

AP Ed.Cet-2016

**Syllabus for the subjects under Part-A and Part-B of the Education
Common Entrance Test - 2016**

PART - A: GENERAL ENGLISH

(Marks: 25)

1. Reading Comprehension.
2. Correction of Sentences, Articles, Prepositions, Tenses, Spelling.
3. Vocabulary, Synonyms, Antonyms.
4. Transformation of Sentences - Simple, Compound and Complex. Voices, Direct Speech and Indirect Speech.

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A P Ed.CET-2016

**Syllabus for the subjects under Part-A and Part-B of the
Education Common Entrance Test - 2016.**

PART - B: GENERAL KNOWLEDGE & TEACHING APTITUDE

(Marks: 15+10)=25

1. Questions will be designed to test the ability of the candidate's general knowledge of the environment around him and its application to society.
2. Questions will also be designed to test knowledge of current events and of such matters of every day observation and experience in their scientific outlook as is expected of an educated person.
3. The test will also include questions relating to India and its neighbouring Countries especially pertaining to History, Culture, Geography, Ecology, Economics, General Policy and Scientific Research.
4. Teaching requires certain characteristics like ability to communicate, ability to deal with Children, ability to recognise individual differences etc., apart from analytical thinking and general intelligence. One who has these characteristics will be able to become a good teacher after training. Questions relating to these aspects will be included to test one's teaching aptitude.

APEd.CET- 2016
Part –C

MATHEMATICS **(Marks: 100)**
(SYLLABUS)

1. Sets - relations - binary operations - semi groups - groups - subgroups -normal subgroups - homomorphism-Functions permutations permutation groups - cyclic groups - quotient group - automorphism.
2. Rings - Integral domains - fields - characteristic - homomorphism - Ideals - Prime Ideals - maximal ideals - Rings of permutations - polynomials - polynomial rings.
3. Vector spaces - linearly independent vectors - Basis - dimension - linear transformation -- Null space -- Range -- Rank of a linear transformation.
4. Elementary matrix operations - Elementary matrices – Determinants - properties - rank of matrix - inverse of a matrix - Eigen vectors - Eigen values - systems of linear equations.
5. Three dimensional geometry -- Coordinates -- distance formula - direction cosines - plane - angle between two planes – perpendicular distance from a point - Equation of a line - skew lines – shortest distance - The sphere - tangent plane power of a point - polar plane and pole - radical plane - coaxial system of spheres - The circle - radius - centre.
6. Real numbers - properties - functions - range - sequences - series - limits - continuity - differentiability - differentiation - mean value theorems -- L'Hospital rules -- Integration definite integrals - Reimann integral.
7. Differential equations - first order and first degree - different forms – Exact differential equations - change of variables - equation of first order but not of first degree - higher order linear differential equations - system of linear differential equations.
8. Elements of Number theory - Divisibility - primes - congruences - solutions of congruences - congruences of degree 1 The Euler function ϕ .
- Quadratic equations - quadratic expressions - change of sign – roots maximum - minimum values

Part – C

PHYSICAL SCIENCE: PHYSICS (Marks: 50) (SYLLABUS)

1. **Vector Analysis:** Scalar and Vector fields, Gradient of a scalar field. Divergence and curl of a vector field
2. **Mechanics of particles:** Laws of motion, Motion of variable mass system. Conservation of energy and momentum.
3. **Mechanics of Rigid bodies:** Definition of Rigid body, rotational kinematics relations, equation of motion for a rotating body, angular momentum. Eulers equation, precession of a top.
4. **Central forces:** Central forces - definition and examples, Conservative nature of central forces. Equation of motion under a central force, Gravitational field, motion under inverse square law, derivation of Kepler's laws.
Special Theory of Relativity:- Galilean relativity, absolute frames, postulates of special theory of relativity, Lorentz, transformation .
5. **Fundamentals of vibrations:** Simple harmonic oscillator and solution of the differential equation-physical characteristics of SHM, frequency of loaded spring taking its mass into consideration.
6. **Damped and forced oscillations:** Damped harmonic oscillator, solution of the differential equation of damped oscillator. Energy consideration, comparison with undamped harmonic oscillator.
7. **Vibrating strings:** Transverse wave propagation along a stretched string, general solution of wave equation and its significance, modes of vibration of stretched string clamped at both the ends, overtones.
8. **Kinetic theory of gases:** Deduction of Max Well's law of distribution of molecular speeds - Transport phenomena - Viscosity, thermal conduction and diffusion of gases.
9. **Thermodynamics:** Heat and work - Internal energy - Indicator Diagrams work done is Isothermal and adiabatic processes - First law of thermodynamic - significance and applications of first law of thermodynamics – Reversible and irreversible process - Carnot's theorem - Carnot's engine, efficiency - Clausius - Clapeyron equation - Second law of thermodynamics, different statements - Thermodynamic scale of temperature-Entropy concept - Entropy and disorder measurement of entropy changes in reversible and irreversible processes - Entropy of universe - Entropy - Temperature diagrams,
10. **Quantum theory of Radiation:** Black body Fery's black body distribution of energy in the spectrum of a black body - Wien's displacement law, Wien's law; Raleigh Jean law - Quantum theory of radiation - Planck's law deduction of Wien's law, Releigh Jeans law Wien's displacement from Planck's law.

11. **Basic Electronics:** Formation of electron energy bands in solids-classification of solids in terms of forbidden energy gap – Intrinsic and extrinsic semiconductors – P-N junction diode – Zener diode - pnp and npn transistors – or, and , not, nand, nor gates – Truth tables – De Morgan's laws.
12. **Interference:** The superposition principle - coherence - temporal and spatial conditions for interference of light. Interference by division of wave front - Fresnel's bipism - determination of wavelength of light change of phase on reflection - determination of thickness of a transparent material using prism. Interference by division of amplitude - oblique incidence of a plane wave on a thin film (the cosine law) - colours of thin films - non reflecting thin films - interference by a plane parallel film illuminated by a point surface - interference by film with two non parallel reflecting surfaces (wedge shaped film)-determination of diameter of wire Newton's rings in reflected and transmitted light. Determination of wavelength of monochromatic light Michelson Interferometer, types of fringes, determination of wavelength of monochromatic light, thickness of a thin plate.
13. **Diffraction:** Fraunhofer diffraction - diffraction due to a single slit and circular aperture. Limit of resolution - two-slit Fraunhofer diffraction - Fraunhofer diffraction pattern with N-slits - The Fourier transform and its properties - the shifting theorem and application of the FT to Fourier diffraction due to single slit, A double slit and the diffraction grating - The diffraction grating normal and oblique incidence determination of wavelength of light.
14. **Polarization and double refraction:** Polarized light - Brewsters law - Malus Law - phenomenon of double refraction is calcite - Refraction of plane wave incident on a negative crystal like calcite - Nichol prism. Analysis of polarized light by quarter wave plate - Babinet compensator.
15. **Lasers fiber optics and Holography:** Spontaneous, stimulated emission – Laser principle - population inversion - Einstein coefficients - Types of lasers, He - and New Ruby lasers and the application of lasers.
16. **Electrostatics:** Gauss law and its applications, electric field due to an infinite conducting sheet of charge, uniformly charged sphere and charged cylindrical conductors, mechanical force on a charged conductor, electric potential, potential due to charged spherical conductor, and electric dipole and an infinite line of charge.
17. **Dielectrics:** An atomic view, potential energy of a dipole in an electric field, polarization and charge density, dielectrics and Gauss's law - Relation between D.E. and P-Dielectric constant and susceptibility, Boundary conditions at the dielectric surface.
18. **Capacitance:** Capacity of concentric spheres and cylindrical condenser, capacity of parallel plate condenser with and without dielectric - electric energy stored by a charged condenser - force between plates of condenser, attracted disc electrometer construction and working.

19. **Moving charge in electric and magnetic fields:** Hall effect, cyclotron, synchrocyclotron and synochrotron - force on a current carrying conductor, force and torque on current loop - Biot Severt's law and calculation of B due to long straight wire, circular a current loop and solenoid.
20. **Electromagnetic induction:** Faraday's law - Lenz's law - expression for induced emf – electromotive force-time varying magnetic fields - Betatran - Ballistic galvanometer - theory - damping correction - self and mutual inductance, coefficient of coupling, calculation self inductance of along solenoid - toroid - energy stored in magnet in field principles of transformer.
21. **Varying and alternating currents:** CR circuits, LR circuits, growth and decay of currents, LCR circuit, critical damping - alternating current, relation between current and voltage in pure RC and L-vector diagrams LCR circuit power factor, series and parallel resonant circuit - Q - factor.
22. **Maxwell's equations and electromagnetic wave:** A review of basic laws of electricity and magnetism - displacement current - Maxwell's equations in differential form Maxwell's wave equation. Plane electromagnetic waves transverse nature of electromagnetic waves poynting theorem, production of electromagnetic waves (Hertz experiment)

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Part - C

PHYSICAL SCIENCE:

CHEMISTRY
(SYLLABUS)

(Marks: 50)

Inorganic Chemistry

1. Atomic Structure and Elementary Quantum Mechanics

Black Body radiation, Plack's Radiation law, Photoelectric effect, heat capacity of solids, Compton effect. De Broglie's hypothesis, Heisenberg's uncertainty principle, Sinusoidal wave equation, Hamiltonian operator, Schrodinger's wave equation and its importance, physical interpretation of the wave function, significance of ψ and ψ^2 .

2. Chemical Bonding

Ionic solids - lattice and hydration energy, solubility of ionic solids, hydration energy and hydration enthalpy of ions, covalent nature of ionic bond covalent bond - Stereochemistry of inorganic molecules - common hybridization and shapes of molecules Molecular orbital theory - Shapes and sign convention of atomic orbital, modes of overlapping, concepts of sigma and pi bonds, criteria for forming molecular orbital from atomic orbital, LCAO - concept, types of molecular orbital - bonding, antibonding and non-bonding, electron density distribution diagram for H_2^+ , MOED of homonuclear - H_2 , He_2^+ , B_2 , C_2 , N_2 , O_2 , F_2 and their ions (unhybridised diagrams only) and heteronuclear diatomic molecules CO, CN-, NO, NO- and HF. Bond order and magnetic properties.

3. Periodic properties

Review of trends in atomic and ionic radii - covalent radii - single, double and triple bond covalent radii, van der Waal radii, radii of cations, anions iso - electronic ions, ionization energy, Electropositivity, basic nature, reducing behavior, electron affinity and electro negativity - Methods of determination and evaluation - Pauling's and Mulliken's approach, application in predicting and explaining chemical behavior - nature of bond, bond length and bond angles, diagonal relationship.

4. s-block and p-block elements

Comparative study, salient feature of hydrides - ionic and covalent, polymeric, complex hydrides, reducing properties. Oxides - monoxide, peroxide and super oxide - basicity, oxidizing nature. Complexation tendencies. Comparative study of group 13-17.

Hydrides - Classification - ionic, covalent, metallic and complex hydrides. Synthesis of each class of hydrides. Structure of (a) covalent hydrides, electron deficient hydrides. Diborane, decaborane. (b) complex hydrides - borohydrides. Reactivity - stability, hydrolysis and reducing properties. Oxides - Classification - a) Normal - acidic, basic amphoteric and neutral, b) mixed, c) sub oxide, d) peroxide, e) super oxide. Structure of oxides of C, N, P, S and Cl. Reactivity - thermal stability, hydrolysis. Halides - Classification - ionic, covalent and complex halides. Structure of halides of B, C, Si, N, P, S. Reactivity - stability, hydrolysis. Lewis acid nature of boron trihalides. Oxy - acids - Oxy - acids of B, C, N, P, S and Cl - structure and acidic nature. Carboranes - Nomenclature, classification - closo, nido and arachno -*

preparation and structure. Borazole - Preparation, properties and structure.

Carbonyls - Classification - mono and polynuclear, general preparation, structure and bonding in $\text{Ni}(\text{CO})_4$, $\text{Fe}(\text{CO})_5$ and $\text{Co}_2(\text{CO})_8$.

5. d - block elements

Chemistry of elements of First Transition series - electronic configuration, metallic nature, atomic and ionic radii, ionization potential - Oxidation state - relative stability of various oxidation states, ionic and covalent character, acidic and basic nature, oxidizing and reducing nature of various oxidation states, redox potential - Frost and Latimer diagrams - stability, disproportionation and comproportionation of different oxidation states. Colour - d-d transition, colour and spectral behaviour of transition metal ions with respect of d^1-d^2 configuration. Magnetic behavior - determination of magnetic moment, Gou's balance, paramagnetism, diamagnetism. Complexation behaviour, stability of complexes - oxidation states, pi complexes, class-a, class-b and class-a/b acceptors. Catalytic properties - important examples.

Chemistry of elements of Second and Third Transition series - comparative treatment with their 3d analogues with respect to oxidation state, magnetic behavior, spectral properties. Study of Ti, Cr and Cu triads - Titanium triad - electronic configuration, reactivity of +III and +IV states - oxides, halides. Chromium triad - reactivity of +III and +VI states. Copper triad - reactivity of +I, +II, and +III states.

6. f- block elements

Chemistry of Lanthanides - electronic structure, position in periodic table, oxidation state, Atomic and ionic radii, Lanthanide contraction - cause and consequences, anomalous behaviour of post lanthanides, basicity, Complexation - type of donor ligands preferred, magnetic properties - paramagnetism. Colour and spectra - f-f transition. Occurrence and separation - ion exchange method, solvent extraction.

Chemistry of Actinides - General features - electronic configuration, oxidation state, actinide contraction, and colour and complex formation. Comparison with lanthanides.

7. Metals

Theories of bonding in metals - Free electron theory - thermal and electrical conductivity of metals, drawbacks. Valence bond theory - explanation of metallic properties and its limitations. Band theory - explanation of metallic properties, conductors, semi conductors and insulators. General methods involved in extraction of metals - minerals and ores, ore concentration - electromagnetic separation, gravity separation - Wilfley table, hydraulic classifier, leaching, froth

flotation, Calcination and roasting. Acid and alkali digestion. Reduction of oxides, carbonates, halides, sulphides, sulphates - smelting, flux, auto reduction, aluminothermic reduction, hydrometallurgy, electrolytic reduction. Purification of impure metals - liquation, fractional distillation, zone refining, oxidative processes - cupellation, basemetalisation, puddling, poling, thermal

decomposition, Amalgamation, Electrolysis. Alloys - Classification, substitutional solid solutions, interstitial solid solutions, intermetallic compounds, Hume - Rothery rules. Preparation of alloys - fusion, electro deposition, reduction and compression Uses ferrous and non-ferrous alloys.

8. Co-ordination compounds

Nomenclature of inorganic molecules and complex compounds - A. Simple inorganic molecules - multiplying affixes, structural affixes (i) cations - monatomic homopolyatomic, (ii) anions - monoatomic, homopolyatomic, heteropolyatomic (iii) radicals (iv) isopolyanions (v) heteropolyanions (vi) salts and salt like compound (vii) addition compounds. B. Complex compounds - Werner's theory - postulates, experimental evidences. Sidwick's theory - calculation of BAN, limitations. Metal Ligand bonding in Transition metal complexes - Valence bond theory - postulates, geometries of coordination number 4 - tetra hedral and square planer and 6 - octahedral. Limitations. Crystal field theory - features,

splitting of d - orbitals in octahedral, tetrahedral and square planar complexes, crystal field stabilization energy, (elementary treatment - diagrams only). Magnetic properties of Transition metal complexes. Types of magnetic behavior, spin only formula, calculation of magnetic moments. Electronic spectra of metal complexes - d-d transitions, spectrochemical series. Determination of composition of complexes, Job's method and mole ratio method, Stability constants, factors affecting stability of complexes. Isomerism in co-ordination compounds - Structural - ionization, hydrate, linkage, coordination, coordination position and polymerization isomerism. Stereoisomerisms - geometrical and optical isomerism.

Hard and soft acids and bases

Classification, Pearson's concept of hardness and softness, application of HSAB principles - stability of complexes, predicting the feasibility of a reaction.

Organic chemistry -1

9. Stereochemistry of carbon compounds

Molecular representations: Wedge, Fischer, Newman and Saw-horse formulae. Isomeris: Definition of homomers and isomers. Classification of isomers; Constitutional and Stereoisomers - definition and examples. Constitutional isomers: chain, functional, positional isomers and metarerism. Stereoisomers: enantiomers and diastereomers - definitions and examples. Conformational and Configurational isomerism - definition.

10. Structural theory in Organic Chemistry

Brief review of structural theory of organic chemistry, Hybridization, Bond length, bond angle, bond energy, curved arrow notation, drawing electron movements with half headed and double headed arrow. Types of bond fission and organic reagents (Electrophilic, Nucleophilic, and free radical reagents including neutral molecules like H_2O_2 , BF_3 , NH_3 & AlCl_3).

Bond polarization: Factors influencing the polarization of covalent bonds, electro negativity - inductive effect. Application of inductive effect, (a) Basicity of amines (b) Acidity carboxylic acids (c) Stability carbonim ions. Resonance or

Mesomere effect, application to (a) acidity phenol, (b) acidity of carboxylic

acides. Hyper conjugation and its application to stability to stability of carbonium ions, Free radicals and alkenes.

Types of organic reactions: Addition - electrophilic, nucleophilic and free radical. Substitution - electrophilic, nucleophilic and free radicium. Elimination - Examples (mechanism not required).

11. Acyclic Hydrocarbons

Alkanes - IUPAC Nomenclature of Hydrocarbons. Method of preparation: Hydrogenation of alkynes and alkenes, Wurtz reaction, Keibe's electrolysis, Corey-House reaction. Chemical reativity - inert nature, free radical substitution mechanism. Halogenation examples - reactivity, selectivity and orientation. Conformational analysis of ethane and n-butance.

Alkene - Preparation of alkenes (a) by dehydration of alcohols (b) dehydrohalogenation of alkyl halides (c) by dehalogenation of 1, 2 dihalides (brief mechanism), Zaitsev's rule. Properties: Addition of Hydrogen - heat of hydrogenation and stability of alkenes. Addition of halogen and its mechanism. Addition of HX, Markonikov's rule, addition of H_2O , HOX , H_2SO_4 with mechanism and addition of HBr in the presence of peroxide (anti - Markonikv's addition).

Oxidation - hydroxylation by KMnO_4 , OSO_4 Peracids (Via epoxidation), hydroboration, ozonolysis - location of double bond. Dienes - Types of dienes, reactions of conjugated dienes- 1, 2 and 1, 4 addition of HBr to 1,3 - butadiene and Diel's - Alder reaction.

Alkynes - Preparation by dehydrohalogenation of dihalides, dehalogenation of tetrahalides acetylene from CaC_2 . Properties: Acidity of acetylenic hydrogen (formation of metal acetylides). Preparation of higher acetylenes, metal - ammonia reductions. Physical properties. Chemical reactivity - electrophilic addition of X_2 , HX, H_2O (tautomerism), Oxidation (formation of enediol, 1, 2 diones and carboxylic acids), reduction and polymerization reaction of acetylene.

12. Benzene and its reactivity

Molecular formula of Benzene, structure of Benzene - open chain structure not possible, proposition of cyclic structure by kekule, dynamic equilibrium, evidence based on ozonolysis experiment, concept of resonance, resonance energy. Heat of hydrogenadon, heat of combustion of Benzene, mention of C-C bond lengths and orbital picture of Benzene.

Concept of aromaticity - aromaticity (definition), Huckl's rule - application to Benzenoid (Benzene, Napthalene, Anthracene and Phenanthrace) and Non-Benzenoi compounds (cyclopropenyl cation, cyclopentadienyl anion and tropylium cation).

Reactions General mechanism of electrophilic substitution mechanism of nitration and sulfonation. Mechanism of halogenatton, Friedel craft's alkylation and acylation. Orientation of aromatic substitution - Definition ortho, para and meta directing groups. Ring activating and deactivating group with examples (Electronic Interpretation of various groups like NO_2 and Phenolic). Orientation: (i) Amino methoxy and methyl groups, (ii) Carboxy, nitro mitrile, carbonyl and

sulfonic acid groups, (iii) Halogens (Explanation by taking minimum of one example from each type).

13. Arenes and polynuclear aromatic hydrocarbons

Polynuclear hydrocarbons - Structure of naphthalene and anthracene (Molecular Orbital diagram and resonance energy) Reactivity towards electrophilic substitution. Nitration and sulfonation as examples.

Hydroxy compounds

Nomenclature and classification of hydroxyl compounds. Preparation: from carbonyl compounds. Aryl carbinols by hydroxyl methylation. Phenols - (a) by diazotization (b) from sulfonic acid (c) from cumene (d) by hydrolysis of halobenzene. Physical properties - Hydrogen bonding (inter molecular and intramolecular) effect of hydrogen bonding on boiling point and water solubility Chemical properties (a) acidic nature of Phenols (b) Formation of aloxide/phenoxides and their reaction with RX (c) replacement of OH by X using PCl_5 , PBr_3 , SOCl_2 and with HX/ZnCl_2 . Esterification by (a) acid halides, anhydrides and acids (mechanism) (b) Esters of inorganic acids (c) dehydration of alcohols. Oxidation of alcohols by CrO_3 , KMnO_4 . Special reactions of phenols - (a) Bromination, (b) Kolbe - Schmidt reaction (c) Riemer Tiemann (d) Azo coupling. Identification of alcohols by oxidation - KMnO_4 , Ceric ammonium nitrate - Lucas reagent; Phenols by reaction with FeCl_3 , and by the solubility in NaOH . Polyhydroxyl compounds - Pinacol - Pinacolone rearrangement, Oxidative cleavage ($\text{Pb}(\text{OAc})_4$ & HIO_4).

Carbonyl compounds

Nomenclature of aliphatic and aromatic carbonyl compounds and isomerism. Synthesis of aldehydes & ketones from acid chloride by using 1,3-dithianes, nitriles and from carboxylic acids. Base catalysed reactions - with particular emphasis on Aldol, Cannizzaro reaction, Perkin reaction, Benzoin condensation, haloform reaction, Knoevenagel condensation. Oxidation reactions - KMnO_4 oxidation and auto oxidation, reduction - catalytic hydrogenation, Clemmenson's reduction, Wolf-kishner reduction, MPV reduction, reduction with LAH, NaBH_4 . Analysis - 2,4 - DNP test, Tollen's test, Fehlings test, Schiff's test, haloform test (with equations). Introduction to α -unsaturated carbonyl compounds.

Nitrogen compounds

Nitro hydro carbons: Nomenclature and classification - nitro hydrocarbons - structure. Tautomerism of nitroalkanes leading to acid and keto form. Preparation of Nitroalkanes. Reactivity - halogenation, reaction with HONO (Nitrous acid), Nef reaction and Mannich reaction leading to Michael addition and reduction. Aromatic Nitro hydrocarbons: Nomenclature, Preparation of

Nitrobenzene by Nitration (mechanism), from diazonium salts. Physical properties, chemical reactivity - orientation of electrophilic substitution on nitrobenzene. Reduction reaction of Nitrobenzenes in different media. Amines (Aliphatic and Aromatic): Nomenclature, classification into 1° , 2° , 3° Amines and Quaternary ammonium compounds. Preparative methods - 1. Ammonolysis of alkyl halides 2. Gabriel synthesis 3. Hoffman's bromamide reaction (mechanism). Reduction of Amides and Schmidt reaction.

Chemical Properties: (a) Alkylation (b) Acylation (c) Carbylamine reaction (d) Hinsberg separation. 5. Reaction with Nitrous acid of 1°, 2°, 3° (Aliphatic and aromatic amines). Electrophilic substitutions of Aromatic amines - Bromination and Nitration, oxidation of aryl and 3° Amines, diazotization. 6. Diazonium salts: Preparation with mechanism. Synthetic importance - (a) Replacement of diazonium group by - OH, X (Cl) - Sandmeyer and Gatterman reaction, by fluorine (Schiemann's reaction), by iodine, CN, NO₂, H and aryl groups. Coupling Reaction of diazonium. (i) with phenols (ii) with anilines. Reduction to phenyl hydrazines.

14. Heterocyclic Compounds

Introduction and definition: Simple 5 membered ring Compounds with one hetero atom Ex. Furan, Thiophene and pyrrole. Importance of ring systems - presence in important Natural products like hemoglobin and chlorophyll. Numbering the ring systems as per Greek letters and Numbers. Aromatic character - 6- electron system (Four - electrons from two double bonds and a pair of non bonded electrons from the hetero-atom). Tendency to undergo substitution reactions.

15. Carbohydrates

Introduction: Classification and nomenclature - classification into mono, oligo and polysaccharides into pentoses, hexoses etc. into aldoses and ketoses.

Monosaccharides: All discussion to be confined to (+) glucose as an example of aldo hexoses and (-) fructose as example of ketohexoses. Chemical properties and structural elucidation: Evidences for straight chain pentahydroxy aldehyde structure (Acetylation, reduction to n-hexane, cyanohydrin formation, reduction of Tollen's and Fehling's reagents and oxidation to gluconic and saccharic acids). Number of optically active, isomers possible for the structure, configuration of glucose based on D-glyceraldehydes as primary standard (No proof for configuration is required). Evidence for cyclic structure of glucose (some negative aldehyde tests and mutarotation).

Cyclic structure of glucose: Proposition of cyclic structure (Pyranose structure, anomeric Carbon and anomers). Proof for the ring size (methylal, hydrolysis oxidation reactions). Different ways of writing pyranose structure (Haworth formula and chair conformational formula). Structure of fructose: Evidence of 2 - ketohexose structure (formation of penta acetate, formation of cyanohydrin its hydrolysis and reduction by HI to give 2-Carboxy-n-hexane Same osazone formation from glucose and fructose, Hydrogen bonding in osazones, cyclic structure for fructose (Furanose structure and Haworth formula). Inter Conversion of Monosaccharides: Aldopentose to aldo hexose -eg: Arabinose to D-glucose, D-mannose (Kiliani - Fischer method). Epimers, Epimerisation. Lobry de Bruyn van Ekenstein rearrangement. Aldohexose -Aldopentose eg: D-glucose to D-arabinose by Ruff's degradation. Aldohexose (+) (glucose) to ketohexose (-) (fructose) and Ketohexose (Fructose) to aldohexose (Glucose).

16. Amino acids and proteins

Introduction: Definition of Amino Acids, classification of Amino acids into alpha, beta and gamma amino acids. Natural and essential amino acids - definition and examples, classification of alpha amino acids into acidic, basic and

neutral amino acids with examples. Methods of synthesis: General methods of synthesis of alpha amino acids (specific examples - Glycine, Alanine, valine and Leucine) by following methods: (a) From halogenated Carboxylic acid (b) Malonic ester synthesis (c) strecker's synthesis. Physical properties: Optical activity of naturally occurring amino acids: L -configuration, irrespective of sign of rotation. Zwitter ion structure - salt like character, solubility, melting points, amphoteric character, definition of isoelectric point.

Chemical properties: General reactions reactions due to amino and carboxyl groups - Lactams from gamma and delta amino acids by heating peptide bond (amide linkage). Structure and nomenclature of peptides and proteins, peptide synthesis.

Physical Chemistry

17. Gaseous state

Deviation of real gases from ideal behavior, Vanderwaal's equation of state. Critical Phenomena: PV - isotherms of real gases, continuity of state, Andrews's isotherms of carbon dioxide. The vander waals equation and the critical state, Derivation of relationship between critical constants and Vander waal's constants. Experimental determination critical constants. The law of corresponding states, reduced equation of state. Joule-Thomson effect and inversion temperature of a gas. Liquid action of gases: i) Linde's method based on Joule-Thomson effect, ii) Claude's method based on Adiabatic expansion of a gas.

18. Liquid state

Intermolecular forces, structure of liquids (qualitative description). Structural differences between solids, liquids and gases. Liquid crystals, the mesomorphic state: classification of liquid crystals into Smectic and Nematic, differences between liquid crystal and solid/liquid. Application of liquid crystals as LCD devices, lubricants and in digestion/assimilation of food.

19. Solid state:

Laws of Crystallography - (i) Law of Constancy of interfacial angles (ii) Law of Symmetry, symmetry elements in crystals (iii) Law of rationality of indices.

Definition of space lattice, unit cell. Bravais Lattices and Seven crystal systems. Structure of NaCl (Bragg's method and Powder method). Defects in crystals:

Stoichiometric and Non-stoichiometric defects. Band theory of Semiconductors: Extrinsic and Intrinsic semi conductors, n-type and p-type and their applications in photo electro chemical cells.

20. Dilute Solutions and Colligative properties

Dilute solutions, colligative properties, ideal and non-ideal solution. Raoult's law, relative lowering of vapor pressure, molecular weight determination. Osmosis laws of osmotic pressure, its measurement, determination of molecular weight from osmotic pressure. Elevation of boiling point and depression of freezing point. Derivation of relation between molecular weight and elevation in boiling point and depression in freezing point. Experimental methods for determining various colligative properties. Abnormal molar mass, Van't Hoff factor, degree of dissociation and association of solutes.

21. Colloids and Surface Chemistry

Definition of colloids, classification of colloids. Solids in liquids (sols): Preparation and properties - kinetic, optical and electrical: stability of colloids, protective action, Hardy-Schultz law, gold number. Liquids in liquids (emulsions): types of emulsions, preparation and emulsifier. Liquids in solids (gels) classification, preparation and properties, inhibition, general applications of colloids.

22. Solutions

Liquid - liquid mixtures - ideal liquid mixtures, Raoult's and Henry's law. Non-ideal systems. Azeotropes - HCl-H₂O, ethanol-water systems. Fractional distillation. Partially miscible liquids - phenol-water, trimethyl amine-water, nicotine-water systems, Lower and upper consolute temperature. Effect of impurity on consolute temperature. Immiscible liquids and steam distillation.

23. Chemical Kinetics

Rate of a reaction, factors influencing the rate of a reaction - concentration, temperature, pressure, solvent, light and catalyst. Concentration dependence of rates, mathematical characteristics of simple chemical reactions - Zero order, first order, second order, pseudo first order, half-life and mean life. Determination of order of a reaction - differential method, method of integration, half-life method and isolation method. Radioactive decay as first order phenomenon. Arrhenius equation, and concept of activation energy. Theories of chemical kinetics: effect of temperature on rate of a reaction Simple collision theory based on hard sphere model.

24. Thermodynamics

Definition of thermodynamic terms: System, surroundings, types of systems, and intensive and extensive properties. State and path functions and their differentials. Thermodynamic process. Concept of heat and work.

First law of Thermodynamics: Statement, definition of internal energy and enthalpy. Heat capacity, heat capacities at constant volume and pressure and their relationship. Joule's law - Joule. Thomson coefficient and inversion temperature. Calculation of w, q, dU and dH for the expansion of ideal gases under isothermal and adiabatic conditions for reversible process. Temperature dependence of enthalpy - Kirchoff's equation. Second law of Thermodynamic: need for the law, different statements of the law. Carnot cycle and its efficiency, Carnot Theorem. Thermodynamic scale of temperature. Concept of entropy, entropy as a state function, entropy as a function of V & T , entropy as a function of P & T , entropy change in physical processes. Gibbs and Helmholtz functions: Gibbs function (G) and Helmholtz function (A) as thermodynamic quantities. A & G as criteria for thermodynamic equilibrium and spontaneity, their advantage over entropy change. Variation of G with P, V and T .

Part - C

BIO- SCIENCE:

BOTANY
(SYLLABUS)

(Marks: 50)

Paper - I: Microbial Diversity, Cryptogams and Gymnosperms

Unit - I: Evolution of Life and Diversity of Microbes

Origin and evolution of Life - an outline.

1. **Viruses:** Structure, replication and transmission; plant diseases caused by viruses and their control.
2. **Bacteria:** Structure, nutrition, reproduction and economic importance. An outline of Plant diseases of important crop plants caused by bacteria and their control.
3. Brief account of Archaeobacteria, Chlamydia, Actinomycetes and Mycoplasma.
4. **Cyanobacteria:** Cell structure, thallus organisation and their prospecting (uses) – Biofertilizers. (Structure and life history of *Oscillatoria*, *Nostoc* and *Anabaena* For practicals only)

Unit - II: Algae and Fungi

5. **Algae:** General account, thallus organisation, structure, reproduction, classification and economic importance.
6. Structure, reproduction, life history and systematic position of *Oedogonium*, (*Coleochaete*, *Chara* for practical purpose only), *Ectocarpus* and *Polysiphonia*.
7. **Fungi:** General characters, classification and economic importance.
8. Structure, reproduction and life history of *Albugo*, *Penicillium*, *Puccinia*, *Alternaria*,. General account of plant diseases caused by Fungi and their control.
9. **Lichens:** Structure and reproduction; ecological and economic importance.

Unit - III: Bryophyta and Pteridophyta

10. **Bryophytes:** General characters, classification and alternation of generations.
11. Structure, reproduction, life history and systematic position of *Marchantia*, *Anthoceros* and *Polytrichum*. Evolution of Sporophyte in Bryophytes.
12. **Pteridophytes:** General characters, classification, alternation of generations and evolution of sporophyte.
13. Structure, reproduction, life history and systematic position of *Rhynia*, *Lycopodium*, *Equisetum*, (*Marsilea* for practical purpose only) .
14. Evolution of stele, heterospory and seed habit in Pteridophytes.

Unit - IV: Gymnosperms and Palaeobotany

15. **Gymnosperms:** General characters, structure, reproduction and classification.
16. Morphology of vegetative and reproductive parts, systemic position, life history of *Pinus* and *Gnetum*
17. Distribution and economic importance; endangered Gymnosperms.
18. **Palaeobotany:** Introduction, Fossils and fossilization; Geological time scale; Importance of fossils.
19. Bennettitales: General account

Paper - II: Anatomy, Embryology, Taxonomy and Medicinal Botany

Unit - I: Anatomy

1. **Meristems:** Types, histological organisation of shoot and root apices and theories.
2. **Tissues and Tissue Systems:** Simple and complex.
3. **Leaf:** Ontogeny, diversity of internal structure; stomata and epidermal outgrowths.
4. **Stem and root: Vascular cambium** - Formation and function. Anamalous secondary growth-General account. Stem - *Boerhavia, Bignonia, Dracaena*;
Root – *Beta*
5. **Wood structure:** General account. Study of local timbers – Teak (*Tectona grandis*), Rosewood, (*Albergia latefolia*), Red sanders, (*Pterocarpus santalinus*) Nallamaddi (*Terminalia tomentosa* (T. *alata*)), Yegisa (*Pterocarpus marsupium*) and Neem (*Azadirachta indica*).

Unit - II: Embryology

6. Introduction: History and importance of Embryology.
Anther structure, Microsporogenesis and development of male gametophyte.
7. Ovule structure and types; Megasporogenesis; types and development of female gametophyte. Pollination - Types; Pollen - pistil interaction. Fertilization.
8. Endosperm - Development and types. Embryo - development and types; Polyembryony and Apomixis - an outline.
9. Palynology: Principles and applications.

Unit - III: Taxonomy

11. Introduction: Principles of plant systematics, Systematics vs Taxonomy, Types of classification: Artificial, Natural and Phylogenetic.
12. Systems of classification: Salient features and comparative account of Bentham & Hooker and Engler & Prantle. An introduction to Angiosperm Phylogeny Group (APG).
13. Current concepts in Angiosperm Taxonomy: Embryology in relation to taxonomy, Cytotaxonomy, Chemotaxonomy and Numerical Taxonomy.
14. Nomenclature and Taxonomic resources: An introduction to ICBN, Vienna code - a brief account. Herbarium: Concept, techniques and applications.
15. Systematic study and economic importance of plants belong to the following families: Capparaceae, Rutaceae, Fabaceae (Faboideae/papilionoideae, Caesalpinioideae, Mimosoideae), Cucurbitaceae, Apiaceae, Asteraceae, Asclepiadaceae, Lamiaceae, Euphorbiaceae, Orchidaceae and Poaceae.

Unit - IV: Medicinal Botany

16. Ethnomedicine: Scope, interdisciplinary nature, distinction of Ethnomedicine from Folklore medicine. Outlines of Ayurveda, Siddha, Unani and Homeopathic systems of traditional medicine. Role of AYUSH, NMPB, CIMAP and CDRI.
17. Plants in primary health care: Common medicinal plants – Tippateega (*Tinospora cordifolia*), tulasi (*Oscimum sanctum*), pippallu (*Piper longum*), Karaka (*Terminalia chebula*), Kalabanda (*Aloe vera*), Turmeric (*Curcuma longa*).
18. Traditional medicine vs Modern medicine: Study of select plant examples used in traditional medicine as resource (active principles, structure, usage and pharmacological action) of modern medicine: Aswagandha (*Withania somnifera*), Sarpagandha (*Rauvolfia serpentina*), Nela usiri (*Phyllanthus amarus*), Amla (*Phyllanthus emblica*) and Brahmi (*Bacopa monnieri*).
19. Pharmacognosy: Introduction and scope. Adulteration of plant crude drugs and methods of identification - some examples. Indian Pharmacopoeia.
20. Plant crude drugs: Types, methods of collection, processing and storage practices. Evaluation of crude drugs.

III YEAR

BOTANY

III YEAR Degree with effective from the academic year 2010-11

Paper – III: Cell Biology, Genetics, Ecology and Biodiversity

Unit - I: Cell Biology

Plant cell envelopes: Ultra structure of cell wall, molecular organisation of cell membranes.

1. Nucleus: Ultrastructure, Nucleic acids - Structure and replication of DNA; types and functions of RNA.
2. Chromosomes: Morphology, organisation of DNA in a chromosome, Euchromatin and Heterochromatin. Karyotype.
3. Special types of chromosomes: Lampbrush, polytene and B - chromosomes.
4. Cell division: Cell cycle and its regulation; (mitosis, meiosis for practical observation)

Unit - II: Genetics

6. Mendelism: Laws of inheritance. Genetic interactions - Epistasis, complementary, supplementary and inhibitory genes.
7. Linkage and crossing over: A brief account, construction of genetic maps - 2 point and 3 point test cross data.
8. Mutations: Chromosomal aberrations - structural and numerical changes; Gene mutations, transposable elements.
9. Gene Expression: Organisation of gene, transcription, translation, mechanism and regulation of gene expression in prokaryotes (Lac. and Trp Operons).
10. Extra nuclear genome: Mitochondrial and plastid DNA, plasmids.

Unit - III: Ecology

11. Concept and components of Ecosystem. Energy flow, food chains, food webs, ecological pyramids,
12. Plants and environment: Ecological factors - Climatic (light and temperature), edaphic. Ecological adaptations of plants.
13. Population ecology: Natality, mortality, growth curves, ecotypes, ecads.
14. Community ecology: Frequency, density, cover, life forms, biological spectrum, ecological succession (Hydrosere, Xerosere).
15. Production ecology: Concepts of productivity, GPP, NPP, CR (Community Respiration) and secondary production, P/R ratio and Ecosystems.

Unit - IV: Biodiversity and Conservation

Biodiversity: Concepts, Convention on Biodiversity - Earth Summit. Types of biodiversity.

16. Levels, threats and value of Biodiversity.
17. Hot spots of India – Endemism, North Eastern Himalayas, Western Ghats.
18. Agro-biodiversity: Vavilov centres of crop plants.
19. Principles of conservation: IUCN threat-categories, RED data book - threatened & endangered plants of India. Role of organisations in the conservation of Biodiversity - IUCN, UNEP, WWF, NBPGR, NBD.

III YEAR Degree with effective from the academic year 2010-11

Paper - IV: Physiology, Tissue Culture, Biotechnology, Seed Technology and Horticulture

Unit - I: Physiology (Part A)

1. *Water Relations*: Diffusion, Imbibition, Osmosis; water, osmotic and pressure potentials; ascent of sap; transpiration; Stomatal structure and movements.
2. *Mineral Nutrition*: Essential macro and micro mineral nutrients and their role; symptoms of mineral deficiency; absorption of mineral ions; passive and active processes.
3. *Enzymes*: Nomenclature, characteristics, mechanism and regulation of enzyme action, enzyme kinetics, factors regulating enzyme action.
4. *Photosynthesis*: Photosynthetic pigments, absorption and action spectra; Red drop and Emerson enhancement effect; concept of two photosystems; mechanism of photosynthetic electron transport and evolution of oxygen; photophosphorylation; Carbon assimilation pathways: C₃, C₄ and CAM; photorespiration.
5. *Translocation of organic substances*: Mechanism of phloem transport; source-sink relationships.

Unit - II: Physiology (Part B)

6. *Respiration*: Aerobic and Anaerobic; Glycolysis, Krebs cycle; electron transport system, mechanism of oxidative phosphorylation, pentose phosphate pathway.
7. *Nitrogen Metabolism*: Biological nitrogen fixation, nitrate reduction, ammonia assimilation, protein synthesis.
8. *Lipid Metabolism*: Structure and functions of lipids; conversion of lipids to carbohydrates, -oxidation.
9. *Growth and Development*: Definition, phases and kinetics of growth. Physiological effects of phytohormon- auxins, gibberellins, cytokinins, ABA, ethylene and brassinosteroids; Physiology of flowering and photoperiodism, role of phytochrome in flowering.

10. *Stress Physiology*: Concept and plant responses to water, salt and temperature stresses.

Unit - III: Tissue Culture and Biotechnology

11. Tissue culture: Introduction, sterilization procedures, culture media - composition and preparation; explants.
12. Callus culture; cell and protoplast culture, Somatic hybrids and cybrids.
13. Applications of tissue culture: Production of pathogen free plants and somaclonal variants, production of stress resistance plants, secondary metabolites and synthetic seeds.
14. Biotechnology: Introduction, history and scope.
15. rDNA technology: Vectors and gene cloning and transgenic plants.

Unit - IV: Seed Technology and Horticulture

16. Seed: Seed dormancy; causes and methods of breaking dormancy.
17. Seed storage: Seed banks, factors affecting seed viability, genetic erosion. Seed production technology; seed testing and certification.
18. Horticulture techniques: Introduction, Cultivation of ornamental and vegetable crops, Bonsai and landscaping
19. Floriculture: Introduction. Importance of green house, polyhouse, mist chamber, shade nets; Micro irrigation systems. Floriculture potential and its trade in India
20. Vegetative Propagation of plants: Stem, root and leaf cuttings. Layering and bud grafting. Role of plant growth regulators in horticulture.

Part – C

BIO-SCIENCE:

**ZOOLOGY
(SYLLABUS)**

(Marks: 50)

Biology of Invertebrates and Cell Biology

1. General characters and classification of Major Invertebrate phyla with examples upto orders,
2. Protozoa: (i) Polystomella - type study, (ii) Trypanosoma life cycle only
3. Porifera : Canal system, Histology & Spicules.
4. Coelenterata: (i) Obelia type study, (ii) Polymorphism in Siphonophora, (iii) Corals and Coral reef formation.
5. Helminthes - Fasciola - Detailed type Study.
6. Annelida: (i) Metamerism - (ii) Comparative study of the following systems of Leach and Nereis - External Characters - Digestive system - Reproductive system - Coelom and Coelomoducts,
7. Arthropoda: Comparative study of Palasmon and Scorpion with reference to External features, appendages, Respiration, Circulation Excretion. Peripatus: Structure and affinities.
8. Mollusca : (i) Comparative study of Pila & Fresh water Mussel : External characters, Shell, Mantle complex and foot. (ii) Pearl formation (iii) Torsion in Gastropoda.
9. Echinodermata: Starfish - detailed study.
10. Hemichordata : Balanoglossus - External Features, Tornaria larva – Affinities of Hemichordata.
11. Important Invertebrate larval forms: (a) Amphiblastula, (b) Ephyra larva, (c) Trochophore, (d) Nauplius, Zoea, Mysis, (e) Veliger, Glochidium, (f) Echinopluteus, Ophiopluteus, Auricularia and Doliolaria.
12. Ultra structure of Animal Cell: Cell Division, Mitosis and Meiosis.
13. Structure and function of the following cell organelles: (i) Plasma Membrane: Membrane, Transport of small molecules, Cell Junctions, Cell adhesion, (ii) Cytoskeleton, (iii) Golgi Complex, (iv) Lysosomes, (v) Role of mitochondria in cellular energy, transactions, (vi) Chromosomes - Structure and type, Salivary gland chromosomes.

Animal Physiology, Behaviour and Ecology

Animal Physiology pertaining to:

1. Nutrition: Types of nutrition in animals, autotrophic - Heterotrophic, vitamins and minerals.
2. Digestion in Mammals
3. Respiration: Brief account of types of respiratory mechanism, respiratory pigments, gas transport with reference to mammals.
4. Circulation: Composition and functions of blood, coagulation of blood; Myogenic and Neurogenic hearts, mammalian heart - structure and function, Blood pressure and its role and exchange of materials in capillaries,
5. Osmo-regulation: Pertaining to aquatic animals only.

6. Excretion: (i) Classification of animals based on end products of excretion, (2) Formation of nitrogen waste. (3) Nephron: Structure and Function.
7. Nervous transmission: Structure of neuron, action-potential, production and propagation of nerve impulse and synaptic transmission.
8. Muscle contraction.
9. Endocrine glands of Mammals: Pineal body, Hypophysis, Hypothalamus, Thyroid, Parathyroid, Thymus, Adrenal Gastro intestinal, Pancreas, Testis and ovary.
10. Hormonal control of reproduction in mammals.
11. Concept of Homeostasis.

Animal Behaviour

Taxis, reflexes, instinctive behaviour, motivated behaviour, learning, imprinting, habituation, classical conditioning, instrumental conditioning trial and error learning, physiology and phylogeny of learning, biological rhythms -circadian, lunar and circannual rhythms.

Animal Ecology

1. Physico-chemical factors of the animal Environment: Temperature, light, pressure, atmospheric gas i.e.; oxygen and carbon dioxide; Biogeochemical cycles: nitrogen, carbon and phosphorus cycles.
2. Animal community and Animal population: Ecosystems (Ecological succession, Ecological pyramids, energy flow in an eco system) – Animal associations: Parasitism, Commensalism, Symbiosis ; Environments and adaptive features of animals inhabiting / deep sea, cave, and desert.
3. Environmental pollution.
4. Wild life, wild life sanctuaries and national parks of India.

Biology of Chordates, Genetics, Evolution and Zoogeography

1. General characters and outline classification upto the level of order.
2. Protochordata: (a) Structure and Affinities of Amphioxus;
(b) Structure Life history of an Ascidian.
3. Cyclostomata: General characters of cyclostomes and differences between Myxin & Petromyzon.
4. Comparative study of the following systems with reference to Scoliodon (pisces), Rana (Amphibia) calotes (Reptilia), Columba (Aves) and Lagomorpha (Mammalian) - (a) Skeletal system: Heart and aortic arches; (d) Nervous system - Brain.
5. General Topics: (i) Parental care in Amphibia; (ii) Dentition in Mammals.
6. Developmental Biology: (i) Gastrulation in amphioxus, Frog and Chick; (ii) Development of chick upto 24 hrs., (iii) Foetal membranes of chick, (iv) Placenta in Mammals (Formation and types).

Genetics:

1. Gene interaction with 3 examples
2. Sex determination.
3. Sex linked inheritance
4. Blood group inheritance
5. Fine structure of gene, Operon/ concept, Cloning, Lethal genes
6. Chromosomal Aberration and human diseases. Evolution and Zoogeography.
 1. Modern synthetic theory of Evolution, Mutations, Genetic basis of Evolution, Genetic Drift (Hardy Weinberg's Law), Isolation and speciation.
 2. Characteristics of the following Zoogeographic regions and their fauna: (i) Oriental regions, (ii) Ethiopian Region, (iii) Australian Region.

Part - C

SOCIAL STUDIES:

**GEOGRAPHY
(SYLLABUS)**

(Marks: 35)

I. Principles of Physical Geography:

Interior of the Earth. Major relief features of the Earth; Mountains, plateaus and plains. Wegner's theory of continental drift, theory of Isostasy, Earthquakes and Volcanoes. Chief types of rocks and their characteristics. Weathering and Erosion. Landforms in Fluvial, Arid, Karst, Glacial and Marine cycles. Structure and composition of the atmosphere. Distribution of temperature-vertical and horizontal; temperature inversion.

Pressure Belts and Planetary wind systems, Monsoons & Local winds, Precipitation, types of rainfall, Cyclones and anticyclones-tropical and temperate cyclones-an outline of Koppen's classification of climates.

Submarine relief - Distribution of temperature and salinity - Movements of Ocean water: Waves, Tides and Currents - Currents of the Pacific, the Atlantic and the Indian ocean - Ocean deposits.

II. Social and Economic Geography:

Definition, scope and objectives of Economic Geography Physical Environment and Human activities Concept of Resources, Types of resources, Conservation and management of resources - Distribution, Pattern and growth trends of population in the world-Type of settlements. Urban and Rural Trends in Urban growth - Agriculture: Distribution of Rice, Wheat Tea, Coffee, Cotton and Sugarcane - Distribution of major forest types, major fishing grounds of the world - Mineral and power resources : Iron, Bauxite, Coal & Petroleum -Weber's theory of industrial location - Location and distribution of Iron and Steel, Cotton Textiles.

III. Regional Geography of India:

Locational aspects, Major Physiographic regions, climate, drainage, soil types and natural vegetation - pattern and growth trends of population, urbanization -Agriculture: Rice, Wheat, Cotton, Jute, Sugarcane, Tea and Coffee - irrigation and power development in India - Minerals : Iron, coal and petroleum - Composition and pattern of trade - Resource appraisal of Telangana, Rayalaseema and Coastal Andhra.

IV. Regional Geography of Asia:

Scope and content of Regional Geography - location, Relief, Drainage, Climate, Natural Vegetation, Agriculture. Types mineral wealth (iron, tin, coal and oil); Industrial development, industries (shipbuilding, petrochemicals, automobiles); Population distribution; Broad outlines of the following as regions: South East Asia : Thailand, Malaysia, Indonesia - South West Asia : Iran, Iraq, Afghanistan.

Part - C

SOCIAL STUDIES:

**HISTORY
(SYLLABUS)**

(Marks: 30)

Paper – I HISTORY AND CULTURE OF INDIAN UPTO 1526

Unit – I

Influence of Geography on History – Survey of the Sources – Indus valley civilization – Its characteristic features – Vedic culture - Early and later Vedic periods – Post. Vedic period – Emergence of Varna and caste system – Rise of new religious Movements – Jainism and Buddhism in 6th Century B.C Impact on society and culture.

Unit – II

A brief survey of political conditions in ancient India – Magadha Alexander’s Invasion and Mouryas – Ashoka’s Dharma. Its nature and propagation – Mouran Administration – Economy – Art and Architecture.

Unit – III

Post-Mouryan period in North India – A brief political survey of Kushans, Guptas, Puswabuthi and Rajputs Polity and Administration – Social condition – Caste system – position of Women – Economy – Indian Feudalism – Art – Architecture – Education, Literature, Philosophy, Science and Technology.

Unit – IV

A brief political survey of South India – Sangham Age – Satavahanas – Pallavas – Cholas – Calukyas and Rastrakutas - Kakatiya and Vijayanagara – Polity and Administration, Society Economy – Art and – Architecture.

Unit – V

Invasions of Arabs, Ghaznavids and Ghoris and delhi Sultanate – A brief political survey, Polity and Administration under Delhi Sultanate – Society, Composition of rural Society, Nobility – Status of Women, Economic and technological developments, Agriculture – Industry – Trade and Commerce – Urbanisation, Art and Architecture – Fine Arts – Education and Literature.

Unit VI

Impact of Islam on Indian Society and Culture – Bhakthi and Sufi Movements Emergence of Composite culture.

Paper II History and Culture of India (1526 – 1950)

Unit – I : Survey of Sources

Establishment of Mughal Empire – Sur Interrugnam – Brief Survey of Political History upto 1707 AD – Polity and administration – Society – Social Composition – Ulema – Nobility – Peasantry – artisans – Slaves – Status of Women – Economy: Agriculture Industries, Trade and Commerce. Economic and Technological developments:

Religion

Education, Literature, Art, Architecture and Fine Arts.

Decline and Disintegration of Mughal Empire – Rise of Regional Powers – Maratas – Sikhs

Unit – II: Advent of European powers – Portuguese, Dutch, English and French

Expansion and consolidation of British Empire – Wars – Diplomacy – Policies pursued – Subsidiary Alliance – Doctrine of lapse

Economic policies and changes – Mercantilism and Free – trade policies – Land Revenue Settlement – Permanent – Ryotwari – Mahalwari System – Intrigation Commercialization of Agriculture – Condition of peasants – Famines – Decline of Cottage industries (de-industrilisation)

Unit – III: Anti-Colonial Upsurge – Peasant and Tribal revolts – 1857 revolt – Causes – results

and nature.

Unit – IV: Factors for social change – Christian Missionaries – westren Education –

Emergence of New Middle Classes – Growth of press – Socio – religious Reform movements – Brahma Samaj – Arya samaj – Theosophical Society – Ramakrishna mission – Aligarah Movement

Unit – V : Indian National Movement – Factors for the growth of Nationalism – Indian National

congress – Three Phases of Freedom struggle – revolutionary movements – Left – Wing movement – Peasant and workers movements.

Unit – VI : Emergence of Communal trends – partition of India – Integration of Princely States

into Indian Union.

Paper III HISTORY OF MODERN WORLD (1453 – 1945 AD)

Unit – I :

Characteristic features of Renaissance-Significance of Reformation and Counter reformation movements in Europe-Geographical Discoveries and Rise of Colonialism, Mercantilism and Commercial Revolution – Emergence of Modern World Economy.

Unit – II :

Emergence of nation States in Europe – Nature of Feudalism in Europe and Asia

Unit – III :

Age of revolutions – Glorious revolution (1688) – American Revolution (1776) – French Revolution (1789)

Unit – IV :

Industrial revolution and Rise of Capitalism - Unification Movements in Germany and Italy

Unit – V :

World between 1914 – 1945 Rivalry among colonial powers Imperialist. Hegemony – Causes and consequences of first World War – World between the wars – league of nations, Fascism in Italy. Nazism in Germany, Militarism in Japan – Communist Movements in Russia and China.

Unit – VI :

Causes and consequences of Second World War – UNO

Paper – IV HISTORY AND CULTURE OF ANDHRA PRADESH (FROM SATAVAHANS TO 1956 A.D)**Unit I :**

Influence of geographical features on History: Sources – A Brief Survey of Political history from Satavahanas to Vijayanagara period – Socio – Economic – Cultural conditions under Satavahanas, Kakatiya and Vijayanagara tulers – Growth and Spread of Jainism and Buddhism and their contribution to Art and Architecture.

Unit – II :

The Qutb Sahis – A Brief Survey of Political History – Society, Economy and Culture. The Asaf Jahis – A Brief Survey of their political history – Society, Economy and Culture – Salarjung's Reforms.

Unit – III :

Andhra Under Colonial Rule: Coming of European Merchant Companies – Conquest of Andhra by the British – Early Uprisings – Administration – Land revenue Settlements – Agrarian Condition – Famines – Impact of Industrial revolution on Andhra Economy – Sri Thomas Munroe – Impact of 1857 revolt in Andhra

Unit – IV :

Social reform and Literary Movements: veerasalingam, raghupathi venkataratnam naidu, Gurajada Appa rao, Komarraju Venkata Lakshmana rao, Non-Brahmin, Adi Andhra, dalit, self-Respect Movements – New Literary Movements – Gurram Jashua, Boyi Bhimanna, Viswanatha satyanarayana, Rayaprolu Subba Rao, Sri Sri.

Unit – V :

Freedom Movement in Andhra ; vandemataram, Home Rule, Non Co-Operation, Alluri Sitarama Raju – Rampa Rebellion, 1922-24 – Civil Disobedience and Quit India Movements

Political Consciousness in telangana : Nizam Andhra Maha Sabha, Hyderabad – State Congress, Razakars, Police Action and Accession of Telangana into Indian Union.

Unit VI :

Leftist movements in Andhra and telangana : Peasant Armed Struggle – Tribal Uprisings – Komaram Bhimu – Bhodan Movement, Movement for Separate Andhra State : Andhra mahila Sabha – Sree Bagh Pact – Martydom of Potti Sree Ramulu – Formation of Andhra State, 1953 – Vishalandra Movement – State State’s re-organization Commission – gentlemen’s Agreement – Formation of Andhra Pradesh in 1956

Part - C

SOCIAL STUDIES:

**CIVICS
(SYLLABUS)**

(Marks:15)

POLITICAL SCIENCE

PAPER I : POLITICAL SCIENCE CONCEPTS, THEORIES AND INSTITUTIONS

1. Introduction, definition, Scope and Importance of Political Science
2. Approaches to the Study of Political Science, Liberal and Marxist
3. State – nation and Civil Society
4. Sovereignty : Monism and Pluralism
5. Theories of Origion of the State: Social Contract and Evolutionary (Historical)
6. Concepts
 - a. Law: Sources of Law and Concepts of Role of Law
 - b. Liberty and Equality – Their Relationship
 - c. Theories and kinds of Rights
 - d. Power and Authority
7. Ideologies: Individualism, Anarchism, Fascism and Socialism
8. Forms of Government
 - a. Democracy: Direct and Indirect
 - b. Unitary and federal
 - c. Parlimentary and Presidential
9. Theory of Seperation of Powers
10. Organs of Government
 - a. legislature : i) Unicameral and Bi-cameral
ii) Powers and Functions
 - b . Executive: Powers and Functions
 - c. Judiciary : i) Powers and Functions
ii) Independence of Judiciary and Judicial Review

PAPER – II GOVERNMENT AND POLITICS

1. Salient Features of Indian Constitution
2. Evolution of Indian Constitution – nationalist Movement and Philosophical Foundations
3. Indian Federation – Centre-State relations – recent Trends
4. Fundamental Rights and Duties, Constitutional remedies with special reference to Writs – Directive Principles of State Policy
5. President – election, Powers and Functions – Prime Minister and Council of Ministers
6. Parliament – Composition, Powers and Functions
7. Judiciary – Supreme Court, Composition, Powers, Functions and Judicial review – Judicial Activism.
8. Party System: national and regional parties, Coalitional Politics.
9. Election Commission – Electoral reforms and Voting behavior
10. State Government – Governor, Chief Minister and Council of Ministers – powers and Functions

11. The impact of Socio-Economic factors on Indian Politics
12. Challenges to National Integration – Communalism and Terrorism
13. Local Government Institutions – 73rd & 74th Constitutional Amendments

POLITICAL SCIENCE

III Year Syllabus

Paper III POLITICAL THOUGHT

1. Ancient Indian Political Thought

- a. Sources of Ancient Indian Political Thought
- b. Manu: Varnadharma and Dandaneeti
- c. Kautilya : State and Society
- d. Gouthama Buddha: Dhamma and Sangha

2. Modern Indian Political Thought

- a. Gandhi : Ahimsa and Satyagraha
- b. Nehru : democratic Socialism
- c. Ambedkar: Annihilation of Caste
- d. M.N.Roy: Radical Humanism

3. Westren Political Thought

Plato, Aristotle, Machiavelli, Thomas Hobbes, John Locke, J.J.Rousseau, Jermy Benthom, J.S.Mill, Hegel, Marx

PRINCIPLES OF PUBLIC ADMINISTRATION

1. Meaning, Scope and Importance of Public Administration – Relation with Political Science, Sociology and Economics
2. Public Administration and Private Administration, Differences and Similarities
3. Chief Executive – Role and Functions
4. Line and Staff Agencies
5. base of Departmental Organisation
6. Principles of Organisation – Herarchy, Span of Control, Co ordination, Unity of Command, Delegation of Authority, Centralisation and Decentralisation.
7. Public Policy Formulation – Decesion Making
8. Human resource Management - Recruitment, Training Promotion, Morale and Retirement
9. Financial Administration – Budget – Principles – Budgetary Process – Accounting and Auditing – Comptroller and Auditor General
10. Administrative Accountability – Legislative – Executive – Judicial and Popular Control
11. Public Relations – Meaning and Importance.

PAPER – I INTRODUCTION TO PUBLIC ADMINISTRATION

Block I: Introduction

1. Meaning, Nature, Scope and importance of Public Administration
2. State and Evolution of Public Administration
3. Relationships with other Social Sciences: With special reference to Political Science, Economics, Sociology, Psychology
4. Politics & Administration Dichotomy – Woodrow Wilson and F.J. Goodknow

Block II: Theories and Approaches

5. Classical Approach : Henry Fayol, Gulick and Urwick
6. Scientific Management Approach: Taylor
7. Bureaucratic Approach: Max Weber and Karl Marx
8. Human Relations Approach – Elton Mayo
9. Behavioural Approach: Herbert Simon
10. Socio – Psychological Approach: Hierarchy of Needs : Abraham Maslow; Theory X and Theory Y : Douglas Mc Gregor
11. Ecological Approach: Riggs

Block III: Concepts and Principles of Public Administration

12. Administrative Planning
13. Leadership and Supervision
14. Communication and Public Relations

Block IV: Emerging Trends

15. New Public Administration : Minnowbrook I & II
16. Public Administration and Public Policy
17. New Public Management
18. Governance
19. Public Administration in the context of Globalization, Privatization and Liberalization
20. Post Modern Public Administration

PAPER - II: PUBLIC ADMINISTRATION IN INDIA

Block I: Historical Background

1. Evolution of Indian Administration – Ancient, Medieval and British Periods – Continuity and Change in Indian Administration after Independence
2. Context of Indian Administration – Social, Economic and Political

Block II: Central Administration

3. Union Government and Administration – President, Prime Minister, Council of Ministers, Central Secretariat, Cabinet Secretariat, Cabinet Committees and Prime Minister Office
4. Union and State Relations and Agencies – Administrative Relations – Inter State Council, Finance Commission, All India Services, Planning Commission, National Development Council
5. Public Enterprises in India: a) Forms of Public Enterprises: b) Privatization and Dis-investment

Block III: State and District Administration

6. State Government and Administration: Governor, Chief Minister, Council of Ministers, Secretariat & Directorates, General Administration Department and Chief Secretary
7. District Administration: Changing Role of District Collector, Mandal and Village Administration in Andhra Pradesh
8. Local Governments – Rural and Urban – Structure and functions – 73rd and 74th Constitutional amendments

Block IV: Administrative Accountability

9. Control over Administration:
 - a. Legislative and Judicial Control
 - b. Lok Pal, Lokayukta and Central Vigilance Commission
 - c. Consumer Protection Forums
 - d. Right to Information Act (RTI)
 - e. National and State Human Rights Commissions
10. Administration of Welfare Programmes for Weaker Sections – SCs, STs, BCs Women and Minorities

Block V: Emerging Issues

11. Administrative Reforms, Recommendations of important Commissions and Second ARC
12. Mechanisms for Disaster Management
13. Governance and e-Governance Applications in Indian Administration
14. Public Private Partnerships and Voluntary Sector

III Year Syllabus

PAPER – III: MANAGEMENT OF RESOURCES

Block I: Human Resource Management

1. Meaning, Nature, Scope and Significance of Human Resource Management
2. Human Resource Strategy and Planning
3. Recruitment, Selection, Appointment and Promotion
4. Pay – Components, Principles of Pay & Pay Commissions

Block II: Capacity Building

5. Performance Appraisal – Rewards and Incentives Management
6. Human Resource Development – Concept of HRD; Training – Objectives, Types, Evaluation
7. Employee Capacity Building Strategies and Total Quality Management
8. Human Resource Management Effectiveness and Human Resource Audit

9. Issues in HRM – Downsizing, Outsourcing, Consultancies

Block III: Financial Management

10. Meaning, Scope and Importance of Financial Management
11. Budget – Concept, Principles of Budgeting; Preparation, Enactment and Execution
12. Organization and functions of the Finance Ministry
13. Union – State Financial relations and the role of the Finance Commission
14. Parliamentary Financial Committees – Public Accounts Committee, Estimates Committee and Committee on Public Undertakings and Comptroller and Auditor General of India

Block IV: Materials Management

15. Procurement
16. Storage and Distribution
17. Logistics Management

PAPER - II: PUBLIC ADMINISTRATION IN INDIA

Block I: Historical Background

1. Evolution of Indian Administration – Ancient, Medieval and British Periods – Continuity and Change in Indian Administration after Independence
2. Context of Indian Administration – Social, Economic and Political

Block II: Central Administration

3. Union Government and Administration – President, Prime Minister, Council of Ministers, Central Secretariat, Cabinet Secretariat, Cabinet Committees and Prime Minister Office
4. Union and State Relations and Agencies – Administrative Relations – Inter State Council, Finance Commission, All India Services, Planning Commission, National Development Council
5. Public Enterprises in India: a) Forms of Public Enterprises: b) Privatization and Dis-investment

Block III: State and District Administration

6. State Government and Administration: Governor, Chief Minister, Council of Ministers, Secretariat & Directorates, General Administration Department and Chief Secretary
7. District Administration: Changing Role of District Collector, Mandal and Village Administration in Andhra Pradesh
8. Local Governments – Rural and Urban – Structure and functions – 73rd and 74th Constitutional amendments

Block IV: Administrative Accountability

9. Control over Administration:
 - a. Legislative and Judicial Control
 - b. Lok Pal, Lokayukta and Central Vigilance Commission
 - c. Consumer Protection Forums
 - d. Right to Information Act (RTI)
 - e. National and State Human Rights Commissions
10. Administration of Welfare Programmes for Weaker Sections – SCs, STs, BCs Women and Minorities

Block V: Emerging Issues

11. Administrative Reforms, Recommendations of important Commissions and Second ARC
12. Mechanisms for Disaster Management
13. Governance and e-Governance Applications in Indian Administration
14. Public Private Partnerships and Voluntary Sector

SOCIAL STUDIES:

**Part - C
ECONOMICS
(SYLLABUS)**

(Marks: 20)

- 1) Micro-Macro, Static-Dynamic, Normative and Positive Economics.
- 2) Cardinal and Ordinal approaches, and law of diminishing marginal utility.
- 3) Law of variable proportions, and returns to scale.
- 4) Different concepts of costs and their Inter-reaction.
- 5) Concepts of National Income.
- 6) Meaning of Economic Development and Measure of Economic Development - GNP, PQLI, and HDL
- 7) Sources of Public revenue.
- 8) Canons and Effects of Public Expenditure.
- 9) Functions and classification of Money.
- 10) Budgets and Money supply - concept of Inflation.
- 11) Functions of commercial banks and functions of Reserve Bank of India.
- 12) Methods of Credit control.
- 13) Importance of Agriculture in the Indian Economy,
- 14) Population growth in India - causes - problems of over population.
- 15) Regional disparities - causes of inequalities in Income and Wealth.
- 16) Meaning of a mixed Economy, characteristic features.
- 17) The concept of poverty - causes of poverty in India.
- 18) Types of unemployment - Disguised, Seasonal, Frictional, Structural.
- 19) Objectives of Planning in India - Important achievements and failures of planning India.
- 20) Importance of infrastructure.
- 21) Social sector - Literacy rates in India - Progress in Health Status.
- 22) Organized and unorganized sectors in the Indian Economy.
- 23) Structure of the Indian Economy - Agriculture sector, Industry sector and Service sector.

Part - C

ENGLISH METHODOLOGY

(Marks: 50+50=100)

(SYLLABUS)

A) Language Skills

(Marks: 50)

- i) Language functions
- ii) Elements of phonetics
- iii) Grammar
- iv) Phrasal Verbs (idioms)
- v) Writing Skills
- vi) Study Skills
- vii) Reference Skills
- viii) Vocabulary
- viii) Punctuations

(Questions to be set other than as in Part A General English.)

(Marks: 50)

B) Syllabus prescribed for Optional English at B.A. Degree level (B.A., ML / Special English) 50 Questions (50 Marks).

(1) Language and Literature:

- (a) Brief Survey of the English Language : Standardization : Word - formation, foreign influences (Latin, French, Scandinavian); Semantic Changes (relevant chapters from the Outline History of the English Language by F.T. Wood)
- (b) Understanding / Comprehension
 - (i) of a literacy prose passage
 - (ii) of a poem

(2) Forms of poetry: evolution, kinds and variations:

- Sonnet : : Wordsworth "Scorn not the Sonnet".
- Ode : : Shelley "Ode to the West Wind"
- Elegy : : Gray "Elegy Written in a Country Churchyard"
- Balled : : Yeats "The Balled of Father Giligen"

Lyric : : Robert Burns "A Red, Red Rose"

Dramatic : : Browning "My Last Duchess"

Monologue

(3) **Element of Drama :**

Plot/Structure : : Farrell Mitchell "The Best Laid Plans"

Character : : J.B. Priestly "Mother's Day"

Dialogue : : Anton Chekov "The Marriage Proposal"

(4) **Elements of Fiction :**

Point of View : : Khushwant Singh "The Interview"

Setting/Atmosphere : : Edgar Allen Poe "The Tell-Tale Heart"

Style/Narrative : : O Henry "The Gift of the Magi"

Techniques

(5) A. Poetry from the Elizabethan age to the Pre-Romantic

B. Spenser : : Sonnet "One Day I Wrote Her Name"

Milton : : "L'allegro"

Donne : : "The Sunrising"

Pope : : Extract from "The Rape of the Lock"
(Cantos I & II)

Blake : : "The School Boy"

(6) A. Development of drama : 16th and 17th Century British Drama

B. Shakespeare : : Twelfth Night

(7) Prose : Origin and Development of the Essay; kinds

B. Bacon : : "Of Truth"

Steele : : "One Judicious Flattery"

Lamb : : "Dream Children"

Chesterton : : "On Lying in Bed"

(8) A. Fiction: Origin and Development of the Novel

B. Henry Fielding : : Joseph Andrews

(9) Origin and growth of Indian English Literature.

(10) Poetry for detailed study.

1. Sri Aurobindo - Though The Paraclete
2. Toru Dutt - Sita
3. Nissim Ezekiel - Very Indian Poem in Indian English
4. A.K. Ramanujan - The Hindoo: he reads his GITA and is calm at all events.
5. K.N. Daruwalla - The Epileptic
6. Gouri Desh Pande - The female of the Species

(11) DRAMA for detailed study
Girish Karnard : Naga Mandala

(12) FICTION
Kushwant Singh ; Train to Pakistan.

(13) American English Language and Literature :
The English language in America

II Year Prose

- | | | | |
|-----|--------------------------------------|---|----------------------|
| (1) | Film Making | - | Satyajit Rey |
| (2) | Not Just Organges | - | Isac Tobolsky |
| (3) | On shaking hands | - | A.G.Gardena |
| (4) | Indian's contribution to world Unity | - | Ornald Toyenbee |
| (5) | Poetry | | |
| | 1. The Solitary Reaper | - | William Wordsworth |
| | 2. The Role not taken | - | Robert Frost |
| | 3. Refugee Mother & Child | - | Chinera Achibe |
| | 4. I will embrace only the son | - | Tripuraneni srinivas |

Non-Detailed

- | | | |
|--------------------------|---|------------------|
| 1. Gajar Halwa | - | Geetha Hariharan |
| 2. My brother My brother | - | Narah Burke |
| 3. Never -Never Nest | - | Cedric Mount |
| 4. Refund | - | Fritz Karinthy |

III Year Drama

1. William Shakespeare (Placbeth)
2. William Congrey (The way of the world)
3. Oliver Goldsmith (She stops to conquer)
4. G.B.Shah (Arms & the man)
5. Christopher Marlowe (Edward the II)

IV Novel

1. R.K. Narayan (The English Teacher)
2. Mark Twain (The Advertisement of Tom Sawyer)
3. Thomas Hardy (The Mayor of Caster Bridge)
4. Charles Dickens (A tale of two Cities)