

Ed.Cet-2015

**Syllabus for the subjects under Part-A and Part-B of the Education
Common Entrance Test - 2015.**

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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**Syllabus for the subjects under Part-A and Part-B of the
Education Common Entrance Test - 2015.**

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.

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APEd.CET- 2015
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 (SYLLABUS)

(Marks: 50)

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.
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:** Block 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. **Statistical thermodynamics:** Introduction of statistical mechanics - statistical equilibrium - probability theorems in statistical thermodynamics - Max Well - Boltzmann distribution law (Statement and expression only) - Application to ideal gas. Quantum Statistics - Phase space - Fermi - Dirac distribution law (statement and expression only) - Application to electron gas - Bose -- Einstein distribution law (statement and expression only) - application to photon gas - comparison of three statistics.
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 in calcite - Refraction of plane wave incident on a negative crystal like calcite - Nicol 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. **Magnetostatics:** Magnetic scalar-potential due to magnetic shell - field due magnetic shell - equivalent of electron circuit and magnetic shell - application of field due to magnetic shell - magnetic induction (B) and field (H) - Permeability and susceptibility - Hysteresis loop.
20. **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 Savart's law and calculation of B due to long straight wire, circular a current loop and solenoid.
21. **Electromagnetic induction:** Faraday's law - Lenz's law - expression for induced emf - electromotive force-time varying magnetic fields - Betatron - 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.
22. **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.
23. **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 salvation energy, solubility of ionic solids rule, power and oplarisability 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-bobding, 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, ploynuclear, 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, niod 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, basematuration, 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 CFSE, 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 metamerism. 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 radical. 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 reactivity - inert nature, free radical substitution mechanism. Halogenation examples - reactivity, selectivity and orientation. Conformational analysis of ethane and n-butane.

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 H₂O' HOX, H₂SO₄ with mechanism and addition of HBr in the presence of peroxide (anti - Markonikv's addition).

Oxidation - hydroxylation by KMnO₄, OSO₄ 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 CaC₂. Properties: Acidity of acetylenic hydrogen (formation of metal acetylides). Preparation of higher acetylenes, metal-ammonia reductions. Physical properties. Chemical reactivity - electrophilic addition of X₂, HX, H₂O (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 hydrogenation, 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 Phenanthrene) and Non-Benzenoid compounds (cyclopropenyl cation, cyclopentadienyl anion and tropylium cation).

Reactions General mechanism of electrophilic substitution mechanism of nitration and sulfonation. Mechanism of halogenation, 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 NO₂ and Phenolic). Orientation: (i) Amino methoxy and methyl groups, (ii) Carboxy, nitro, nitrile, 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) Rierner 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, Fehling's 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 on 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 polysacchrides 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 debruyn 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 van der 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 .

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Part - C

BIO- SCIENCE:

**BOTANY
(SYLLABUS)**

(Marks: 50)

A) 1. Branches of Botany:

Virology, Phycology, Mycology, Lichenology, Bryology, Pteridology, Palaeobotany, Histology, Anatomy, Physiology, Pathology, Ecology, Taxonomy, Embryology, Cell Biology, Genetics, Evolution, Biotechnology, Microbiology.

B) Classification of Plant Kingdom:

2. Classification of plant kingdom and salient features of major groups (Algae, Fungi, Bryophyta, Pteridophyta, Gymnosperms & Angiosperms)
3. Bentham & Hooker's and Engler & Prantle's systems of classifications ; Plant diversity in Angiosperm families - Annonaceae, Malvaceae, Capparidaceae, Rutaceae, Fabaceae, Caesalpiniaceae, Mimosaceae, Cucurbitaceae, Apiaceae, Rubiaceae, Asteraceae, Sapotaceae, Asclepiadaceae, Convolvulaceae, Acanthaceae, Lamiaceae, Amarantaceae, Euphorbiaceae, Orchidaceae, Liliaceae, Palmae and Poaceae.

C) Microbiology:

4. Structure, replication and transmission of viruses and Mycoplasma ; Diseases caused by viruses in plants and humans.
5. Structure, nutrition and reproduction of bacteria ; useful bacteria , bacterial diseases of plants and Humans.
6. Structure, reproduction, life history and systematic position of *Volcvox*, *Oedogonium*, *Chara*, *Vaucheria*, *Ectocarpus*, and *Polysiphonia*; General account of Bacillariophyceae & Economic importance of algae.
7. Structure, reproduction, life history and systematic position of *Albugo*, *Mucor*, *Pencilium*, *Peziza*, *Puccinia*, and *Alternaria* - plant diseases caused by *Albugo*, *Puccinia* and *Alternaria*
8. Structure, reproduction and economic importance of lichens.

D) Cell Biology:

9. Prokaryotic and eukaryotic cells; structures and functions of cell organelles.
10. Cell division - mitosis and meiosis

E) Tissue organization and growth:

11. Tissues and tissue systems in plants ; Histological organization of apical meristems;Stellar evolution in Pteridophytes;
12. Primary structure and secondary growth in roots and stems of dicots and monocots; abnormal secondary growth ; internal structure of dicot and monocot leaves in relation to photosynthesis and water stress.

F) Physiology:

13. Water relations of plants: Importance of water to plants; physical properties of water; Diffusion and Osmosis; Absorption and transport of water; Transpiration - physiology of stomata.
14. Nutrition in plants: Autotrophism, heterotrophism and types ; Absorption of mineral elements by plants ; essential macro and micro elements and their role.
15. Photosynthesis: Mechanisms and regulating factors.
16. Nitrogen metabolism: Biology of nitrogen fixation; importance of nitrate reductase and regulation; ammonium assimilation ; Protein synthesis; 1D, 2D and 3D structure of proteins.
17. Lipid metabolism: Saturated and unsaturated fatty acids; fatty acid biosynthesis; β - oxidation.
18. Growth and differentiation: Seed germination and dormancy- influencing factors; kinetics of growth; plant hormones and mechanisms of action ; phytochromes and their role ; fruit development and ripening.
19. Respiration: types, mechanism and controlling factors.

G) Plant reproduction:

20. Types of reproduction -- vegetative, asexual and sexual ; evolution of sporophyte in Bryophytes ; Heterospory and seed habit in Pteridophytes.
21. Flower as a modified shoot; pollen-pistil interaction ; self incompatibility.
22. Microsporogenesis ; Megasporogenesis -Types of embryosacs; development of Mono-, bi- and tetrasporic types.
23. Endosperm types and development.
24. Development of dicot and monocot embryos; polyembryony.

H) Plant resources and their utilization:

25. Rice, wheat maize, potato, sugarcane, cotton, jute, G'nut, mustard, coconut, Teak, rosewood, sandalwood, *Terminalia catapa*, tea, coffee, rubber, spices and medicinal plants.

I) Plants and Environment:

26. Atmosphere (gaseous composition), water (properties of water cycle), light (global radiation & photosynthetically active radiation), temperature, soil (soil profile, physico-chemical properties), and biota.
27. Morphological, anatomical and physiological responses of plants to water (Hydrophytes & Xerophytes), temperature (Thermoperiodicity & Vernalization), light (Photoperiodism, Heliophytes, Sciophytes), and salinity.

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 Leech 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. Peripastus: 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.

Biological 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 Myxine & 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 continual 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)

- I. History of India upto 1526 A.D.
 1. Pre historic, Paleolithic, Mesolithic and Neolithic culture. Harappa Civilization - origin, extent, urban planning - Nature of polity and economic organization.
 2. Rise of new Religious movements: Jainism and Buddhism in 6th century B.C.
 3. The Mouryan empire - Ashoka's dhamma, its nature and propagation, Mouryan Administration State, Economy, Art and Architecture.
 4. Post-Mouryan period, Socio-cultural developments with special reference to Satavahanas and Kushans.
 5. Developments in the Gupta period - Administrative system, society, Economy, An and Architecture, Literature, Philosophy, Science and Technology.
 6. Chalukyan period - vatapi Chalukyas, Eastern Chalukyas of Vengi, Rashtra Kutas - Development of society, economy and culture, Religious movements.
 7. Pallavas and Their contribution to society and culture - Art and Architecture.
 8. Rise and fall of Delhi sultanate- Socio- Economic and cultural study.
 9. Impact of Islam on Indian culture and Bhakti and Sufi movement.
 10. Vijayanagar - Bahamani Kingdoms - Society, economy, Art and Architecture.

II. History of India (1526-1964 A.D.)

A. Later Medieval India:

1. Consolidation, Expansion and Diplomacy under Moghul empire upto 1707.
2. General conditions under Moghul rule:
 - (a) Social conditions: Velemas Nobility - Zamindars, Peasantry - Artisans - Slaves and status of women.
 - (b) Economic conditions: Agriculture, Trade and Commerce.
3. Study of Art and Architecture, Literature, Education and Fine Arts (1526-1761A.D).
4. Rise, growth and decline of Marathas - Administration of Sivaji.

B. Modern India:

5. Advent of European powers: Portuguese, French and English.
6. Expansion and Consolidation of British empire:
 - (a) Ideologies of expansion: Mercantilism, orientalism; utilitarianism and Evangelicalism.
 - (b) Tools of expansion: War and Diplomacy - Carnatic, Bengal, Subsidiary alliance and Doctrine of Lapse.
7. Economic Changes:
 - (a) Land revenue settlements; permanent settlement, ryotwari and mahalwari, conditions of peasants, rural indebtedness, and recurrent famines.
 - (b) Nature of colonial economy: Commercialisation of agriculture and its effects, Decline of cottage industries, causes for poverty in India.
8. Social Changes:
 - (a) Spread of western education, (b) Rise of professional classes and the

emerging intelligentsia. (c) Growth of the press; English and in Indian languages, (d) Indian renaissance (e) Socio-Religious movements (f) Status of women.

9. Popular resistance to company rule:
 - a) Peasant and Tribal movements (brief survey)
 - b) Revolt of 1857-causes, nature and results.
10. National Movement:
 - a) Emergence of Indian National Movement - Indian National Congress - Moderates, extremists and Revolutionaries.
 - b) Rise of Gandhi-Nature of Gandhian movements
 - c) Indian polity-(1939-1945) -Quit India movement.
 - d) Subhas Chandra Bose and Indian National Army.
 - e) Emergence of communal trends - Communal politics and partition.
11. India 1947-1964.
 - a) Integration of the Indian, Princely States.
 - b) Making of the constitution.

III. History of Modern Europe (1789-1960)

1. French Revolution: Causes - Course - Constitutional assembly - National convention - Directory - Effects of the Revolution.
2. Emergence of Napoleon Bonaparte - Expansion, Consolidation and down fall.
3. Vienna congress - Concert of Europe - Metternich - Revolutions of 1830 and 1848.
4. Second Republic in France - Napoleon III - Paris commune - the rise of IIIrd French Republic.
5. National movements: Unification of Italy - Unification of Germany.
6. Revolution in Turkey - Balkan wars.
7. Scramble for African and Asian colonies - Theories and mechanisms of Imperialism.
8. First world war-causes and effects. Treaty of Versailles.
9. Rise of Fascism and Nazism.
10. League of Nations - Achievements and failures.
11. Second world war - causes, course and effect.
12. Post second world war developments - U.N.O, Cold war - Rise of third block.

Part - C

SOCIAL STUDIES:

CIVICS

(Marks:

15)

(SYLLABUS)

I. Political Science - Concepts and Theories:

1. Introduction, definition, scope and importance of political science.
2. Different approaches to the study of political science - Traditional and Modern.
3. Relation with other social sciences: History, Economics, Public Administration, Sociology and Ethics.
4. Society - State - Nation.
5. Sovereignty: Monism and Pluralism.
6. The theories of origin of the State: Diva Right, Social Contract and evolutionary (History).
7. Law, Liberty and Equality:
 - a) Law: Source of law-Concepts of Rule of Law,
 - b) Liberty and Equality - Their relationship,
 - c) Theories of Rights,
 - d) Kinds of rights
8. Classification of Governments: Traditional (Aristollen)
Modern:
 - a) Democracy: Direct and Indirect democratic devises
 - b) Unitary and Federal
 - c) Parliamentary and Presidential
9. The theory of separation of powers,
10. Organs of Government
- (A) Legislature : (i) Types - Unicameral, Bicameral (ii) Committee system, (iii) Functions of Legislature (iv) Decline of legislature
- (B) Executive : (i) Types - Parliamentary and Presidential (ii) Rise of executive in modern times
- (C) Judiciary : (i) Functions (ii) Independence of Judiciary (iii) Judicial review,
11. Electorate: Methods of representation, voting behaviour.
12. Political parties - Functions - Types of party system.
13. Popular control - Methods of control - Public opinion - Mass media.

II. Public Administration - Concepts and Theories

1. Meaning and scope of Public Administration.
2. Importance of Public Administration in the context of Globalization, Privatisation & Liberalization.
3. Evolution of Public Administration.
4. Relation with other Social Sciences (with special reference to political Science; Sociology & Economics).
5. Politics & Public Administration - Dichtomy - Woodrew Wilson,
6. Classical Theory:
 - (a) Administrative Management - Fayal

- (b) Structures 7 Principles of Organisation - Gulick & Urwick
- (c) Scientific management - Taylor.
- (d) Bureaucracy - Weber and Karl Max.
- 7. Human relations Approach: Elton Mayo
- 8. Behavioural Approach: Simon (Decision Making), Barnard (Authority & Informal Organisations) and Me Gregor(Theory X and Theory Y).
- 9. Comparative Public Administration - Weidner
- 10. Development Administration - Weidner
- 11. New public administration
- 12. New Public Management Perspective.
- 13. Concepts in Administration: Planning, Leadership, Supervision, Communication, Public Relations, Motivation.

III. Indian Government and Politics:

1. Introductory note on Nationalist movement in India: Brief sketch : survey from 1885-1947.
2. Constituent Assembly - Making of the Indian constitution. Salient features of the Constitution - amending procedure.
3. Indian Federation : Union - State relations - recent trends.
4. Fundamental rights, Fundamental duties, Directive principles of state policy.
5. President - Election - powers and functions - council of ministers P.M.
6. Parliament of India - Composition powers and functions.
7. Indian judiciary- Supreme Court-composition powers, functions-judicial review.
8. Indian Party system major national parties - regional parties.
9. State Government Governor Council of ministers-Chief Minister.
10. Social and Economic factors in Indian Politics - Language, Religion, caste Regionalism peasant trade unions, youth, tribal movements, their impact on national integration.

IV. Public Administration in India;

1. Evolution of Indian administration -• Ancient Medieval Mughal and British Periods - Continuity and Change in Indian Administration after Independence.
2. Context of Indian Administration - Social, Economic and Political.
3. Union Government and Administration - President, Prime Minister, Council of Ministers, Central Secretariat, Cabinet Secretariat, Cabinet Committees and Prime Minister Office.

Union and State Relations and Agencies - Administrative Relations -Inter State Council, Finance Commission, All India Service, Planning Commission, National Development Council.

5. Public enterprises in India:
 - (a) Forms of Public Enterprises - (i) Department (ii) Corporation and Company.
 - (b) Issues: Privatisation, Dis-investment downsizing.
6. State Government and Administration: Governor, Chief Minister, Council of Ministers, State Secretariat/Directorates, Regional Administration/ General Administration and Chief Secretary.
7. District Administration: Changing Role of District Collector - Special Agencies - DRDA, ITDA.

8. Local Governments - Rural and Urban - Structure and functions - 73rd and 74th Constitutional amendment.
 9. Control Over Administration.
 - (a) Legislative Control
 - (b) Judicial Control
 - (c) Citizen's Control - Lok Pal / Lokayukta
 - (d) Consumer Protection Forum.
 - (e) CVC (Central Vigilance Commission)
 10. Administration of Welfare Programmes for Weaker Sections - S.C.s, S.T.s, Women, Minorities.
 11. Administrative Reforms, Recommendations of important Commissions and Committees.
 12. Good Government and e-Governance.
- V. Challenges facing our country today;**
1. Illiteracy
 2. Casteism
 3. Communalism
 4. Regionalism
 5. Anti-Social Practices
- VI. United Nations and India's role:**
1. Origin, Aims and structure of the united nations.
 2. Principal organs of the united nations.
 3. Specialized Agencies of the united nations.
 4. Political and non-political achievements of the united nations
 5. India's role in the united nations.

Part - C

ENGLISH METHODOLOGY
(SYLLABUS)

(Marks: 50+50=100)

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 Duches 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 Canonization"
 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 :: Othello
- (7) Prose : Origin and Development of the Essay; kinds
 B. Bacon :: "Of Youth and Age"
 Steele :: "One Judicious Flattery"
 Lamb :: "Dream Children"
 Chesterton :: "On Lying in Bed"
- (8) A. Fiction: Origin and Development of the Novel
 B. Jane Austen :: Pride and Prejudice
 Indian Writing in English - Indian English Literature
- (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
- (14) Poetry for detailed study
 1) Wallace Stevens : Of Modern Poetry

- 2) Dickenson : "Hope" is Thing with Feathers
 - 3) Emily Robert Frost: Stopping By woods on a snowy Eveninj
 - 4) Robinson Jeffers : Science
 - 5) Archibald Macleish : "Not Marble Nor The Gilded
"Monuments" For Adcle.
 - 6) William Carlos Williams ; The Yachts.
- (15) DRAMA for detailed study
Eugene O 'Neill : The Hairy Ape.
- (16) PROSE
Theoreau: Walden