution of differential equation, formation of differential equation-formation of differential equation by eliminating arbitrary constants (at most two constants), solution of first order and first degree differential equation-variable separable method, homogeneous differential equation (equation reducible to homogeneous form are not expected), Linear differential equation, applications : population growth, bacterial colony growth, surface area, Newton's laws of cooling, radioactive decay.

Unit 7- Statistics Bivariate frequency distribution - bivariate data, tabulation of bivariate data, scatter diagram, covariance of ungrouped data, covariance for bivariate frequency distribution, Karl Pearson's coefficient of correlation.

Unit 8- Probability distribution Probability distribution of a random variable-definition of a random variable, discrete and continuous random variable, probability mass function (p.m.f.), probability distribution of a discrete random variable, cumulative probability distribution of a discrete random variable, expected value, variance and standard deviation of a discrete random variable, probability density function, distribution function of a continuous random variable.

Unit 9- Bernoulli trials and Binomial distribution Definition of Bernoulli trial, conditions for Binomial distribution, binomial distribution (p.m.f.), mean, variance and standard deviation, calculation of probabilities (without proof), Normal distribution :, man, variance and standard deviation, standard normal variable, simple problems (without proof).

MHT CET Biology Syllabus

Std. XI

Section I - Botany

Unit 1- Diversity in Living World: Chapter 1- Diversity in organisms: 1. Diversity in living organisms-Brief idea. 2. Systematic and binomial system of nomenclature - meaning of the terms taxonomy, systematics, classification and nomenclature, Need of classification. Three domains of life, Concept of species. Taxonomic hierarchy with examples. Binomial nomenclature explanation, significance and examples. 3. Classification of living organisms (five Kingdom classification) – Major groups and principles of classification for each Kingdom with examples. 4. Lichens - Meaning, characters, examples and importance. 5. Viruses and viroid - Definitions, characters, types with examples, Economic importance and list of viral diseases. Chapter 2 - Kingdom Plantae: 1. Salient features of major plant groups - Algae, Bryophytes, Pteridophyta, Gymnosperms and Angiosperms (Dicotyledons and Monocotyledons). Three to five salient features and two examples of each category. 2. Botanical gardens and herbaria - Meaning, importance and list of gardens and herbaria in India.

Unit 2- Structure and function of cell: Chapter 3 - Biochemistry of cell: 1. Basic chemical constituents of living bodies. 2. Structure and function of carbohydrates, proteins, lipids and nucleic acids in brief. 3. Enzymes - Definition, Types, general properties, Enzyme action and factors affecting enzyme activity in brief. Chapter 4 Cell Division: 1. Cell cycle 2. Mitosis 3. Meiosis

Unit 3- Structural organization in plants Chapter 5 - Morphology of Plants: 1. Morphology, anatomy and functions of different parts - Root, stem, leaf, inflorescence, flower, fruit and seed. 2. Plant tissues.

Unit 4- Plant Physiology Chapter 6 - Plant Water Relations and Mineral Nutrition: 1. Movement of water, food, nutrients and gases - Absorption of water and minerals, Apoplast and Symplast Pathways. Active and passive absorption in brief. 2. Guttation Ascent of sap, root pressure concept and cohesion - tension theory. Translocation of sugars through phloem brief account. Transpiration – structure of stomata, mechanism of opening and closing of stomata, Role of K⁺ ions 3. Role of water and minerals - macronutrients and micronutrients and their role. Mineral deficiency symptoms, Mineral toxicity, Elementary idea of Hydroponics, Nitrogen Metabolism (nitrogen cycle, biological nitrogen fixation) Chapter 7 - Plant Growth and Development: Seed dormancy Germination - Hypogeal, epigeal and viviparous. Definition and characteristics of growth. Phases of growth, Conditions of growth, Differentiation, de- differentiation, redifferentiation Sequence of developmental process in a plant cell Growth regulators - auxins, gibberellins, cytokines, ethylene and abscissic acid (role in brief) Photoperiodism, Photomorphogenesis including brief account of Phytochromes Vernalization.

Section II – Zoology

Unit 1-Diversity in Living World Chapter 8 - Kingdom Animalia 1. Salient features of major phyla under kingdom Animalia. Classification of following phyla with three to five salient features and two examples of each category: Porifera, co elenterata ctenophora, Platyhelminthes, Nematelminthes, Annelida, Arthropoda, Mollusca, Echinodermata and Hemichordata. Classification of phylum chordata up to class level with three to five salient features and two examples of each category: Urochordata, Cephalochordata, Cyclostomata, Chondrichthyes, Osteichthyes, Amphibia, Reptilia, Aves and Mammalia. 2. Zoological parks and Museums - General idea with list.

Unit 2- Structure and function of cell Chapter 9 - Organization of Cell 1. Cell theory - brief account 2. Prokaryotic and eukaryotic cell - structure and examples. 3. Plant cell and animal cell. 4. Nuclear organization - Nucleus, nucleolus and nucleoplasm. 5. Cell wall and cell membrane - (fluid mosaic model). 6. Cell organelles: Plastids, Mitochondria, Golgi complex, Lysosomes, and Endoplasmic reticulum, Vacuoles, Ribosome and Centrioles (ultrastructure and functions). Micro bodies, cytoskeleton, cilia and flagella.

Unit 3- Structural organization in Animals: Chapter 10- Study of Animal Tissues: 1. Animal tissues - types a) Epithelial tissues - simple epithelium (squamous, cuboidal, columnar, Ciliated, glandular). - compound epithelium (stratified). b) Connective tissue - (Areolar, Adipose, Tendons, Ligaments, Cartilage and Bone). c) Muscular tissue - (Smooth, striated and cardiac). d)

Nervous tissue (Neurons, glial cells and types of neurons). Chapter 11- Study of Animal Type 1. Morphology, anatomy and functions of digestive, circulatory, respiratory, nervous, and reproductive systems of cockroach.

Unit 4- Human Physiology Chapter 12- Human Nutrition i) Digestive system in brief ii) Physiology of digestion, gastrointestinal hormones, Peristalsis. Calorific value of proteins, carbohydrates and fats iii) Absorption, assimilation and egestion iv) Nutritional and digestive disorders – PEM, indigestion, constipation, Jaundice, vomiting and diarrhea Chapter 13- Human Respiration Respiratory organs in animals (Recall only) i) Respiratory system in brief ii) Breathing- inspiration and expiration. iii) Exchange of gases, transport of CO₂ and O₂ and tissue respiration. Regulation of Respiration, Respiratory volumes iv) Respiratory disorders- Asthma, Emphysema and occupational lung diseases. Chapter 14 - Human skeleton and Locomotion: Brief account of human skeleton: A] Axial Skeleton B] Appendicular Skeleton (Details to be dealt with the relevant practical) Types of joints - synarthroses, amphiarthroses, and diarthroses. Types of diarthroses - ball and socket, hinge, condyloid, pivot, saddle and gliding joints. Types of Movement- Ciliary, Flagella, Muscular Mechanism of muscle movement: Contractile proteins and Muscle contraction. Skeletal and muscular disorders – Myasthenia gravis, Osteoporosis, arthritis, muscular dystrophy tetany and gout.

Biology Section I – BOTANY

Std. XII

Unit 1-Genetics and Evolution: Chapter 1 - Genetic Basis of Inheritance: Mendelian inheritance. Deviations from Mendelian ratio (gene interaction in complete dominance, co-dominance, multiple alleles and Inheritance of blood groups), Pleiotropy, Elementary idea of polygenic inheritance. Chapter 2 - Gene: its nature, expression and regulation: Modern concept of gene in brief-cistron, muton and recon. DNA as genetic material, structure of DNA as given by Watson and Crick's model, DNA Packaging, semi conservative replication of eukaryotic DNA. RNA: General structure, types and functions. Protein Synthesis; central dogma, Transcription; Translation-Genetic Code, Gene Expression and Gene Regulation (The Lac operon as a typical model of gene regulation).

Unit 2- Biotechnology and its application: Chapter 3 - Biotechnology: Process and Application: Genetic engineering (Recombinant DNA technology): Transposons, Plasmids, Bacteriophages; Producing Restriction Fragments, Preparing and cloning a DNA Library, Gene Amplification (PCR). Application of Biotechnology in Agriculture – BT crops Biosafety Issues (Bio piracy and patents)

Unit 3- Biology and Human Welfare : Chapter 4 - Enhancement in Food Production Plant Breeding Tissue Culture: Concept of Cellular Tot potency, Requirements of Tissue Culture (in brief), Callus Culture, Suspension Culture. Single Cell Protein. Bio fortification. Chapter 5 - Microbes in Human Welfare: Microbes in Household food processing. Microbes in Industrial Production. Microbes in Sewage Treatment. Microbes in Biogas (energy) Production. Microbes as Biocontrol Agents. Microbes as Bio fertilizers.

Unit 4- Plant Physiology: Chapter 6 - Photosynthesis Autotrophic nutrition Site of Photosynthesis Photosynthetic Pigments and their role. Light-Dependent Reactions (Cyclic and non-cyclic photophosphorylation) Light-Independent Reactions (C3 and C4 Pathways) Chemiosmotic hypothesis, Photorespiration, Factors affecting Photosynthesis. Law of limiting factors. Chapter 7 - Respiration ATP as currency of Energy Mechanism of Aerobic (Glycolysis, TCA Cycle and Electron Transport System) and Anaerobic Respiration. Fermentation Exchange of gases Amphibolic pathway. Respiratory quotient of Nutrients. Significance of Respiration.

Unit 5- Reproduction in Organisms: Chapter 8 - Reproduction in Plants Modes of Reproduction (Asexual and Sexual). Asexual reproduction; uniparental modes vegetative propagation, micro-propagation Sexual Reproduction: structure of flower Development of male gametophyte, Structure of anatropous ovule. Development of female Gametophyte. Pollination: Types and Agencies. Outbreeding devices; pollen-pistil interaction. Double Fertilization: Process and Significance. Post-fertilization changes (development of endosperm and embryo, development of seed and formation of fruit) Special modes-apomixes, parthenocarpy, polyembryony. Significance of seed and fruit formation.

Unit 6- Ecology and Environment Chapter 9: Organisms and Environment -I: Habitat and Niche Ecosystems: Patterns, components, productivity and decomposition, energy flow; pyramids of number, biomass, energy; nutrient cycling (carbon and phosphorous). Ecological succession, Ecological services carbon fixation, pollination, oxygen release. Environmental issues: agrochemicals and their effects, solid waste management, Green-house effect and global warming, ozone depletion, deforestation, case studies.

Biology Section II - ZOOLOGY

Unit 1-Genetics and Evolution : Chapter 10 - Origin and the Evolution of Life : Origin of Life: Early Earth, Spontaneous, assembly of organic compounds, Evolution: Darwin's contribution, Modern Synthetic Theory of evolution, Biological Evidences, Mechanism of evolution; Gene flow and genetic drift; Hardy Weinberg principle; Adaptive radiation. Origin and Evolution of Human being. **Chapter 11-** Chromosomal Basis of Inheritance- The Chromosomal Theory. Chromosomes. Linkage and Crossing Over. Sex-linked Inheritance (Hemophilia and colour blindness). Sex Determination in Human being, birds, and honey bee. Mendelian disorders in humans-Thalassemia. Chromosomal disorders in human: Down's syndrome, Turner's syndrome and Klinefelter's syndrome.

Unit 2- Biotechnology and its application: Chapter 12- Genetic Engineering and Genomics DNA Finger Printing. Genomics and Human Genome Project. Biotechnological Applications in Health: Human insulin and vaccine production, Gene Therapy. Transgenic animals.

Unit 3- Biology and Human Welfare Chapter 13- Human Health and Diseases Concepts of Immunology: Immunity Types, Vaccines, Structure of Antibody, Antigen-Antibody Complex, Antigens on blood cells. Pathogens and Parasites (Amoebiasis, Malaria, Filariasis, Ascariasis, Typhoid, Pneumonia, Common cold and ring worm). Adolescence, drug and alcohol abuse. Cancer and AIDS. Chapter 14- Animal Husbandry Management of Farms and Farm Animals. Dairy. Poultry. Animal Breeding. Bee-Keeping. Fisheries. Sericulture Lac culture

Unit 4- Human Physiology: Chapter 15- Circulation Blood composition and coagulation, Blood groups. Structure and pumping action of Heart. Blood Vessels. Pulmonary and Systemic Circulation. Heart beat and Pulse. Rhythmicity of Heart beat. Cardiac output, Regulation of cardiac activity. Blood related disorders: Hypertension, coronary artery disease, angina pectoris, and heart failure. ECG, Lymphatic System (Brief idea): Composition of lymph and its functions. Chapter 16- Excretion and osmoregulation Modes of excretion-Ammonotelism, ureotelism, uricotelism. Excretory System. Composition and formation of urine. Role of Kidney in Osmoregulation. Regulation of kidney function: renin angiotensin, atrial natriuretic factor, ADH and Diabetes insipidus, role of other organs in excretion. Disorders; Kidney failure, Dialysis, Kidney stone (renal calculi). Transplantation. Uremia, nephritis. Chapter 17- Control and Co-ordination Nervous System Structure and functions of brain and Spinal cord, brief idea about PNS and ANS. Transmission of nerve impulse. Reflex action. Sensory receptors (eye and ear), Sensory perception, general idea of other sense organs. Endocrine System Endocrine glands Hormones and their functions Mechanism of hormone action. Hormones as messengers and regulators. Hormonal imbalance and diseases: Common disorders (Dwarfism, Acromegaly, cretinism, goitre, exophthalmic goitre, Diabetes mellitus, Addison's disease)

Unit 5- Reproduction in Organisms: Chapter 18- Human Reproduction Reproductive system in male and female. Histology of testis and ovary. Reproductive cycle. Production of gametes, fertilization, implantation. Embryo development up to three germinal layers. Pregnancy, placenta, parturition and lactation (Elementary idea). Reproductive health-birth control, Contraception and sexually transmitted diseases. MTP, Amniocentesis; Infertility and assisted reproductive technologies IVF, ZIFT, GIFT (elementary idea for general awareness).

Unit 6- Ecology and Environment: Chapter 19-Organisms and Environment-II: Population and ecological adaptations: population interactions-mutualism, competition, predation, parasitism, population attributes- growth, birth rate and death rate, age distribution. Biodiversity and its conservation Biodiversity- concept, patterns, importance, loss. Threats to and need for biodiversity conservation, Hotspots, endangered organisms, extinction, red data book, biosphere reserves, national parks and sanctuaries. Environmental issues: air pollution and its control, water pollution and its control and radioactive waste management. (Case studies any two)

MHT CET Physics Syllabus

Std. XI

Unit 1- Measurements Introduction, Need for measurement, Units for measurement, System of Units, S.I. Units, Fundamental and derived units, Dimensional analysis, Order of magnitude and significant figures, Accuracy and errors in measurement.

Unit 2- Scalars and Vectors Addition and subtraction of vectors, Product of vectors.

Unit 3- Projectile motion uniformly accelerated motion along straight line, Non uniform motion, Position time graph and velocity-time graph, Equation of a projectile path, Time of flight, Horizontal range, and Maximum height of a projectile, Relative velocity.

Unit 4- Force Types of forces, General idea of gravitation, electromagnetic and nuclear forces, Law of conservation of momentum, Work done by a variable force. Work energy theorem, Elastic and inelastic collisions in one and two dimensions, Inertial and non-inertial frames, Moment of force, Couple and properties of couple, Centre of mass, Centre of gravity, and Conditions of equilibrium of a rigid body.

Unit 5- Friction in solids and liquids Origin and nature of frictional forces, Laws of static friction, Laws of kinetic friction, Pressure due to fluid column, Pascal's Law and its applications, Effect of gravity on fluid pressure, Viscosity, Streamline flow, Turbulent flow, Viscous force, Newton's formula, Stokes' law, Equation for terminal velocity, Reynold's number, Bernoulli's principle and its applications.

Unit 6- Sound Waves and oscillations, Progressive waves, Characteristics of transverse waves, Characteristics of longitudinal waves, Sound as longitudinal wave motion, Relation between v , f and λ Newton's formula for velocity of sound, Laplace's correction.

Unit 7- Thermal properties of matter Temperature and heat, Measurement of temperature, Ideal-gas equation and absolute temperature, Thermal expansion, Specific heat capacity, Calorimetry, Change of state, Latent heat, Heat transfer.

Unit 8- Refraction of Light Refraction of monochromatic light, Snell's law, Total internal reflection, Critical angle, Optical fiber, Dispersion of light, Prism formula, Angular dispersion and dispersive power, Rainbow, Scattering of light, Blue colour of sky, Colour of sun at sunrise and sunset. Elementary idea of Raman Effect.

Unit 9- Ray optics Reflection of light by spherical mirrors, Refraction at single curved surface, Lens maker's equation, Combination of thin lenses in contact, Concept of conjugate foci, Correction of eye defects, Magnifying power of simple microscope, Magnifying power of compound microscope, Magnifying power of telescope, Reflecting telescope - schematic diagram with explanation.

Unit 10- Electrostatics Frictional electricity, Charges and their conservation, Coulomb's law and dielectric constant, Forces between multiple electric charges, Superposition principle of forces, Continuous distribution of charges, Concept of charge density, Electric field intensity, Potential energy, Electric potential due to point charge, Relation between electric field intensity and potential, Potential difference, Volt and electron volt, Electric dipole and dipole moment, Electric lines of force. Equipotential surfaces, P.E. of single charge and system of charges.

Unit 11- Current electricity Ohm's law, Resistance, Specific resistance, Temperature dependence of resistance, Colour code of carbon resistor, Series and parallel combination of resistors, E.M.F. and internal resistance of cell, Work done by electric current, Power in electric circuit, Cells in series and in parallel, Elementary idea of secondary cells.

Unit 12- Magnetic effect of electric current Oersted's experiment, Biot Savart's law, Right hand rule, Magnetic induction at the center of circular coil carrying current, Magnetic induction at a point along the axis of a coil carrying current, Fleming's left hand rule, Force between two infinitely long current carrying parallel conductors, Definition of Ampere, Force acting on a conductor carrying current in magnetic field, Torque on a current loop in magnetic field.

Unit 13- Magnetism Origin of magnetism due to moving charges, Equivalence between magnetic dipole and circular coil carrying current, Definition of magnetic dipole moment and its unit, Torque acting on a magnet in uniform magnetic induction, Bar magnet as an equivalent solenoid, Magnetic field lines, Magnetic induction due to bar magnet at a point along the axis and at a point along equator, Earth's magnetic field and magnetic elements, Electromagnets and factors affecting their strength.

Unit 14- Electromagnetic waves Electromagnetic waves and their characteristics, Transverse nature of electromagnetic waves, Electromagnetic spectrum, Space communication, Propagation of electromagnetic waves in atmosphere.

Std. XII

Unit 1- Circular motion Angular displacement, Angular velocity and angular acceleration, Relation between linear velocity and angular velocity, Uniform circular motion, Radial acceleration, Centripetal and centrifugal forces, Banking of roads, Vertical circular motion due to earth's gravitation, Equation for velocity and energy at different positions of vertical circular motion. Kinematical equations for circular motion in analogy with linear motion.

Unit 2- Gravitation Newton's law of gravitation, Projection of satellite, Periodic time, Statement of Kepler's laws of motion, Binding energy and escape velocity of a satellite, Weightlessness condition in orbit, Variation of 'g' due to altitude, latitude, depth and motion, Communication satellite and its uses.

Unit 3- Rotational motion Definition of M.I., K.E. of rotating body, Rolling motion, Physical significance of M.I., Radius of gyration, Torque, Principle of parallel and perpendicular axes, M.I. of some regular shaped bodies about specific axes, Angular momentum and its conservation.

Unit 4- Oscillations Explanation of periodic motion, S.H.M., Differential equation of linear S.H.M. Projection of U.C.M. on any diameter, Phase of S.H.M., K.E. and P.E. in S.H.M., Composition of two S.H.M.'s having same period and along same line, Simple pendulum, Damped S.H.M.

Unit 5- Elasticity General explanation of elastic property, Plasticity, Deformation, Definition of stress and strain, Hooke's law, Poisson's ratio, Elastic energy, Elastic constants and their relation, Determination of 'Y', Behavior of metal wire under increasing load, Applications of elastic behavior of materials.

Unit 6- Surface tension Surface tension on the basis of molecular theory, Surface energy, Surface tension, Angle of contact, Capillarity and capillary action, Effect of impurity and temperature on surface tension.

Unit 7- Wave motion Simple harmonic progressive waves, Reflection of transverse and longitudinal waves, Change of phase, Superposition of waves, Formation of beats, Doppler Effect in sound.

Unit 8- Stationary waves Study of vibrations in a finite medium, Formation of stationary waves on string, Study of vibrations of air columns, Free and Forced vibrations, Resonance.

Unit 9- Kinetic theory of gases and Radiation Concept of an ideal gas, Assumptions of kinetic theory, Mean free path, Derivation for pressure of a gas, Degrees of freedom, Derivation of Boyle's law, Thermodynamics- Thermal equilibrium and definition of temperature, 1st law of thermodynamics, 2nd law of thermodynamics, Heat engines and refrigerators, Qualitative idea of black body radiation, Wein's displacement law, Green-house effect, Stefan's law, Maxwell distribution, Law of equipartition of energy and application to Specific heat capacities of gases.

Unit 10- Wave theory of light Wave theory of light, Huygens' Principle, Construction of plane and spherical wave front, Wave front and wave normal, Reflection at plane surface, Refraction at plane surface, Polarization, Polaroids, Plane polarized light, Brewster's law, Doppler Effect in light.

Unit 11- Interference and diffraction Interference of light, Conditions for producing steady interference pattern, Young's experiment, Analytical treatment of interference bands, Measurement of wavelength by biprism experiment, Diffraction due to single slit, Rayleigh's criterion, Resolving power of a microscope and telescope, Difference between interference and diffraction.

Unit 12- Electrostatics Gauss' theorem proof and applications, Mechanical force on unit area of a charged conductor, Energy density of a medium, Dielectrics and electric polarization, Concept of condenser, Capacity of parallel plate condenser, Effect of dielectric on capacity, Energy of charged condenser, Condensers in series and parallel, van-de Graff generator.

Unit 13- Current electricity Kirchoff's law, Wheatstone's bridge, Meter Bridge, Potentiometer.

Unit 14- Magnetic effects of electric current Ampere's law and its applications, Moving coil galvanometer, Ammeter, Voltmeter, Sensitivity of moving coil galvanometer, Cyclotron.

Unit 15- Magnetism Circular current loop as a magnetic dipole, Magnetic dipole moment of revolving electron, Magnetization and magnetic intensity, Diamagnetism, Para magnetism, Ferromagnetism on the basis of domain theory, Curie temperature.

Unit 16- Electromagnetic inductions Laws of electromagnetic induction, proof of, $e = -d\Phi/dt$ Eddy currents, Self-induction and mutual induction, Need for displacement current, Transformer, Coil rotating in uniform magnetic induction, Alternating currents, Reactance and impedance, LC

oscillations (qualitative treatment only) Power in AC circuit with resistance, inductance and capacitance, Resonant circuit, Watt less current, AC generator.

Unit 17-Electrons and photons Photoelectric effect, Hertz and Lenard's observations, Einstein's equation, Particle nature of light.

Unit 18- Atoms, Molecules and Nuclei Alpha particle scattering experiment, Rutherford's model of atom. Bohr's model, Hydrogen spectrum, Composition and size of nucleus, Radioactivity, Decay law, mass energy relation, mass defect, B.E. per nucleon and its variation with mass number, Nuclear fission and fusion, de Broglie hypothesis, Matter waves – wave nature of particles, Wavelength of an electron, Davisson and Germer experiment, Continuous and characteristics X-rays.

Unit 19- Semiconductors Energy bands in solids, Intrinsic and extrinsic semiconductors, P-type and N-type semiconductor, P-N junction diode, I-V characteristics in forward and reverse bias, Rectifiers, Zener diode as a voltage regulator, Photodiode, Solar cell, I-V characteristics of LED, Transistor action and its characteristics, Transistor as an amplifier (CE mode), Transistor as a switch, Oscillators and Logic gates (OR, AND, NOT, NAND, NOR)

Unit 20- Communication systems Elements of communication system, bandwidth of signals, bandwidth of transmission medium, Need for modulation, Production and detection of an amplitude modulated wave, space communication, Propagation of electromagnetic waves in atmosphere.

MHT CET Chemistry Syllabus

Std. XI

Unit 1- Some Basic Concepts of Chemistry General Introduction: Importance and scope of chemistry. Historical approach to particulate nature of matter, laws of chemical combination, Dalton's atomic theory: concept of elements, atoms and molecules. Atomic and molecular masses mole concept and molar mass: Avogadro's law and Avogadro number, percentage composition, empirical and molecular formula, chemical reactions, stoichiometry and calculations based on stoichiometry.

Unit 2- States of matter: Gases and liquids- Three states of matter. Intermolecular interactions, type of bonding. Role of gas laws in elucidating the concept of the molecule, Boyle's law, Charles law, Gay Lussac's law. Ideal behavior, empirical derivation of gas equation. Ideal gas equation. Deviation from ideal behavior, liquefaction of gases. Critical temperature. Kinetic energy and molecular speeds (elementary idea) Liquid State – Vapour pressure, viscosity and surface tension.

Unit 3- Structure of atom Discovery of electron, proton and neutron; atomic number, isotopes and isobars. Rutherford's model and its limitations, Bohr's model and its limitations, concept of

shells and subshells, dual nature of matter and light, de Broglie's relationship, Heisenberg's uncertainty principle, concept of orbitals, quantum numbers, shapes of s, p and d orbitals, rules for filling electrons in orbitals – Aufbau principle, Pauli's exclusion principle and Hund's rule, electronic configuration of atoms, stability of half-filled and completely filled orbitals.

Unit 4- Periodic table Significance of classification, brief history of the development of periodic table, modern periodic law and present form of periodic table, periodic trends in properties of elements atomic radii, ionic radii. Inert gas radii nomenclature of elements with atomic number greater than 100. Enthalpy: Explanation and definition of term. Ionization enthalpy, electron gain enthalpy, electronegativity, valence.

Unit 5- Redox reactions Concept of oxidation and reduction, redox reactions, oxidation number, balancing redox reactions, in terms of loss and gain of electrons and change in oxidation number.

Unit 6- Chemical Equilibrium in physical and chemical processes, dynamic nature of equilibrium, law of mass action, equilibrium constant, factors affecting equilibrium, Le Chatelier's principle. Ionic equilibrium: Ionization of acids and bases, strong and weak electrolytes, degree of ionization, ionization of polybasic acids, acid strength, concept of pH. Hydrolysis of salts (elementary idea). Buffer solutions, solubility product, and common ion effect, Henderson equation.

Unit 7- Surface chemistry Adsorption – physisorption and chemisorption; factors affecting adsorption of gases on solids; catalysis : homogenous and heterogeneous, activity and selectivity; enzyme catalysis; colloidal state : distinction between true solutions, colloids and suspensions; Lyophilic, Lyophobic, multi-molecular and macromolecular colloids; properties of colloids; Tyndall effect, Brownian movement, electrophoresis, coagulation; emulsion – types of emulsions. Elementary idea of nanomaterials.

Unit 8- Nature of chemical bond Valence electrons, ionic bond, Born Haber cycle: covalent bond parameters. Lewis structure, polar character of covalent bond, covalent character of ionic bond, valence bond theory, resonance, geometry of covalent molecules, VSEPR theory, concept of hybridization involving s, p and d orbitals and shapes of some simple molecules, molecular orbital theory of homo-nuclear diatomic molecules, hydrogen bond.

Unit 9- Hydrogen Position of hydrogen in periodic table, occurrence, isotopes, preparation, properties and uses of hydrogen; hydrides ionic, covalent and interstitial; physical and chemical properties of water, heavy water. Hydrogen peroxide- preparation, properties and structure; hydrogen as a fuel. Uses of hydrogen peroxide.

Unit 10- s-Block elements (Alkali and alkaline earth metals) Group 1 and Group 2 elements : General introduction, electronic configuration, occurrence, anomalous properties of the first element of each group, diagonal relationship, trends in the variation of properties (such as ionization enthalpy, atomic and ionic radii), trends in chemical reactivity with oxygen, water, hydrogen and halogens; uses. Preparation and properties of some important compounds: Sodium carbonate, sodium hydroxide and sodium hydrogen carbonate, biological importance of sodium

and potassium. Calcium oxide and calcium carbonate and industrial uses of lime and limestone, biological importance of Magnesium and Calcium.

Unit 11- p-Block elements Group Introduction to p-Block elements Group 13 elements: General introduction, electronic configuration, occurrence. Variation of properties, oxidation states, trends in chemical reactivity, anomalous properties of first element of the group. Boron physical and chemical properties, some important compounds: borax, boric acids, boron hydrides. Aluminium; uses, reactions with acids and alkalis. Group 14 elements: General introduction, electronic configuration, occurrence, variation of properties, oxidation states, trends in chemical reactivity, anomalous behavior of first element. Carbon – catenation, allotropic forms, physical and chemical properties; uses of some important compounds; oxides. Important compounds of silicon and their uses: silicon tetrachloride, silicones, silicates and zeolites and structure of silicates.

Unit 12- Basic principles and techniques in organic chemistry General introduction, methods of qualitative and quantitative analysis, Classification and IUPAC nomenclature of organic compounds. Melting point and boiling point. Electronic displacements in a covalent bond; inductive effect, electrometric effect, resonance and hyper conjugation. Homolytic and heterolytic fission of a covalent bond; free radicals, carbonations, carbanions; electrophiles and nucleophiles, types of organic reactions.

Unit 13- Alkanes Classification of hydrocarbons – Nomenclature, isomerism, conformations (ethane only), physical properties, chemical reactions including free radical mechanism of halogenation, combustion and pyrolysis.

Unit 14- Alkenes Nomenclature, structure of double bond (ethane), geometrical isomerism, physical properties, methods of preparation. Chemical reactions; addition of hydrogen, halogen, water, hydrogen halides (Markovnikoff's addition and peroxide effect) ozonolysis, oxidation, mechanism of electrophilic addition.

Unit 15- Alkynes Nomenclature, structure of triple bond (ethylene), physical properties. Methods of preparation, chemical reactions: acidic character of alkynes, addition reaction of – hydrogen, halogens, hydrogen halides, water.

Unit 16- Aromatic compounds Introduction, IUPAC nomenclature; benzene; resonance aromaticity; chemical properties; mechanism of electrophilic substitution. – Nitration, sulphonation, halogenation, Friedel Craft alkylation and acylation; Carcinogenicity and toxicity.

Unit 17- Environmental chemistry Environmental pollution- air, water and soil pollution, chemical reactions in atmosphere, smog, major atmospheric pollutants, acid rain, ozone and its reactions, effects of depletion of ozone layer, green-house effect and global warming. Pollution due to industrial wastes, green chemistry as an alternative tool for reducing pollution, strategy for control of environmental pollution.

Std. XII

Unit 1- Solid State Classification of solids based on different forces; molecular, ionic, covalent and metallic solids, amorphous and crystalline solids (elementary idea), unit cell in two dimensional and three dimensional lattices, calculation of density of unit cell, packing in solids, voids, number of atoms per unit cell in a cubic unit cell, point defects, electrical and magnetic properties, Band theory of metals, conductors and semiconductors and insulators and n and p type semiconductors.

Unit 2- Solutions and colligative properties Types of solutions, expression of concentration of solids in liquids, solubility of gases in liquids, solid solutions, colligative properties –relative lowering of vapour pressure, Raoult's law elevation of boiling point, depression of freezing point, osmotic pressure, determination of molecular masses using colligative properties, abnormal molecular mass. Van't Hoff factor and calculations involving it.

Unit 3-Chemical thermodynamics and energetic Concepts of system, types of systems, surroundings. Work, heat, energy, extensive and intensive properties, state functions. First law of thermodynamics – internal energy and enthalpy, Hess' law of constant heat summation, enthalpy of bond dissociation, combustion, formation, atomization, sublimation. Phase transition, ionization and solution and dilution Introduction of entropy as a state function, free energy change for spontaneous and non-spontaneous processes, and equilibrium constant. Second and third law of thermodynamics

Unit 4- Electrochemistry Redox reactions, conductance in electrolytic solutions, specific and molar conductivity, variations of conductivity with concentration, Kohlrausch's Law, electrolysis and laws of electrolysis (elementary idea), dry cell –electrolytic and galvanic cells; lead accumulator, EMF of a cell, standard electrode potential, Nernst equation and its application to chemical cells, fuel cells; corrosion. Relation between Gibb's energy change and EMF of a cell.

Unit 5- Chemical kinetics Rate of reaction (average and instantaneous), factors affecting rate of reaction; concentration, temperature, catalyst; order and molecularity of a reaction; rate law and specific rate constant, integrated rate equations and half-life (only for zero and first order reactions); concept of collision theory (elementary idea, no mathematical treatment). Activation energy, Arrhenius equation.

Unit 6-General principles and processes of isolation of elements Principles and methods of extraction – concentration, oxidation, reduction electrolytic method and refining; occurrence and principle of extraction of aluminium, copper, zinc and iron

Unit 7- p-Block elements Group 15 elements: General introduction, electronic configuration, occurrence, oxidation states, trends in physical and chemical properties; nitrogen – preparation, properties and uses; compounds of nitrogen; preparation and properties of ammonia and nitric acid, oxides of nitrogen (structure only); Phosphorous-allotropic forms; compounds of phosphorous; preparation and properties of phosphine, halides (PCl_3 , PCl_5) and Oxo acids (elementary idea only). Group 16 elements: General introduction, electronic configuration, oxidation states, occurrence, trends in physical and chemical properties; dioxygen; preparation, properties and uses; Classification of oxides, simple oxides; Ozone. Sulphur – allotropic forms; compounds of Sulphur; preparation, properties and uses of Sulphur dioxide; Sulfuric acid;

industrial process of manufacture, properties and uses, Oxo acids of Sulphur (structures only). Group 17 elements: General introduction, electronic configuration, oxidation states, occurrence, trends in physical and chemical properties; compounds of halogens; preparation, properties and uses of chlorine and hydrochloric acid, inter-halogen compounds, Oxo acids of halogens (structure only). Group 18 elements: General introduction, electronic configuration. Occurrence, trends in physical and chemical properties, uses.

Unit 8- d and f Block Elements d-Block Elements - General introduction, electronic configuration, occurrence and characteristics of transition metals, 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 preparation and properties of $K_2Cr_2O_7$ and $KMnO_4$. f-Block elements Lanthanides – Electronic configuration, oxidation states, chemical reactivity and lanthanoid contraction and its consequences. Actinoids – Electronic configuration, oxidation states. Comparison with lanthanides.

Unit 9- Coordination compounds Coordination compounds – Introduction, ligands, coordination number, colour, magnetic properties and shapes, IUPAC nomenclature of mononuclear coordination compounds, bonding; Werner's theory, VBT, CFT. Isomerism, (structural and stereo) importance of coordination compounds.

Unit 10- Halogen derivatives of alkanes (and arenes) Halo-alkanes: Nomenclature, nature of C-X bond, physical and chemical properties, mechanism of substitution reactions. Stability of carbocations, R-S and d-l configuration Halo-arenes: Nature of C-X bond, substitution reactions (directive influence of halogen for mono-substituted compounds only) stability of carbocations, R-S and d-l configurations. Uses and environmental effects of – dichloromethane, trichloromethane, tetra-chloro-methane, iodoform, freons, DDT.

Unit 11- Alcohols, phenols and ethers Alcohols: Nomenclature, methods of preparation, physical and chemical properties (of primary alcohols only); identification of primary, secondary and tertiary alcohols; mechanism of dehydration, uses of methanol and ethanol. Phenols: Nomenclature, methods of preparation, physical and chemical properties, acidic nature of phenol, electrophilic substitution reactions, uses of phenols. Ethers: Nomenclature, methods of preparation, physical and chemical properties, uses.

Unit 12- Aldehydes, ketones and carboxylic acids Aldehydes and ketones: Nomenclature, nature of carbonyl group, methods of preparation. Physical and chemical properties, mechanism of nucleophilic addition, reactivity of alpha hydrogen in aldehydes; uses. Carboxylic acids: Nomenclature, acidic nature, methods of preparation, physical and chemical properties; uses.

Unit 13- Organic compounds containing nitrogen Nitro compounds-General methods of preparation and chemical reactions Amines : Nomenclature, classification, structure, methods of preparation, physical and chemical properties, uses, identification of primary, secondary and tertiary amines. Cyanides and isocyanides: Will be mentioned at relevant places in context. Diazonium salts: Preparation, chemical reactions and importance in synthetic organic chemistry.

Unit 14- Biomolecules Carbohydrates: Classification (aldoses and ketoses), mono saccharides d-1 configuration (glucose and fructose), oligosaccharides (sucrose, lactose, and maltose), polysaccharides (starch, cellulose, and glycogen), and importance. Proteins: Elementary idea of α -amino acids, peptide, linkage, polypeptides, proteins; structure of amines-primary, secondary, tertiary structure and quaternary structures (qualitative idea only), denaturation of proteins; enzymes. Lipids and hormones (elementary idea) excluding structure, their classification and functions. Vitamins: Classification and functions. Nucleic acids: DNA and RNA

Unit 15- Polymers Classification - natural and synthetic, methods of polymerization (addition and condensation), co-polymerization. Some important polymers; natural and synthetic like polythene, nylon, polyesters, Bakelite, and rubber. Biodegradable and non -biodegradable polymers.

Unit 16- Chemistry in everyday life: 1. Chemicals in medicines: analgesics, tranquillizers, antiseptics, disinfectants, antimicrobials, anti-fertility drugs, antibiotics, antacids, antihistamines elementary idea of antioxidants 2. Chemicals in food: Preservatives, artificial sweetening agents. 3. Cleansing agents: Soaps and detergents, cleansing action.

MHT CET Previous Year (2017) Chapter-Wise Marks Distribution

Chemistry

CHAPTER NAME	EASY	MEDIUM	DIFFICULT	TOTAL
Solid State	1	1	1	3
Solutions and Colligative properties	1	2	-	3
Chemical thermodynamics and energetics	-	4	-	4
Electrochemistry	-	2	-	2
Chemical Kinetics	-	3	-	3
General principles of isolation of elements	3	-	-	3
p- block elements	4	3	-	7
d and f block elements	3	-	-	3
Co-ordination compounds	2	-	-	2
Halogen Derivatives of Alkanes & Arenes	1	2	-	3
Alcohols, phenols and Ethers	3	-	-	3
Aldehyde, Ketones and carboxylic acids	1	3	-	4
Compounds containing Nitrogen	-	3	-	3
Biomolecules	1	1	1	3
Polymers	1	1	-	2
Chemistry in Everyday life	2	-	-	2

Biology

Chapter Name	Easy	Medium	Difficult	Total
Genetic Basis of Inheritance	3	1	0	4
Molecular Basis of Inheritance	5	1	1	7
Biotechnology	4	0	0	4
Enhancement in food production	5	1	0	6
Microbes in Human welfare	3	1	0	4
Photosynthesis	4	1	0	5
Respiration	4	1	0	5
Reproduction In Plants	11	0	1	12
Organisms & Environment	3	0	0	3
Origin and Evolution of Life	3	2	0	5
Chromosomal basis of inheritance	3	1	0	4
Genetics engineering and Genomics	3	2	0	5
Human Health and Disease	3	1	0	4
Animal Husbandry	2	1	0	3
Circulation	3	1	0	4
Excretion and Osmoregulation	4	1	0	5
Control and Co-ordination	5	1	0	6
Human reproduction	8	1	0	9
Organisms and Environment	4	1	0	5

Physics

Chapter Name	Easy	Medium	Difficult	Total
Circular Motion	-	2	1	3
Gravitation	1	-	-	1
Rotational Motion	-	1	1	2
Oscillations	2	2	-	4
Elasticity	-	1	-	1
Surface Tension	-	1	1	2
Wave Motion	-	2	-	2
Stationary Waves	1	3	-	4
Kinetic Theory of gases & Radiation	3	1	-	4
Wave theory of light	1	1	-	2
Interference and diffraction	2	1	-	3
Electrostatics	4	1	-	5

Current electricity	1	2	-	3
Magnetic Effects of Electric current	1	1	-	2
Magnetism	1	-	-	1
Electromagnetic Induction	-	2	-	2
Electrons and Photons	-	-	2	2
Atoms, Molecules and Nuclei	2	-	-	2
Semi-conductors	2	-	-	2
Communication Systems	1	-	-	1
Combo Combination questions	-	1	1	2

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