SYLLABI FOR UPSEE-2019

PAPER – 1 (PHYSICS, CHEMISTRY & MATHEMATICS)

Section A, PHYSICS

Measurement: Dimensional analysis and error estimation, dimensional compatibility and significant figures.

Motion in one dimension: Average velocity, instantaneous velocity, one-dimensional motion with constant accelerations, freely falling bodies.

Laws of Motion: Force and inertia, Newton's laws of motion, and their significance.

Motion in two dimensions: Projectile motion, uniform circular motion, tangential and radial acceleration in curve-linear motion, relative motion and relative acceleration.

Work, Power and Energy: Work done by a constant and variable forces, kinetic and potential energy, power, Conservative and non-conservative forces, conservation of energy, gravitational energy, work energy theorem, potential energy stored in a spring.

Linear Momentum & collisions: Linear momentum & impulse, conservation of linear momentum for two particle system, collisions, collision in one dimension, collision in two dimension, rocket propulsion.

Rotation of a rigid body about a fixed axis: Angular velocity and angular acceleration, rotational kinematics, rotational motion with constant angular acceleration relationship between angular and linear quantities, rotational energy, moment of inertia for a ring, rod, spherical shell, sphere and plane lamina, torque and angular acceleration, work and energy in rotational motion, rolling motion of a solid sphere and cylinder.

Gravitation: Gravitational field, Kepler's laws and motion of planets, planetary and satellite motion, geostationary satellite.

Oscillatory motion: Harmonic motion, oscillatory motion of mass attached to a spring, kinetic & potential energy, Time Period of a simple pendulum, comparing simple and harmonic motion with uniform circular motion, forced oscillations, damped oscillations and resonance.

Mechanics of solids and fluids: States of matter young's modulus, bulk modulus, shear modulus of rigidity, variations of pressure with depth, Buoyant forces and Archimedes principle, Pascal's law, Bernoulli's theorem and its application, surface energy, surface tension, angle of contact, capillary rise, coefficient of viscosity, viscous force, terminal velocity, Stoke's law, stream line motion, Reynold's numbers.

Heat and thermodynamics: First law of thermodynamics, specific heat of an ideal gas at constant volume and constant pressure, relation between them, thermodynamics process (reversible, irreversible, isothermal, adiabatic), second law of thermodynamics, concept of entropy and concept of absolute scale, efficiency of a Carnot engine, thermal conductivity, Newton's law of cooling, black body radiation, Wien's displacement law, Stefan's law.

Wave: Wave motion, phase, amplitude and velocity of wave, Newton's formula for longitudinal waves, propagation of sound waves in air, effect of temperature and pressure on velocity of sound, Laplace's correction, Principle of superposition, formation of standing waves, standing waves in strings and pipes, beats, Doppler's effect.

Electrostatics: Coulomb's law, electric field and potential due to point charge, dipole and its field along the axis and perpendicular to axis, electric flux, Gauss's theorem and its applications to find the field due to infinite sheet of charge, and inside the hallow conducting sphere, capacitance, parallel plate capacitor

with air and dielectric medium between the Plates, series and parallel combination of capacitors, energy of a capacitor, displacement currents.

Current Electricity: Concept of free and bound electrons, drift velocity and mobility, electric current, Ohm's law, resistivity, conductivity, temperature dependency of resistance, resistance in series and parallel combination, Kirchhoff's law and their application to network of resistances, principle of potentiometer, effect of temperature on resistance and its application.

Magnetic Effect of Current: Magnetic field due to current, Biot-Savart's law, magnetic field due to solenoid, motion of charge in a magnetic field, force on a current carrying conductors and torque on current loop in a magnetic field, magnetic flux, forces between two parallel current carrying conductors, moving coil galvanometer and its conversion into ammeter and voltmeter.

Magnetism in Matter: The magnetization of substance due to orbital and spin motions of electrons, magnetic moment of atoms, diamagnetism, paramagnetism, ferromagnetism, earth's magnetic field and its components and their measurement.

Electro magnetic induction: Inducede.m.f.,Faraday'slaws,Lenz'slaw,electromagneticinduction,self and mutual induction, B-H curve, hysteresis loss and its importance, eddycurrents.

Ray Optics and optical instruments: Sources of light, luminous intensity, luminous flux, illuminance, photometry, wave nature of light, Huygen's theory for propagation of light and rectilinear propagation of light, reflection of light , total internal reflection, reflection and refraction at spherical surfaces, focal length of a combination of lenses, spherical and chromatic aberration and their removal, refraction and dispersion of light due to a prism, simple and compound microscope, reflecting and refracting telescope, magnifying power and resolving power.

Wave Optics: Coherent and incoherent sources of light, interference, young's double slit experiment diffraction due to a single slit, linearly polarized light, Polaroid.

Modern Physics: Photo-electricequation,matterwaves,quantization,Planck'shypothesis,Bohr'smodel of hydrogen atom and its spectra, ionization potential, Rydberg constant, solar spectrum and Fraunhofer lines, fluorescence and phosphorescence, X-Rays and their productions, characteristic and continuous spectra.

Nuclear Instability, radioactive decay laws, Emission of α, β, γrays, Mass - defect, Mass Energy equivalence, Nuclear Fission Nuclear Reactors, Nuclear Fusion.

Classification of conductors, Insulators and semiconductors on the basis of energy bands in solids, PN junction, PN Diode, junction Transistors, Transistor as an amplifier and Oscillator.

Principles of Logic Gates (AND, OR and NOT) Analog Vs Digital communication, Difference between Radio and television, Signal propagation, Principle of LASER and MASER, Population Inversion, Spontaneous and stimulated Emission.

Section B, CHEMISTRY

Atomic Structure: Bohr's concept. Quantum numbers, Electronic configuration, molecular orbital theory for homo-nuclear molecules, Pauli's exclusion principle.

Chemical Bonding: Electrovalency, co-valency, hybridization involving s, p and d orbitals hydrogen bonding.

Redox Reactions: Oxidation number, oxidising and reducing agents, balancing of equations.

Chemical Equilibrium and Kinetics: Equilibrium constant (for gaseous system only) Le Chatelier's principle, ionic equilibrium, Ostwald's dilution law, hydrolysis, pH and buffer solution, solubility product, common-ion effect, rate constant and first order reaction.

Acid-Base Concepts: Bronsted Lowry & Lewis. **Electrochemistry**: Electrode potential and electro-chemical series. **Catalysis**: Types and applications.

Colloids: Types and preparation, Brownian movement, Tyndall effect, coagulation and peptization.

Colligative Properties of Solution: Lowering of vapor pressure, Osmotic pressure, depression of freezing point, elevation of boiling point, determination of molecular weight.

Periodic Table: Classification of elements on the basis of electronic configuration, properties of s,p and d block elements, ionization potential, electronegativity & electron affinity.

Preparation and Properties of the following: Hydrogen peroxide. copper sulfate, silver nitrate, plaster of paris, borax, Mohr's salt, alums, white and red lead, microcosmic salt and bleaching powder, sodium thiosulfate.

Thermo-chemistry: Exothermic & endothermic reactions Heat of reaction, Heat of combustion & formation, neutralization, Hess's law.

General Organic Chemistry: Shape of organic compounds, Inductive effect, mesomeric effect, electrophiles & nucleophiles, Reaction intermediates: carbonium ion, carbanions & free radical, Types of organic reactions, Cannizzaro Friedel Craft, Perkin, Aldol condensation.

Isomerism: Structural, Geometrical & Optical **IUPAC**: Nomenclature of simple organic compounds. **Polymers**: Addition & condensation polymers **Corbohydrates**: Monosaccharides.

Preparation and Properties Of the Followings: Hydrocarbons, monohydric alcohols, aldehydes, ketones, monocarboxylic acids, primary amines, benzene, nitrobenzene, aniline, phenol, benzaldehyde, benzoic acid, Grignard Reagent.

Solid State: Structure of simple ionic compounds, Crystal imperfections (point defects only),Born-Haber cycle

Petroleum: Important industrial fractions, cracking, octane number, anti-knocking compounds.

Section C, MATHEMATICS

Algebra: Sets relations & functions, De-Morgan's Law, Mapping Inverse relations, Equivalence relations, Peano's axioms, Definition of rationals and integers through equivalence relation, Indices and surds, Solutions of simultaneous and quadratic equations, A.P., G.P. and H.P., Special sums i.e. $\sum n^2$ and $\sum n^3$ ($n\sum N$), Partial fraction, Binomial theorem for any index, exponential series, Logarithm and Logarithmic series.Determinantsandtheiruseinsolvingsimultaneouslinearequations,Matrices,Algebraofmatrices, Inverse of a matrix, Use of matrix for solving equations.

Probability: Definition, Dependent and independent events, Numerical problem on addition and multiplication, theorem of probability**.**

Trigonometry: Identities, Trigonometric equations, properties of triangles, solution of triangles, heights and distances, Inverse function, Complex numbers and their properties, Cube roots of unity, De-Moivre's theorem.

Co-ordinate Geometry: Pair of straight lines, Circles, General equation of second degree, parabola, ellipse and hyperbola, tracing of conics.

Calculus: Limits & continuity of functions, Differentiation of function of function, tangents & normal, Simple examples of Maxima & Minima, Indeterminate forms, Integration of function by parts, by substitution and by partial fraction, definite integral, application to volumes and surfaces of frustums of sphere, cone and cylinder. Differential equations of first order and of first degree.

Vectors: Algebra of vectors, scalar and vector products of two and three vectors and their applications.
Dynamics: Velocity, composition of velocity, relative velocity, acceleration, composition of accelerations, Motion under gravity, Projectiles, Laws of motion, Principles of conservation of momentum and energy, direct impact of smooth bodies.
Statics: Composition of coplanar, concurrent and parallel forces moments and couples resultant of set of coplanar forces and condition of equilibrium, determination of centroid in simple cases, Problems involving friction.

PAPER – 2 (PHYSICS, CHEMISTRY & BIOLOGY)

Section A, PHYSICS

Measurement: Dimensional analysis and error estimation, dimensional compatibility and significant figures.
Motion in one dimension: Average velocity, instantaneous velocity, one-dimensional motion with constant accelerations, freely falling bodies.
Laws of Motion: Force and inertia, Newton's laws of motion, and their significance.
Motion in two dimensions: Projectile motion, uniform circular motion, tangential and radial acceleration in curve-linear motion, relative motion and relative acceleration.
Work, Power and Energy: Work done by a constant and variable forces, kinetic and potential energy, power, Conservative and non-conservative forces, conservation of energy, gravitational energy, work energy theorem, potential energy stored in a spring.
Linear Momentum & collisions: Linear momentum & impulse, conservation of linear momentum for two particle system, collisions, collision in one dimension, collision in two dimension, rocket propulsion.
Rotation of a rigid body about a fixed axis: Angular velocity and angular acceleration, rotational kinematics, rotational motion with constant angular acceleration relationship between angular and linear quantities, rotational energy, moment of inertia for a ring, rod, spherical shell, sphere and plane lamina, torque and angular acceleration, work and energy in rotational motion, rolling motion of a solid sphere and cylinder.
Gravitation: Gravitational field, Kepler's laws and motion of planets, planetary and satellite motion, geostationary satellite.
Oscillatory motion: Harmonic motion, oscillatory motion of mass attached to a spring, kinetic & potential energy, Time Period of a simple pendulum, comparing simple and harmonic motion with uniform circular motion, forced oscillations, damped oscillations andresonance.
Mechanics of solids and fluids: States of matter young's modulus, bulk modulus, shear modulus of rigidity, variations of pressure with depth, Buoyant forces and Archimedes principle, Pascal's law, Bernoulli's theorem and its application, surface energy, surface tension, angle of contact, capillary rise, coefficient of viscosity, viscous force, terminal velocity, Stoke's law, stream line motion, Reynold's numbers.
Heat and thermodynamics: First law of thermodynamics, specific heat of an ideal gas at constant volume and constant pressure, relation between them, thermodynamics process (reversible, irreversible, isothermal, adiabatic), second law of thermodynamics, concept of entropy and concept of absolute scale, efficiency of a Carnot engine, thermal conductivity, Newton's law of cooling, black body radiation, Wien's displacement law, Stefan's law.
Wave: Wave motion, phase, amplitude and velocity of wave, Newton's formula for longitudinal waves, propagation of sound waves in air, effect of temperature and pressure on velocity of sound, Laplace's

correction, Principle of superposition, formation of standing waves, standing waves in strings and pipes, beats, Doppler's effect.

Electrostatics: Coulomb's law, electric field and potential due to point charge, dipole and its field along the axis and perpendicular to axis, electric flux, Gauss's theorem and its applications to find the field due to infinite sheet of charge, and inside the hallow conducting sphere, capacitance, parallel plate capacitor with air and dielectric medium between the Plates, series and parallel combination of capacitors, energy of a capacitor, displacement currents.

Current Electricity: Concept of free and bound electrons, drift velocity and mobility, electric current, Ohm's law, resistivity, conductivity, temperature dependency of resistance, resistance in series and parallel combination, Kirchhoff's law and their application to network of resistances, principle of potentiometer, effect of temperature on resistance and its application.

Magnetic Effect of Current: Magnetic field due to current, Biot-Savart's law, magnetic field due to solenoid, motion of charge in a magnetic field, force on a current carrying conductors and torque on current loop in a magnetic field, magnetic flux, forces between two parallel current carrying conductors, moving coil galvanometer and its conversion into ammeter and voltmeter.

Magnetism in Matter: The magnetization of substance due to orbital and spin motions of electrons, magnetic moment of atoms, diamagnetism, paramagnetism, ferromagnetism, earth's magnetic field and its components and their measurement.

Electro magnetic induction: Inducede.m.f.,Faraday'slaws,Lenz'slaw,electromagneticinduction,self and mutual induction, B-H curve, hysteresis loss and its importance, eddycurrents.

Ray Optics and optical instruments: Sources of light, luminous intensity, luminous flux, illuminance, photometry, wave nature of light, Huygen's theory for propagation of light and rectilinear propagation of light, reflection of light , total internal reflection, reflection and refraction at spherical surfaces, focal length of a combination of lenses, spherical and chromatic aberration and their removal, refraction and dispersion of light due to a prism, simple and compound microscope, reflecting and refracting telescope, magnifying power and resolving power.

Wave Optics: Coherent and incoherent sources of light, interference, young's double slit experiment diffraction due to a single slit, linearly polarized light, Polaroid.

Modern Physics: Photo-electricequation,matterwaves,quantization,Planck'shypothesis,Bohr'smodel of hydrogen atom and its spectra, ionisation potential, Rydberg constant, solar spectrum and Fraunhofer lines, fluorescence and phosphorescence, X-Rays and their productions, characteristic and continuous spectra.

Nuclear Instability, radioactive decay laws, Emission of α, β, γrays, Mass - defect, Mass Energy equivalence, Nuclear Fission Nuclear Reactors, Nuclear Fusion.

Classification of conductors, Insulators and semiconductors on the basis of energy bands in solids, PN junction, PN Diode, junction Transistors, Transistor as an amplifier and Oscillator.

Principles of Logic Gates (AND, OR and NOT) Analog Vs Digital communication, Difference between Radio and television, Signal propagation, Principle of LASER and MASER, Population Inversion, Spontaneous and stimulated Emission.

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Atomic Structure: Bohr's concept. Quantum numbers, Electronic configuration, molecular orbitaltheory for homonuclear molecules, Pauli's exclusionprinciple.

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Periodic Table: Classification of elements on the basis of electronic configuration, properties of s,p and d block elements, ionization potential, electronegativity & electron affinity.

Preparation and Properties of the following: Hydrogen peroxide. copper sulfate, silver nitrate, plaster of Paris, borax, Mohr's salt, alums, white and red lead, microcosmic salt and bleaching powder, sodium thiosulfate.

Thermochemistry: Exothermic & endothermic reactions Heat of reaction, Heat of combustion & formation, neutralisation, Hess's law.

General Organic Chemistry: Shape of organic compounds, Inductive effect, mesmeric effect, electrophones & nucleophiles, Reaction intermediates: carbonium ion, carbanions & free radical, Types of organic reactions, Cannizzaro Friedel Craft, Perkin, Aldol condensation.

Isomerism: Structural, Geometrical & Optical **IUPAC**: Nomenclature of simple organic compounds. **Polymers**: Addition & condensation polymers **Corbohydrates**: Monosaccharides.

Preparation and Properties Of the Followings: Hydrocarbons, monohydric alcohols, aldehydes, ketones, monocarboxylic acids, primary amines, benzene, nitrobenzene, aniline, phenol, benzaldehyde, benzoic acid, Grignard Reagent.

SolidState:Structureofsimpleioniccompounds,Crystalimperfections(pointdefectsonly),Born-Haber cycle

Petroleum: Important industrial fractions, cracking, octane number, anti-knocking compounds.

Section-C BIOLOGY

Zoology

Origin of Life: Oparin's theory, Miller's Experiment, Viruses - structure, properties, distribution, classification and pathogenesis (Eg. AIDS, CANCER), Viroids & Prions, Biotic balance.

Organic Evolution: Relationship among organisms and Evidences of organic Evolution - Principles of Evolution - Lamarckism, Darwinism and Speciation.

Mechanism of Organic Evolution: Variations - Definition, causes and types, Mutations (Principles of Hugo de'vries), Role of mutations in speciation. Evolution through ages and human evolution

Human Genetics and Eugenics: Human hereditary traits, study of Twins, A.B.O. blood groups and their inheritance, Rh-factor, Sex determination. Chromosomal aberrations, Important human syndromes, Sex linked characters and their inheritance, Applied Genetics - eugenics, euthenics, euphenics & I.Q. Test.

Applied Biology: Wild life of India - Endangered species: Biosphere Reserves, National Parks and sanctuaries, Project Tiger, Conservation of wild life, Bio-energy, Poultry, Fisheries (edible fishes), Human

Population, Population explosion, problems & control. Test - Tube babies, & Amniocentesis, Application of Biotechnology in human welfare. Human Aging.

Mammalian Anatomy (Eg. Rabbit): Reproductive system (excluding embryonic development) Osteology, structure and organization of different systems.

Animal Physiology:

(A) *Animal Nutrition:* Food, Balanced diet, Nutritional imbalances and deficiency diseases, Digestion, Absorption, Assimilation of food, (comparison between human andRabbit).

(B) *Animal Excretion and Osmoregulation:* Chemical nature of excretory products in various animals, Physiology of excretion, Function of liver and kidney (Homeostatic regulatory functions of kidneys), Formation of urine, Osmoregulation bykidneys.

(C) *Respiratory system:* Exchange and transport of gases (O_2 and Co_2) factors affecting O_2 and Co_2 transport, Cellular respiration, different lung volumes, breathing and soundproduction.

(D) *Nervous systems:* Central, autonomic and peripheral nervous system, Receptors, Effectors, Reflex- action. Nature and conduction of Nerve- impulses, Synapse, Sense organs - Structure & working of Eye & Ear, Biochemistry of vision and tastebuds.

(E) *Endocrine System:* Different endocrine glands and Hormones - definition, types, characteristics and their functions, (in relation to human beings), Hormonal disorders andpheromones.

(F) *Circulatory System:* Circulation of body fluids- Blood and lymph, Open and closed vascular systems, Structure and working physiology of Heart, Comparison between arteries and veins, Lymphaticsystem.

(G) *AnimalDiversity:*ClassificationofAnimalkingdom(BasedonStorar&Eusinger),Characteristicfeature of different phyla and classes withexamples.

Detailed studies of followings:

(a) Protozoa

(i) Amoeba-Habit&Habitat,structure,locomotion,reproduction,Osmoregulation,Parasiticamoeba

- Entamoeba histolytica and Entamoeba gingivalis, structure, diseases caused by them and their control measures.

(ii) Plasmodium vivax-life-cycle, malaria therapy andcontrol.

(iii) Protozoan anddiseases

(b) Porifera: A simple sponge (Leucosolenia); Detailed study of structure & physiology, Sponge industry.

(c) Coelenterata: Hydra - Habit and Habitat, morphology, tissue differentiation in relation to physiological division of labour andregeneration.

(d) Aschelminthes: Ascaris- morphology, life-cycle, therapy andcontrol.

(e) Annelida: Pheretima posthuma - Bionomics and economic importance.

(f) Arthropoda: (Periplaneta): Structure- external andinternal.

Comparison between Periplaneta and Blatta.

(i) House fly & Mosquito: structure and life–cycle

(ii) Economic importance of insets & their control.

Botany

Plant Cell: Structure & functions electron microscopic structured mitochondria, Plastids centrosomes. Lysosomes, microsomes, endoplasmic reticulum, Nucleus, Golgibodes, D.N.A & R.N.A. Cytoplasm, membranes and cell wall.

Protoplasm: structure, components physical and chemical properties.

Cell division (formation) - free cell formation, Amitosis & Meiosis, Duplication of D.N.A.

Ecology: Ecological factors (atmospheric, edaphic, climatic, geological & biotic factors).

Ecosystem: Structure, components of ecosystem eg. Water soluble minerals and gases, producers consumers, decomposers, Pond and forest ecosystem.

Atmospheric pollution-causes and control, Types of pollution - Detergents, chemicals automobile exhaust, Radioactive matter, Smog, sound, Pesticides.

Genetics: Mendalism, Mendals experiment and law of inheritance.

Modern Classification of plant kingdom- (according to Ostwald & Tippo) (outline).

Seeds in angiospermic plants: description of development of angiospermic plants (life history of angiospermic plants).

Fruits: Dispersal of fruits and seeds

Cell differentiation Plant Tissue: Meristematic classification of meristematic&permanent tissue and functions and classification of tissue system.

Anatomy of Root, stem and leaf: difference between dicot and Monocot stem. Secondary growth of stem and root. Anatomy of hydrophytes, Xeophytes & Mesophytes.

Important phylums:

Algae: Habitat, general characters & uses, description of ulothrix & spirogyra. Bacteria: structure - types of nutrition, reproduction and economic importance.

Fungi: structure description of Rhizopus and yeast and their economic importance, Fermentation. Broyophyta: structure and economic importance, description of funaria (Moss)

Pteridophyta: general structures of pteridophytes description of fern (Droypteris) General study of gymnosperms and life history of cycas.

Classification of angiosperm,

Description of families - identification and economic importance Cruciferae, Malvaceae, Leguminosae, compositeae, cucurbitaceae. **Soil:**

Absorption of water through root hairs osmosis, Translocation and Root pressure Nitrogen cycle.

Special modes of nutrition in plants (Autotrophic, heterotrophic, Parasites, saprophytes, Symbionts insectivorous and their ecological relation.

Photosynthesis: Chloroplast, light, chlorophyll and Carbon dioxide, Mechanism of photosynthesis formation of A.T.P. and their functions and importance of photosynthesis.

Transpiration: factors and importance, Mechanism of opening and closing of stomata.

Respiration: aerobic, anaerobic respiration, mechanism of respiration (Glycolysis, Kreb's cycle, E.T.S.) Growth & movement: definition of growth, Region of growth & their measurements, types of movements in plants, Growth harmone.

PAPER – 3 (APTITUDE TEST FOR ARCHITECTURE& DESIGN)

Part – A: Mathematics & Aesthetic Sensitivity

MATHEMATICS

Algebra: Sets relations & functions, De-Morgan's Law, Mapping Inverse relations, Equivalence relations, Peano's axioms, Definition of rationals and integers through equivalence relation, Indices and surds, Solutions of simultaneous and quadratic equations, A.P., G.P. and H.P., Special sums i.e. $\sum n^2$ and $\sum n^3$ ($n\sum N$), Partial fraction, Binomial theorem for any index, exponential series, Logarithm and Logarithmic series.Determinantsandtheiruseinsolvingsimultaneouslinearequations,Matrices,Algebraofmatrices, Inverse of a matrix, Use of matrix for solving equations.

Probability: Definition, Dependent and independent events, Numerical problem on addition and multiplication, theorem of probability**.**

Trigonometry: Identities, Trigonometric equations, properties of triangles, solution of triangles, heights and distances, Inverse function, Complex numbers and their properties, Cube roots of unity, De-Moivre's theorem.

Co-ordinate Geometry: Pair of straight lines, Circles, General equation of second degree, parabola, ellipse

and hyperbola, tracing of conics.

Calculus: Limits & continuity of functions, Differentiation of function of function, tangents & normal, Simple examples of Maxima & Minima, Indeterminate forms, Integration of function by parts, by substitution and by partial fraction, definite integral, application to volumes and surfaces of frustums of sphere, cone and cylinder. Differential equations of first order and of first degree.

Vectors : Algebra of vectors, scalar and vector products of two and three vectors and their applications.

Dynamics: Velocity, composition of velocity, relative velocity, acceleration, composition of accelerations, Motion under gravity, Projectiles, Laws of motion, Principles of conservation of momentum and energy, direct impact of smooth bodies.

Statics: Composition of coplanar, concurrent and parallel forces moments and couples resultant of set of coplanar forces and condition of equilibrium, determination of centroid in simple cases, Problems involving friction.

Aesthetic sensitivity

Aesthetic sensitivity Test is aimed to evaluate a candidate for aesthetic Perception, Imagination, and Observation; Creativity and Communication; and Architectural awareness.

- Visualizing three dimensional objects from two dimensional drawings
- Visualizing different sides / surfaces of three dimensional objects.
- Identifying commonly used materials and objects based on their textural qualities.
- Analytical Reasoning
- Mental Ability
- Imaginative comprehension and expression
- Architectural awareness

Part- B: Drawing Aptitude

The Drawing Aptitude Test is aimed to evaluate a candidate for his understanding of Scale and Proportion; sense of perspective, color and; understanding of the effects of light on objects through shades and shadows

- Ability to sketch a given object proportionately and rendering the same in visually appealing manner
- Visualising and drawing the effects of light on the objects and their shadow cast on the surroundings.
- Sense of Perspective Drawing
- Combining and composing given three dimensional elements to form a building or structural form
- Creating interesting two dimensional compositions using given shapes or planner forms
- Creating visual harmony using colors in given composition
- Understanding of scale and sense of proportion

PAPER – 4 (APTITUDE TEST FOR GENERAL AWARENESS (BHMCT/BFAD/BFA/ MBA (Integrated))

(A) Reasoning & Logical Deduction:

- Geometrical designs &Identification
- Selection of related letters / words / numbers /figures
- Identification of odd thing / item out from a group
- Completion of numerical series based on the pattern /logic
- Fill in the blanks of the series based on the numerical pattern and logic of the series
- Syllogisms (logic based questions), Identification of logic & selection of correct answers based on the

logic

(B) Numerical Ability & Scientific Aptitude:

- Arithmetical questions up to 10^{th}standard
- Calculation of fraction, percentages, square rootsetc.
- Profit & Loss and Interest calculations
- Data/Table analysis, Graph & Bar Diagram and Pie Chart analysis
- Questions related to common use of science (Physics & Chemistry)
- Health & Nutrition

(C) General Knowledge:

- Current affairs / Events (Political, Social, Cultural &Economics)
- Historical events
- Geography including Tourist Places/Spots
- Current affairs relating to Business &Trade
- Countries & Currencies
- Latest Who's Who?
- Sports &Games

(D) English Language:

- Word Meanings
- Antonyms &Synonyms
- Meaning of Phrases &Idioms
- Fill in the blanks
- Complete / Improvement of the sentences with correct use of Pronouns, Verbs, Adverbs & Adjectives
- Reading comprehension's followed by questions

PAPER – 5 (APTITUDE TEST FOR LATERAL ENTRY IN ENGINEERING (B.SC. GRADUATEs) / LATERAL ENTRY IN 2nd Year MCA)
Part 1: Mathematics

Algebra: Sets relations & functions, De-Morgan's Law, Mapping Inverse relations, Equivalence relations, Peano's axioms, Definition of rationals and integers through equivalence relation, Indices and surds, Solutions of simultaneous and quadratic equations, A.P., G.P. and H.P., Special sums i.e. $\sum n^2$ and $\sum n^3$ ($n \sum N$), Partial fraction, Binomial theorem for any index, exponential series, Logarithm and Logarithmic series.Determinantsandtheiruseinsolvingsimultaneouslinearequations,Matrices,Algebraofmatrices, Inverse of a matrix, Use of matrix for solving equations.

Probability: Definition, Dependent and independent events, Numerical problem on addition and multiplication, theorem of probability**.**

Trigonometry: Identities, Trigonometric equations, properties of triangles, solution of triangles, heights and distances, Inverse function, Complex numbers and their properties, Cube roots of unity, De-Moivre's theorem.

Co-ordinate Geometry: Pair of straight lines, Circles, General equation of second degree, parabola, ellipse and hyperbola, tracing of conics.

Calculus: Limits & continuity of functions, Differentiation of function of function, tangents & normal, Simple examples of Maxima & Minima, Indeterminate forms, Integration of function by parts, by substitution and by partial fraction, definite integral, application to volumes and surfaces of frustums of sphere, cone and cylinder.

Differential equations of first order and of first degree.

Vectors: Algebra of vectors, scalar and vector products of two and three vectors and their applications.
Dynamics: Velocity, composition of velocity, relative velocity, acceleration, composition of accelerations, Motion under gravity, Projectiles, Laws of motion, Principles of conservation of momentum and energy, direct impact of smooth bodies.

Statics: Composition of coplanar, concurrent and parallel forces moments and couples resultant of set of coplanar forces and condition of equilibrium, determination of centroid in simple cases, Problems involving friction.

Part 2: Computer Concepts

Computer Basics: Organization of computer, Central Processing unit (CPU), Structure of instructions in CPU, Input/ Output devices, Computer memory, Memory organization,

Data Representation-: Representation of characters, Integers, Binary and hexadecimal representation, Binary arithmetic – addition, subtraction, division, multiplication, signed arithmetic and two's complement arithmetic. Floating point representation of numbers, normalized floating point representation, Boolean algebra, truth tables, Venn diagrams

Data Structures- Arrays, lists, stacks, queues

Computer Architecture: Block structure of computers, Communication between processor and I/O devices, Interrupts

Computer Language:- Assembly language and high level language, Computer programming in C

Operating System Basics

PAPER – 6 (APTITUDE TEST FOR MBA/ MCA)

The test is aimed at evaluating the verbal ability, quantitative aptitude, logical & abstract reasoning and knowledge of current affairs. The following is a brief description of contents of the test paper.

Section A (English Language): Grammar, vocabulary, uncommon words, sentence completion, synonyms, antonyms, relationship between words & phrases and comprehension of passages.

Section B (Numerical Aptitude): Numerical calculation, arithmetic, simple algebra, geometry and trigonometry, Interpretation of graphs, charts and tables.

Section C (Thinking and Decision Making): Creative thinking, unfamiliar relationships, verbal reasoning, finding patterns trends and Assessment of figures & diagrams.

Section D (General Awareness): Knowledge of current affairs and other issues related to trade, industry, economy, sports, culture and science.

PAPER – 7 (APTITUDE TEST FOR DIPLOMA HOLDERS IN PHARMACY)

1. Pharmaceutics-I
2. Pharmaceutical Chemistry -I
3. Pharmacognosy
4. Biochemistry and Clinical Pathology
5. Human Anatomy and Physiology
6. Health Education & Community Pharmacy
7. Pharmaceutics -II
8. Pharmaceutical Chemistry -II
9. Harmacology and Toxicology
10. Pharmaceutical Jurisprudence
11. Drug Store and Business management
12. Hospital and Clinical Pharmacy

PAPER – 8 (APTITUDE TEST FOR DIPLOMA HOLDERS IN ENGINEERING)

Engineering Mechanics, Engineering Graphics, Basic Electrical Engg., Basic Electronics Engg., Elements of computer science, Elementary Biology, Basic Workshop Practice and Physics/Chemistry/Maths of Diploma standard.

Appendix B & C

List of Institutions/Branches/Intake of UG & PG Courses

Please see the Website: http://www.upsee.nic.in or https://aktu.ac.in