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.

A P Ed.CET-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.
1. Sets - relations - binary operations - semi groups - groups - subgroups - normal subgroups - homomorphism - Functions permutations permutation groups - cyclic groups - quotient group - automorphism.


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.


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 1The Euler function O.

- 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


3. Mechanics of Rigid bodies: Definition of Rigid body, rotational kinematics relations, equation of motion for a rotating body, angular momentum. Euler's 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 flames, postulates of special theory of relatively, 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.


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.


9. Thermodynamics: Heat and work - Internal energy - Indicator Diagrams work done is Isothermal and adiabatic processes - First law of thermodynamics - 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,


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 chance 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 effraction:** Polarized light - Brewsters law - Malus Law - phenomenon of double refraction is calcite - Refraction of plane wave icident 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 char, uniformly charged sphere and charged cylindrical conductors, mechanical force on a charged conduct, 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 synchrotron - 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.


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, Planck’s Radiation law, Photoelectric effect, heat capacity of solids, Compton effect. De Broglie’s hypothesis, Heisenberg’s uncertainty principle, Sinusoidal wave equation, Hamiltonian operator, Schrödinger’s wave equation and its importance, physical interpretation of the wave function, significance of \( \psi \) and \( \psi^2 \).

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 - Stereocchemistry 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 Waals 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


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

Carbomyls - Classification - mono and ploynuclear, general preparation, structure and bonding in Ni(CO)₄, Fe(CO)₅ and Co₂(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 d¹⁻d² 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.


6. **f- block elements**


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, auro reduction, alumino - thermic reduction, hydrometallurgy, electrolytic reduction. Purification of impure metals - liqutation, fractional distillation, zone refining, oxidative processes - cupellation, bassemerisation, puddling, poling, thermal

8. Co-ordination compounds


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


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 \( \text{H}_2\text{O}_2, \text{BF}_3, \text{NH}_3 \) & \( \text{AlCl}_3 \).

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. Resonace or
Mesomere effect, application to (a) acidity of phenol, (b) acidity of carboxylic acids. Hyper conjugation and its application 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**


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, Markownikov's rule, addition of H$_2$O' HOX, H$_2$SO$_4$ with mechanism and addition of HBr in the presence of peroxide (anti - Markownikv's addition).

Oxidation - hydroxylation by KMnO$_4$, OSO$_4$ Peracids (Via epoxidation), hydroboronation, 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$_2$O (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, Naphthalene, Anthracene and Phenanthrace) and Non-Benzenoid compounds (cyclopropenyl cation, cyclopentadienyl anion and tropylum 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 NO$_2$ 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. Areness 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) Form ation of aloxide/phenoxides and their reaction with RX (c) replacement of OH by X using PCl₅, PBr₃, SOCl₂ and with HX/ZnCl₂. Esterification by (a) acid halides, anhydrides and acids (mechanism) (b) Esters of inorganic acids (c) dehydration of alcohols. Oxidation of alcohols by CrO₃, KMnO₄. Special reactions of phenols - (a) Bromination, (b) Kolbe - Schmidt reaction (c) Riemer Tiemann (d) Azo coupling. Identification of alcohols by oxidation - KmnO₄, Ceric ammonium nitrate - Lucas reagent; Phenols by reaction with FeCl₃, and by the solubility in NaOH. Polyhydroxyl compounds - Pinacol - Pinacolone rearrangement, Oxidative cleavage (Pb(OAc)₄ & HI). Oxide.

Carbonyl compounds


Nitrogen compounds

Nitro hydro carbons: Nomenclature and classification - nitro hydrocarbons - structure. Tautomism 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

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 iodine, CN, NO₂, H and aryl groups. Coupling Reraction 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 aldoeses 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-glyceraldehyde 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 (methylalition, 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-g!ucose to D-arabinose by Ruff's degradation. Aldohexose (+) (glucose) to ketohexose (-) (fructose) and Ketochexose (Fructose) to aldohexose (Glucose).

16. Amino acids and proteins

Introduction: Definition of Amino Acids, classification of Amino acids into alpha, beta and gama 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**


18. **Liquid state**

Intermoie alar forces, structure of liquids (qualitative description). Structural different between solids, liquids and gases. Liquid crystals, the mesomorphic state: classification of liquid crystals into Semectic 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:**


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. Raoul't law, relative lowering of vapor pressure, molecular weight determination. Osmosis laws of somotic 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 detering various colligative properties. Abnormal molar mass, Van't Hoff factor, degree of dissociation and association of solutes.
21. **Colloids and Surface Chemistry**


22. **Solutions**


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**


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.


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.


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)*.


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.

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.

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, Sidda, 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 envelops: 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.
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**

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.
10. Extra nuclear genome: Mitochondrial and plastid DNA, plasmids.

**Unit - III: Ecology**

15. Production ecology: Concepts of productivity, GPP, NPP, CR (Community Respiration) and secondary production, P/R ratio and Ecosystems.
Unit - IV: Biodiversity and Conservation


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.

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.
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, β-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**

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.
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
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) Trypansoma life cycle only
3. Porifera : Canal system, Histology & Spicules.
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,
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.

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, co-agulation 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.


8. Muscle contraction.

9. Endocrine glands of Mammals: Pineal body, Hypophysis, Hypothalamus, Thyroid, Parathyroid, Thymus, Adrenal Gastro intestinal, Pancreas, Testis and ovary.

10. Hormonial 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.


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.


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.


**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


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.
I. **Principles of Physical Geography:**


Pressure Belts and Planetary wind systems, Monsoons & Local winds, Precipitation, types of rainfall, Cyclones and anticyclones-tropical and temperature 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:**


III. **Regional Geography of India:**


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.
Unit – I


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


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


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

Unit – II: Advent of European powers – Portuguese, Dutch, English and French
- Commercialization of Agriculture – Condition of peasants – Famines – Decline of Cottage industries (de-industrilisation)


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 – 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.

nit – 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 :

Unit – III :

Unit – IV :
Unit – V :


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

Unit VI :

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 Origin 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. Parliamentary and Presidential
9. Theory of Separation 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
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.
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. Western Political Thought

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
7. Public Policy Formulation – Decision Making
8. Human resource Management – Recruitment, Training Promotion, Morale and Retirement
10. Administrative Accountability – Legislative – Executive – Judicial and Popular Control
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
8. Human Relations Approach – Elton Mayo
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

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

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
7. Employee Capacity Building Strategies and Total Quality Management
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

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**PAPER - II: PUBLIC ADMINISTRATION IN INDIA**

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14. Public Private Partnerships and Voluntary Sector
SOCIAL STUDIES: ECONOMICS
(SYLLABUS)

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.
6) Meaning of Economic Development and Measure of Economic Development - GNP, PQLI, and HDI.
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.
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: Wordworth "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

Indian Writing in English - Indian English Literature
Origin and growth of Indian English Literature.
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. Ramanjuan - 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

DRAMA for detailed study
Girish Karnard : Naga Mandala

FICTION
Kushwant Singh ; Train to Pakistan.

American English Language and Literature :
The English language in America

II Year Prose

Film Making - Satyajit Rey
Not Just Organges - Isac Tobolsky
On shaking hands - A.G.Gardena
Indian’s contribution to world Unity - Ornald Toyenbee

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. Olider 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. Mare Twain (The Advertisement of Tom Suryer)
3. Thomos Hardy (The Mayer of Caster Bridge)
4. Charles Dickens (A tale of two Cities)