Scheme and Syllabus for the post of Junior Lecturers in Residential Educational Institution Societies

Preliminary (Screening Test)

<table>
<thead>
<tr>
<th>Written Examination (Objective Type)</th>
<th>No. of Questions</th>
<th>Duration (Minutes)</th>
<th>Marks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Paper General Studies, General Abilities and Basic Proficiency in English</td>
<td>150</td>
<td>150</td>
<td>150</td>
</tr>
</tbody>
</table>

Syllabus

Paper: General Studies, General Abilities and Basic Proficiency in English

Section-I: General Studies

2. Indian Constitution; Indian Political System; Governance and Public Policy.
3. Social Exclusion; Rights issues such as Gender, Caste, Tribe, Disability etc. and inclusive policies.
4. Society Culture, Civilization Heritage, Arts and Literature of India and Telangana
5. General Science; India’s Achievements in Science and Technology
7. Economic and Social Development of India and Telangana.
8. Socio-economic, Political and Cultural History of Telangana with special emphasis on Telangana Statehood Movement and formation of Telangana state.

Section-II: General Abilities

10. Moral Values and Professional Ethics in Education.
11. Teaching Aptitude
Section – III: Basic Proficiency in English

i) School Level English Grammar:
   Articles; Tense; Noun & Pronouns; Adjectives; Adverbs; Verbs;
   Modals; Subject-Verb Agreement; Non-Finites; Reported Speech;
   Degrees of Comparison; Active and Passive Voice; Prepositions;
   Conjunctions; Conditionals.

ii) Vocabulary:
   Synonyms and Antonyms; Phrasal Verbs; Related Pair of Words;
   Idioms and Phrases; Proverbs.

iii) Words and Sentences:
   Use of Words; Choosing Appropriate words and Words often
   Confused; Sentence Arrangement, Completion, Fillers and Improvement;
   Transformation of Sentences; Comprehension;
   Punctuation; Spelling Test; Spotting of Errors.
Main Examination Scheme and Syllabus for the post of Junior Lecturer in Residential Educational Institution Societies

Scheme of Examination

<table>
<thead>
<tr>
<th>Written Examination (Objective Type)</th>
<th>No. of Questions</th>
<th>Duration (Minutes)</th>
<th>Marks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Paper – I Pedagogy Across the Curriculum (Common Syllabus)</td>
<td>100</td>
<td>90</td>
<td>100</td>
</tr>
<tr>
<td>Paper – II Subject Discipline Knowledge/Concerned Subject</td>
<td>200</td>
<td>180</td>
<td>200</td>
</tr>
</tbody>
</table>

Interview/ Demonstration /viva-voce

Total 330

Syllabus

Paper – I: Pedagogy Across the Curriculum (Common Syllabus)

I. The History and Nature of liberal disciplines of knowledge. Importance of Cognitive and Non-Cognitive areas in Education.

II. Values, Aims and Objectives of Teaching Liberal and Creative Disciplines of Knowledge including Vocational subjects, Crafts, Performance and Fine arts etc.

III. Psychology of Human Development; Psychology of Teaching and Learning.

IV. Curriculum : Construction ,Organization and Development

V. Approaches, Methods and Techniques of Teaching Disciplines of Knowledge

VI. Planning for Effective Instruction : Different Plans and Designing Learning Experiences.

VII. Learning Resources and Designing Instructional Material ; Labs; Teaching Aids ; Textbooks; ICT integration; OERs (Open Educational Resources).


IX. Learning Disabilities; Learning Difficulties and Education of Exceptional and Disabled Children
X. Disciplines of Knowledge and Everyday Life; Non-formal Education in the Institutions of Learning.

XI. Pedagogical Concerns: Quality and Academic Standards; Teaching and Its relationship with Learning and Learner, Learners in Contexts: Situating learner in the Socio-Political and Cultural Context; Managing Behavior problems, Guidance & Counseling, Punishment and Its legal implications, Rights of a Child, Time Management, Distinction between Assessment for Learning and Assessment of Learning, School Based Assessment, Continuous and Comprehensive Evaluation; Understanding Teaching and Learning in the context of NCF and Right to Education Act.
Main Examination Syllabus for the post of Junior Lecturer in Residential Educational Institution Societies

Paper – II

Paper: విద్యా సాంస్కృతిక విభాగం - (లో ఆంధ్రం)

(2) విద్యా సాంస్కృతిక విభాగం - (లో ఆంధ్రం)

పండుగు, పచ్చి, మామిడి, పండుగు (పండుగుల, పచ్చిల, మామిడిల సాంస్కృతికవృత్తిలు, పండుగుల సాంస్కృతికవృత్తిలు), రాతారంల - అగ్రహార సాంస్కృతికవృత్తి, చెన్నత సాంస్కృతికవృత్తి మొదలు - (పండుగుల - పచ్చి - మామిడిల సాంస్కృతికవృత్తిలు - గాంధీ - అగ్రహార సాంస్కృతికవృత్తి - చెన్నత సాంస్కృతికవృత్తిలు - పండుగుల), ఆంధ్రా ప్రదేశ్ సాంస్కృతికవృత్తిలు, చెన్నత సాంస్కృతికవృత్తి మొదలు - (పండుగుల - పచ్చి - మామిడి)

(3) విద్యా సాంస్కృతిక విభాగం - (లో ఆంధ్రం)

చెప్పాలను, ఉండగాను అంగులంచేందుకు:

ఎక్కడ ఎక్కడ కనం, రాయలు, సంబంధం, మాధ్యమాల (చిత్రాలు, వివిధ రూపాలు) - ప్రభావం, మాధ్యమం, మాధ్యమాలు (చిత్రాలు, వివిధ రూపాలు, రిమాక్స్, నిపుణులు, సంవత్సరాలు, వివిధ రూపాలు, తెలంగాణా) - ఎక్కడయా ఎక్కడయా శాస్త్రాలు ప్రామాణిక సాధనాలు - తమ ముఖం ప్రతి రోజు ప్రతి విలువ కోసం - తపస్విత్వం నిర్మాణ - పటిష్టించండి.

ప్రతి మంది సంస్కృతి చేస్తుంది - ప్రతి విశేషాలు, ప్రతి సంస్కృతి చేస్తుంది - అధ్యాపకుడు, క్రియా ప్రామాణిక అనుసంధానాలు, చిత్రాల చేస్తుంది. ఈ సంస్కృతి సంస్కృతి చేస్తుంది మాధ్యమాల ద్వారా (చిత్రాలు, వివిధ రూపాలు) ప్రభావం, ప్రభావాన్ని అంగులంచేందుకు (చిత్రాలు, పాత్రాలు) అడుగు యొక్క సంస్కృతి చేస్తుంది. ప్రతి సంస్కృతి చేస్తుంది - మాధ్యమాలు - చిత్రాలు, తెలంగాణా మాధ్యమాలు - తపస్విత్వం నిర్మాణ - పటిష్టించండి.
Main Examination Syllabus for the post of Junior Lecturer in Residential Educational Institution Societies

Paper – II: English

I. Genres, Movements, Schools, Concepts.

- Structuralism, Poststructuralism, Feminism, Postcolonialism, Diaspora, Race Gender and Caste.
- English Literary Criticism from Philip Sidney to Matthew Arnold
- New Criticism, Formalism, Archetypal criticism, New Historicism, Psychoanalytical criticism, Reader response criticism.
- Literary Genres: Poetry, Fiction, Prose, Drama (origins and development, elements, forms, types)

II. Writers and Texts

- Christopher Marlowe  Doctor Faustus
- William Shakespeare  Hamlet
- John Milton  Paradise Lost-Book 1
- William Wordsworth  “Immortality Ode”, Tintern Abbey
- Robert Browning  “My Last Duchess”, “Andrea del Sarto”
- Thomas Hardy  Tess of the d’Urbervilles
- TS Eliot  The Waste Land
- G.B. Shaw  Saint Joan
- Virginia Woolf  “A Room of One’s Own”
- William Golding  Lord of the Flies
- Walt Whitman  “When Lilacs Last in the Dooryard Bloomed”, “Crossing Brooklyn Ferry”
- Arthur Miller  Death of a Salesman
- Toni Morrison  Beloved
- Mulk Raj Anand  Untouchable
- Kamala Das  “An Introduction”, “The Old Playhouse”
- Girish Karnad  Hayavadana
- Salman Rushdie  Midnight’s Children
- Chinua Achebe  Things Fall Apart
- Margaret Atwood  Edible Woman
- Derek Walcott  Dream on Monkey Mountain
III English Language Teaching

1. ELT in India: (History and status of English in India; English as Second Language, English as Foreign Language, and English as Global Language).

2. Methods and Approaches: (Grammar Translation method, Direct method, Audio-Lingual method; Structural approach, Communicative language teaching)

3. Teaching of Language Skills: (Teaching of Listening, Speaking, Reading, and Writing Skills; Teaching of Grammar and Functional English; Teaching of Vocabulary; Classroom techniques; Use of authentic materials) Teaching literature.

4. Testing and Evaluation: (Principles, Types, Objectives of testing and evaluation)

5. Phonetics and Phonology; Syntax and Structure.

IV. Literary comprehension-(Excerpts from poetry and prose for comprehension
Main Examination Syllabus for the post of Junior Lecturer in Residential Educational Institution Societies

Paper - II: Sanskrit

I. Vedic Literature
Subject matter of Samhitas, Brachmanas, Aranyakas, Upanisads.

History of Vedic Literature
Main theories regarding the age of Rigveda – Maxmuller, A Weber, Jacobi, Balagangadara Tilak, M. Winternitz, Indian traditional views.

Vedangas
Siksa, Kalpa, Vyakarana, Niruktam, Chandas, Jyotisa.

II. Darasana
i) Samkhyakarika of Isvarakrishna, Satkaryavadav, Purusa-svarupa, Prakriti Svarupa, Sristikrama, Pratyayasarga, Kaivalya.
iii) Tarkabhasa of Kesavamisra / Tarkasamgraha of Annambhatta: Padartha, Karana, Pramana, Pratyksa, Anumana, Upamana, Sabda.
iv) Sarvadarsanasamgraha: Jainism, Buddhism, Charvak
v) Yogasutra – Vyasabhasya
   Cittabhumi, Cittavrittis, Concept of Isvara, Yogagas, Samadhi, Kaivalya.

- Grammar, Linguistics, Prosody:
  1) Siddhantakanmd
     Definition – Samhita, Gunra, Vriiddhi, Pratipadika, Nadi, Ghi, Upadha, Aprikta, Gati, Pada, Vibhasa, Savarna, Karaka
     Samasa
     Tinamta (Bhu and Edha only)
     Kridanta (Krityaprakriya only)
     Taddhita (Matvarthiya)
     Stripratyaya
  ii) Mahabhasya (Paspasahnika)
      Definition of Sabda
      Relation between Sabda and Artha
      Purposes of the Study of Grammar
      Definition of Vyakarana.
      Result of the proper use of Sabda
      Method of Grammar
2) Linguistics.
   - Paniniyasiksa
   - Definition and types of languages, Genealogical and Morphological classification of languages, Speech mechanism and classification of sounds: Stops, Fricatives, Semi-Vowels and Vowels, Phonetic Laws, (Grimm, Grassmann and Verner)

   Characteristics of the three types of Indo Aryan
   Causes of Phonetic – change.
   Directions of semantic change and reasons
   Definition of Vakya and its types.
   Discourse Analysis (Mahavakyavicara)
   Difference between Bhasa and Vak
   Difference between Language and Dialect.

   iii) Niruktam, (Chapter 1 and 2 only)
        Four fold division of Padas,
        Concept of Nama,
        Concept of Akhyata,
        Meaning of upasarga,
        categories of Nipatas,
        Six states of action (Sadbhavikaras)
        Purposes of study of Niruktam,
        Principles of Etymology.
        Etymology of following words, Acarya, Vira, Hrada, Go, Samudra, Vritra,
        Aditya, Usas, Megha, Vak, Udaka, Nadi, Asva, Agni, Jatavedas, Vaisravana, Nighantu.

   iv) Purana and Itihasa.
        Definition of Purana, Mahapuranas and Upapuranas.
        Ramayana
        Arrangement of Ramayana
        Legends in Ramayana
        Society in the Ramayana
        Ramayana as a source of later Sanskrit works
        Literary value of the Ramayana

        Mahabharata
        Arrangement of Mahabharata
        Legends in Mahabharata
        Society in the Mahabharata
        Mahabharata as a source of later Sanskrit works
        Literary value of the Mahabharata

   v) Kavyasastra
        Kavyaprakasha
        Kavyalakshana, kavyaprayojana, Kavyahetu, kavyabheda, Sabdasakti,
        Abhihitanvayavada, Anvitalbhidanavada, Concept of Rasa and discussion of Rasasutra
Alankaras, Anuprasa, Slesa, Vakrokti, Upama, Rupaka, Utpreksha, Samasokty, Apahnuti, Nidarshana, Arthantaranyasa, Dristanta, Vibhavana, Visesokti, Kavyalinga.

- Dhwanyaloka (I Udyota)
- Dasarupaka (3rd Chapter only)

vi) Poetry, Prose, Dramas and History of Sanskrit Literature

i) Poetry
   - Raghuvamsa (I and XIV cantos)
   - Kumarasambhava (V canto)
   - Kiratarjuniya (I canto)
   - Sisupalavadha (II canto)
   - Naisadhiyacarita (I canto)

ii) Prose
   - Dasakumaracaritam (VIII chapter)
   - Harshacharitam (V Chapter)
   - Kadambari (Shudrakavarnanam & Shukanasopadesha)

iii) Dramas
   - Svapnavasavadatta.
   - Abhijnanasakuntalam
   - Mrichakatikam
   - Uttrararamacharitam
   - Mudrarakshasam
   - Ratnavali
   - Pratimanatakam

i) History of Sanskrit Literature
   - Mahakavyas
   - Lagukavyas
   - Historicalkavyas
   - Lyric Poetry
   - Campukavyas
   - Gadyakavyas
   - Didactic Poetry

(VII) (i) Kautilya’s Arthasastra (First ten Adikaras)
(ii) Manusmriti (I, II, and VII Adhyayas)
(iii) Yajnavalkyasmitri (Vyavaharakanda only)
(iv) Susritasamhita (Sutrasthana and Ojah Kshayah)

(VIII) General Translation
(Sanskrit to English and English to Sanskrit )
Main Examination Syllabus for the post of Junior Lecturer in Residential Educational Institution Societies

Paper – II: Mathematics

I. Real Analysis

II. Metric Spaces
Metric spaces – Completeness- Compactness- Connectedness – Continuity and Uniform continuity of a function from one metric space into another-Topological Spaces – Bases and Subbases – Continuous functions

III. Elementary Number Theory
Primes and Composite numbers – Fundamental Theorem of Arithmetic – Divisibility – Congruences – Fermat’s theorem – Wilson’s Theorem – Euler’s Phi - Function

IV. Group Theory
Groups- Subgroups- Normal Subgroups- Quotient groups- Homomorphisms- Isomorphism Theorems- Permutation groups- Cyclic groups- Cayley’s theorem. Sylow’s theorems -Their applications

V. Ring Theory
Rings- Integral domain- Fields- Subrings - Ideals – Quotient rings – Homomorphisms – Prime ideals- Maximal ideals – Polynomial rings – Irreducibility of polynomials – Euclidean domains- Principal ideal domains

VI. Vector Spaces
Vector Spaces, Subspaces – Linear dependence and independence of vectors – basis and dimension – Quotient spaces – Inner product spaces – Orthonormal basis – Gram- Schmidt process

VII. Theory of Matrices

and Index

VIII. Complex Analysis
Algebra of Complex Numbers – The Complex Plane – Complex Functions and Their Analyticity – Cauchy-Riemann equations – Mobius transformations- Power Series- Complex Integration – Cauchy’s Theorem – Morera’s Theorem – Cauchy’s Integral
Formula – Liouville’s Theorem – Maximum Modules Principle – Schwarz’s Lemma – Taylor’s Series – Laurent’s Series-Calculus of Residues – Evaluation of Integrals

IX. Ordinary Differential Equations

Ordinary Differential Equations (ODE) of First order and First degree – Different methods of solving them – Exact Differential equations and Integrating factors- ODE of First order and Higher degree – Equations solvable for p, x and y – Clairaut’s equations – Singular Solutions- Linear Differential Equations with Constant Coefficients and Variable Coefficients – Variation of Parameters

X. Partial Differential Equations

Formation of Partial Differential Equations (PDE) – Lagrange and Charpit’s methods for Solving first order PDEs – Cauchy problem for first order PDEs- Classification of Second Order PDE’s – General Solution of Higher Order PDEs with Constant Coefficients

XI. Solid Geometry

The Plane- Right line- Sphere- Cones and Cylinders
Main Examination Syllabus for the post of Junior Lecturer in
Residential Educational Institution Societies

Paper - II: Physics

I. Mathematical Methods of Physics


II. Classical Mechanics


III. Electromagnetic Theory


IV. Quantum mechanics


V. Thermodynamics and statistical Physics

VI. Electronics


VII. Atomic & Molecular Physics


VIII. Condensed Matter Physics


IX. Nuclear and Particle Physics

Main Examination Syllabus for the post of Junior Lecturer in Residential Educational Institution Societies

Paper – II: Chemistry

Inorganic Chemistry:

1. Atomic structure and chemical bonding – structure and bonding in homo and hetero nuclear molecules. Application of VSEPR, Valence Bond and Molecular orbital theories in explaining the structures of simple molecules.

2. Chemistry of main group (I to VII & Nobel gases) elements.

3. Chemistry of transition elements and inner transition elements.

4. General principles of metallurgy: Occurrence of metals, Concentration of ores -levigation, magnetic separation, froth flotation, leaching, Extraction of crude metal from concentrated ore-conversion to oxide, reduction of oxide to the metal, Thermodynamic principles of metallurgy-Ellingham diagram limitations, applications. Extraction of iron, copper and zinc from their oxides, Electrochemical principles of metallurgy, Oxidation and reduction, Refining of crude metal-distillation, liqation poling, electrolysis, zone refining and vapour phase refining, Uses of aluminium, copper, zinc and iron. Alloys: Inter-metallic compounds.


8. Metal carbonyls, Nitrosyls and Metallocenes - Structure and bonding.


10. Analytical chemistry- Chromatography – General principles involved in separations by Paper, Thin layer, Column Chromatography, GC and HPLC.
Physical Chemistry:


18. Solid state chemistry: General characteristics of solid state. Classification of crystalline solids based on different binding forces, probing the structure of solids: X-ray crystallography, Crystal lattices and unit cells. Bravais lattices- primitive and centred unit cells, Number of atoms in a unit cell (primitive, body centred and face centred cubic unit cell), Close

Organic Chemistry:


20. Classification, preparations and properties of alkane, alkenes, alkynes, cycloalkanes, aromatic hydrocarbons, halogen compounds, hydroxy compounds, carbonyl compounds, carboxylic acids and its derivatives.


22. Introduction to conformational isomerism, Klyne - Prelog terminology for conformers and torsion angles, dihedral angle, Steric strain and the concept of dynamic stereoisomerism. Study of conformations of acyclic compounds like ethane, butane, dihalobutanes, halohydrin, ethylene glycol, butane-2, 3-diol, amino alcohols and 1,1,2,2-tetrahalobutanes.

23. Nature of bonding in organic molecules and aromaticity, delocalized chemical bonding, conjugation, cross conjugation, resonance, hyperconjugation, tautomerism, Huckel’s Rule and the concept of aromaticity-Aromaticity, non-aromaticity and anti aromaticity.

rearrangements: Benzylic acid, Favourski, Tran annular, Sommlett-Hauser and Smile rearrangement.

25. Organic reaction mechanism: Mechanism, stereochemistry and energy profile diagram of Addition reactions to polar and nonpolar double bonds. Substitution reactions: Mechanism, rate law, stereochemistry and factors affecting on aliphatic and aromatic reactions. Elimination reactions—mechanism, rate law, stereochemistry, orientation and factors affecting on E1, E2, E1CB, pyrolytic syn elimination and a-elimination, elimination vs substitution. Detection of reaction mechanism by product isolation, isotopic labelling, chemical trapping and crossover experiments.

26. Oxidation- Swern, Cr (VI) oxidants, Oxidative cleavage of 1,2-diols - Periodic acid and Lead tetra acetate.
Reductions - Wilkinson's catalytic hydrogenation, LiAlH4, NaBH4, BH3, AlH3 and DIAL.

27. Heterocyclic chemistry: importance as drugs, nomenclature, classification based on size of the ring, number and nature of hetero atoms. Synthesis and reactivity of Pyrrole, furan, Thiophene, pyridine, Indole, Benzothiophene, Quinoline, Isoquionlines.


30. Pericyclic reactions: Classification, Stereochemistry of pericyclic reactions, Molecular Orbitals and Symmetry of ethelene, 1,3-butadiene, 1,3,5-hexatriene, allylic, 1,3-pentadienyl and 1,3,5-heptatrienyl p- systems. Analysis of pericyclic reactions by PMO, FMO and orbital correlation methods.

31. Basic principles, concepts of UV, IR, H1NMR, C13NMR and Mass spectroscopic methods – structure determination of organic compounds by UV, IR, H1NMR, C13NMR and Mass spectroscopic methods.

Main Examination Syllabus for the post of Junior Lecturer in Residential Educational Institution Societies

Paper – II: Botany

I Phycology, Mycology, Bacteria and Viruses
Phycology : Thallus organization ; cell ultra structure ; reproduction (vegetative, sexual, asexual) ; criteria for classification of algae : pigments, reserve food, flagella ; classification, salient features of Chlorophyta, Charophyta, Xanthophyta, Bacillariophyta, Phaeophyta and Rhodophyta ; algal blooms and toxic algae, algal biofertilizers ; algae as food and feed and role of algae in industry.

Mycology : General characters of fungi ; substrate relationship in fungi ; cell ultrastructure ; unicellular and multicellular organization ; cell wall composition ; nutrition (saprobic, biotrophic, symbiotic) ; reproduction (vegetative, asexual, sexual) ; heterothallism ; heterokaryosis parasequacity ; Molecular aspects in classification.

General account of Mastigomycotina, Zygomycotina, Ascomycotina, Basidiomycotina, Deuteromycotina ; fungi in industry, medicine and as food ; fungal diseases in plants and humans ; Mycorrhizae ; fungi as biocontrol agents.

Bacteria- ultrastructure and biochemistry of cell wall, nutritional types, reproduction, Plasmids.

Viruses- Characters and ultrastructure of virions and symptomatology and transmission of plant viruses. Mollicuties general characters of spiroplasmas and phytoplasmas Importance of micro organisms: Microbes in medicine, agriculture and environment.

II Bryophyta, Pteridophyta and Gymnosperms
Bryophyta : Morphology, structure, reproduction and life history ; distribution ; classification, of Marchantiales, Junger maniales, Anthoceratales, Sphagnales, Funariales and Polytrcales ; economic and ecological importance.

Pteridophyta : Morphology, anatomy and reproduction ; classification of Psilosida, Lycopsida, Sphenopsida and Pteropsida; evolution of stele ; heterospory and origin of seed habit; general account of fossil pteriodophyts.


III Taxonomy of Angiosperms
The species concept: Taxonomic hierarchy, species, genus, family and other categories; principles used in assessing relationship, delimitation of taxa and attribution of rank.

Salient features of the International Code of Botanical nomenclature.
Taxonomic tools: Herbarium; floras; histological, cytological, phytochemical, serological, biochemical and molecular techniques; computers and GIS.

Systems of angiosperm classification: Phenetic versus phylogenetic systems; cladistics in taxonomy; relative merits and demerits of major systems of classification.

Study of the following families- Magnoliaceae, Malvaceae, Rutaceae, Apocynaceae, Asclepiadaceae, Lamiaceae, Amaranthaceae and Poaceae.

**IV Plant Anatomy and Embryology**

Shoot development: Organization of the shoot apical meristem (SAM); control of cell division and cell to cell communication; control of tissue differentiation especially xylem and phloem; secretory ducts and laticifers.

Phyllotaxy and leaf differentiation

Root development: Organization of root apical meristem (RAM); vascular tissue differentiation; homeotic mutants in Arabidopsis and Antirrhinum.

Male gametophyte: Structure of anthers; microsporogenesis, role of tapetum; pollen development and gene expression; male sterility; sperm dimorphism and hybrid seed production; pollen germination, pollen tube growth and guidance; pollen storage; pollen allergy, pollen embryos.

Female gametophyte: Ovule development; megasporogenesis; organization of the embryo sac, structure of the embryo sac cells.

Pollination, pollen – pistil interaction and fertilization: Floral characteristics, pollination mechanisms and vectors; self-incompatibility; double fertilization.

Seed development and fruit growth: Endosperm development during early, maturation and desiccation stages; embryogenesis, cell lineages during late embryo development; storage proteins of endosperm and embryo; polyembryony; apomixes; embryo culture; fruit maturation.

Dormancy: Seed dormancy; overcoming seed dormancy; bud dormancy.

**V Plant Resource Utilisation and Conservation**

Origin, evolution, botany, cultivation and uses of (i) Food forage and fodder crops (ii) fibre crops (iii) medicinal and aromatic plants and (iv) vegetable oil-yielding crops. Ethnobotany – Scope and objectives of ethnobotany.

Important fire-wood and timber – yielding plants and non-wood forest products (NWFPs) such as bamboos, rattans, raw materials for paper-making, gums, tannins, dyes, resins and fruits.

Role of plants in Medicine- morphology, active principles and medicinal value of the following plants-Andrographis, Asparagus, Phyllanthus, Gymnema..

Strategies for conservation – in situ conservation: International efforts and Indian initiatives; protected areas in India – sanctuaries, national parks, biosphere reserves, wetlands, mangroves and coral reefs for conservation of wild biodiversity.

Strategies for conservation – ex situ conservation: Principles and practices; botanical gardens, field gene banks, seed banks, in vitro repositories, cryobanks; general account of the activities of Botanical Survey of India (BSI),
National Bureau of Plant Genetic Resources (NBPGR), Indian Council of Agricultural Research (ICAR), Council of Scientific and Industrial Research (CSIR) and the Department of Biotechnology (DBT) for conservation, non-formal conservation efforts.

VI  Plant Ecology
Climate, soil and vegetation patterns of the world: Life zones; major biomes and major vegetation and sol types of the world.
Vegetation organization: Concepts of community; analytical and synthetic characters of community.
Population characters, interactions of species- positive and negative interactions of species.
Ecological succession: types, changes involved in succession, concept of climax
Biotic and abiotic interactions, habitat and niche, allopatric and sympatric spacionship.
Ecosystem organization: Structure and functions; primary production methods of measurement of primary production, energy dynamics (trophic organization, energy flow Pathways, ecological efficiencies); food chains, wood web and ecological pyramids, global biogeochemical cycles of C,N, in terrestrial and aquatic ecosystems.
Biological diversity: Concept and levels; speciation and extinction; IUCN categories of threat; distribution and global patterns, hot spots; endemism, inventory.
Air, water and soil pollution: Kinds, sources, effects on plants and ecosystems.
Climate change: Green house gases (CO2, CH4, N2O, CFCs: sources, trends and role); ozone layer and ozone depletion; consequences of climate change (CO2 fertilization, global warming, sea level rise, UV radiation).
Biogeographical zones of India, Flora of Telangana – vegetational types.

VII  Cell Biology
Ultrastructure and functions of cell organelles. Cell wall, Plasma membrane Plasmodesmata, Chloroplast, Mitochondria, Plant Vacuoles, Nucleus, Ribosomes,
Cell cycle and apoptosis : Control mechanisms; role of cyclins and cyclin dependent kinases; retinoblastoma and E2F proteins; cytokinesis and cell plate formation; mechanisms of programmed cell death. Mitosis and meiosis its significance
Other cellular organelles: Structure and functions of microbodies, Golgi apparatus, lysosomes, endo plasmic reticulum.

VIII  Cytogenetics
Chromatin organization : Chromosome structure and Packaging of DNA, molecular organization of centromere and telomere; nucleolus and ribosomal RNA genes ; euchromatin and heterochromatin ; karyotype analysis ; banding
patterns; specialized types of chromosomes; polytene, lampbrush, B chromosomes and sex chromosomes; molecular basis of chromosome pairing.

Structural and numerical alterations in chromosomes: Duplication, deficiency, inversion and translocation; autopolyploids; allopolyplploids; evolution of major crop plants.

Genetics of prokaryotes and eukaryotic organelles: genetic recombination in phage; genetic transformation, conjugation and transduction in bacteria; genetics of mitochondria and chloroplasts; cytoplasmic male sterility.

Gene structure and expression: Genetic fine structure; cis-trans test; Benzer's experiment; introns and their significance; RNA splicing; regulation of gene expression in prokaryotes and eukaryotes.

Mutations: Spontaneous and induced mutations; physical and chemical mutagens; molecular basis of gene mutations; transposable elements in prokaryotes and eukaryotes; mutations induced transposons; site-directed mutagenesis; DNA damage and repair mechanisms.

Plant Breeding: Principles and methods of plant breeding; Marker assisted breeding.

IX Plant Physiology

Fundamentals of enzymology: General aspects, allosteric mechanism, regulatory and active sites, isoenzymes, kinetics of enzymatic catalysis, Michaelis–Menton equation and its significance.

Membrane transport and translocation of water and solutes: Plant water relations, mechanism of water transport through xylem, passive and active solute transport, membrane transport proteins.

Photochemistry and photosynthesis: Photosynthetic pigments and light harvesting complexes, photooxidation of water, mechanisms of electron and proton transport, carbon assimilation – the Calvin cycle, photorespiration and its significance, the C4 cycle, the CAM pathway, biosynthesis of starch and sucrose.

Respiration and lipid metabolism: Glycolysis, the TCA cycle, electron transport and ATP synthesis, pentose phosphate pathway, glyoxylate cycle, alternative oxidase system, structure and function of lipids, fatty acid biosynthesis, synthesis of membrane lipids, structural lipids and storage lipids and their catabolism.

Nitrogen fixation and metabolism: Biological nitrogen fixation, nodule formation and nod factors, mechanism of nitrate uptake and reduction, ammonium assimilation.


Plant growth regulators and elicitors: Physiological effects and mechanism of action of auxins, gibberellins, cytokinins, ethylene, abscisic acid, brassinosteroids, polyamines, jasmonic acid and salicylic acid.
The flowering process: Photoperiodism, endogenous clock and its regulation, floral induction and development – genetic and molecular analysis, role of vernalization.

X Biotechnology and Genetic Engineering

Plant Biotechnology – Principles, scope and applications.

Plant cell and tissue culture: General introduction, scope, cellular differentiation, and totipotency.

Organogenesis and adventives embryogenesis: Morphogenesis; somatic embryogenesis. Somatic hybridization: Protoplast isolation, fusion and culture.

Applications of plant tissue culture: Clonal propagation, artificial seed, production of hybrids and soma clones, production of secondary metabolites/natural products, cryopreservation and germplasm storage.

Recombinant DNA technology: Gene cloning principles and techniques, genomic/cDNA libraries, vectors, DNA synthesis and sequencing, polymerase chain reaction, DNA fingerprinting and DNA markers.

Genetic engineering of plants: Transgenic plants, Methods of gene transfer – Agrobacterium – medicated and microprojectile, chloroplast transformation, intellectual property rights, ecological risks and ethical concerns.
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Paper - II: Zoology

I General Concepts:
2. Acoelomata, Pseudocoelomata, Coelomata, Proterostomia and Deuterostomia.

II Non-Chordata:
1. General characters and classification of invertebrates up to class level.
8. Mollusca - Torsion and Detorsion, Pearl formation.

III Chordata:
1. General characters and classification of chordates up to class level, Origin of chordates, Phylogeny and Affinities of Hemichordata, Retrogressive metamorphosis.
2. Vertebrate integument and its derivatives, Comparative account of Digestive, Respiratory, Circulatory, Excretory and Reproductive systems of vertebrates.
3. Pisciculture in India, Common edible fishes.
4. Origin and evolution of Amphibia, Neoteny or Paedogenesis.
5. Important snakes of India, Identification of Poisonous and non-Poisonous Snakes, Poisonous Apparatus, Dinosaurs.

IV  **Cell Biology:**
3. Chromosomes structure & function; Heterochromatin, Euchromatin.
5. Recombinant DNA technology, Transgenesis & Cloning.
7. Regulation of gene expression – Lac operon.

V  **Genetics:**
1. Mendel's law of inheritance.
2. Gene mapping methods - Linkage-complete and Incomplete linkage, Linkage maps, Recombination, Mapping with molecular markers, somatic cell hybrids.
3. Crossing over - Types (Somatic or Mitotic crossing over and Germinal or Meiotic crossing over).
4. Mutations - Types (Spontaneous and Induced), Causes and detection.
5. Chromosomal aberrations (Deletion, Duplication, Inversion and Translocation, Ploidy and their genetic implications); Autosomal abnormalities (Down's syndrome, Trisomy-13, 18); Sex anomalies (Turner’s syndrome, Klinfelter's syndrome, Hermaphroditism).
6. Human genetics - Human karyotyping, Genetic disorders due to mutant genes (Huntington’s chorea), Sickle-cell anaemia (SCA), Inborn errors of metabolism-Pheynylketonuria, Alkaptonuria.

VI  **System and Cell physiology:**
2. Cardiovascular system - Neurogenic, Myogenic heart, Cardiac cycle.
5. Muscle - Ultra structure of skeletal muscle, Mechanism of muscle contraction.
6. Sense organs - Eye and Ear.
7. Excretory system - Structure & function of mammalian Kidney and Nephron, Micturition.
8. Osmoregulation - Osmoregulation in Aquatic & Terrestrial animals.
9. Digestive system - Digestion, absorption, assimilation and egestion.

11. Outline classification of organic compounds (Carbohydrates, Proteins and Lipids).

12. Glycolysis (EMP), Kreb’s cycle (TCA CYCLE), Electron transport system (Oxidative phosphorylation), Pentose phosphate pathway, Gluconeogenesis.

VII Evolution:
2. Population genetics - (Gene pool, Gene frequency), Herdy weinberg’s law.
3. Isolation and speciation.
4. Evolution of Man.
5. Zoogeographical realms of the world.

VIII Developmental Biology:
1. Spermatogenesis and Oogenesis.
2. Fertilization, Cleavage, Gastrulation, Formation of germ layers, Parthenogenesis.
3. Formation and Function of Foetal membranes.
4. Types of placenta.
5. Development of Frog and Chick.

IX Histology:
1. Histology of mammalian tissues and organs - Epithelial, connective, blood, bone, cartilage, skin, stomach, intestine, liver, pancreas, kidney, testis and ovary.

X Ecology:
2. Biogeochemical cycles (Carbon, Nitrogen and Phosphorous).
5. Ecological succession.
8. Biodiversity- Economic significance, Conservation, Hot spots of India.

XI Immunology:
1. Cells of the immune system- Lymphoid cells, Mono nuclear cells, Granulocytic cells, Mast cells.
2. Organs of the immune system- Primary and Secondary lymphoid organs, Lymphatic system.

3. Antigens- Antigenic determinants or Epitopes, Immunogenicity, Haptens.

4. Humoral immunity - Immunoglobulin (Fine structure of immunoglobulin and Immunoglobulin classes).

5. Innate (Non-specific immunity) – Anatomical barriers, Phagocytosis, Natural killer cells (NK cells), Interferons.

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Paper – II: History

I  Ancient India:
2. Pre and Proto History – Stone ages and Chalcolithic Cultures.
6. Mouriyan Age: Chandragupta Mouriya and Ashoka, Mouriyan Polity, Administration, Dhamma, Socio-Economic conditions – Decline.
7. Satavahana Age; Political History, Administration, Society, Economy and Culture.
8. Gupta Age: Political History, Administration, Socio-Economic conditions, Growth of Culture, Arts and Architecture, Literature – Decline.
9. India in the Seventh Century A.D.; Pushyabhutis (Harsha), Pallavas, Chalukyas and Rashtrakutas – Political History, Society, Economy and Culture.

II  Medieval India:

III.  Modern India
17. 1857 Revolt; causes, results and significance.
18. Rise and Growth of Indian National Movement – Nationalist Movement I

IV  Modern World:
19. Industrial Revolution- Significance and Results.
20. American War of Independence – Causes, Results, Significance.
21. French Revolution – Causes, Effects, Significance
22. National Liberation Movements in Italy and Germany in the 19th Century – Mazzini, Cavour, Garibaldi, Bismarck.
24. The Russian Revolution of 1917 – Causes, Results and Significance.
25. The world between the Two World Wars – Nazism in Germany, Fascism in Italy, Turkey under Mustafa Kamal Pasha.

V  History of Telangana
28. Pre History
29. Pre-Satavahana, Satavahana, Post-Satavahana - Ikshvakus, Vakatakas, Abiras and Vishnukundis.
30. Telangana from 7th Century to 11th Century- Chalukyas of Badami, Vemulavada, Mudigonda and Kalyana.
31. Age of Kakatiya's; Origin, Political History, Administration, Socio Economic, Religious conditions, Art and Architecture and Literature and their Subordinates.
32. Padma Nayaka's and Musunoori.
33. Qutubshahis – Administration, Religion, Art, Architecture and Literature.
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Paper – II: Economics

I. Micro Economics

1. Demand Analysis

2. Utility Analysis

3. Production Analysis

4. Market Structure Analysis

5. Oligopoly, Duopoly and Factor Pricing Analysis

II. Macro Economics

1. National Income Analysis
and Difficulties in the Estimation of National Income – Limitations of National Income as a Measure of Welfare

2. Theories of Income and Employment


3. Theories of Investment and Interest Rate

Capital and Investment – Types and Determinants of Investment – Marginal Efficiency of Capital – Classical, Neo-Classical and Keynesian Theories of Interest – Simultaneous Determination of Interest and Real Income through IS-LM Framework

4. Supply of Money and Demand for Money


5. Inflation and Trade Cycles


III. Public Finance

1. Introduction to Public Finance


2. Public Revenue and Taxation


3. Public Expenditure and Public Debt


4. Fiscal Policy and Federal Finance

Functions of Finance Commission – Current Finance Commission’s Recommendations

5. Budget

Budget: Concepts, Classification and Types – Revenue Account and Capital Account – Budget Deficits: Concepts, Types and Implications – Fiscal Responsibility and Budget Management (FRBM) – Budgeting in India

IV. International Economics

1. Theories of International Trade

International Trade, Inter-Regional Trade and Inter-Industry Trade – Gains from Trade – Trade as an Engine of Economic Growth – Role of International Trade in Economic Development – Classical and Neo-Classical Theories of International Trade – Heckscher-Ohlin Theory of International Trade

2. Terms of Trade and Barriers to Trade

Concepts of Terms of Trade – Factors Affecting Terms of Trade – Uses and Limitations of Terms of Trade – Secular Deterioration Hypothesis of Terms of Trade: Singer and Prebish – Tariffs, Quotas and Subsidies: Their Effects – Impact of Tariffs on Partial and General Equilibrium Analyses – Political Economy of Non-Tariff Barriers and Their Implications

3. Balance of Payments


4. Exchange Rates

Foreign Exchange Market – Exchange Rates: Concept and Types – Relative Merits and Demerits of Fixed and Flexible Exchange Rates – Theories of Exchange Rates Determination: Mint Parity and Purchasing Power Parity (PPP) – An Overview of Different Methods of Exchange Rate Determination in India

5. International Monetary System and International Finance


V. Economics of Development and Growth

1. Socio-Economic and Institutional Aspects of Economic Development

2. Factors of Economic Development


3. Theories of Growth and Development


4. Strategies of Economic Development and Growth


5. Growth Models


VI. Indian Economy

1. Basic Structure and Demographic Features of Indian Economy


2. National Income, Income Inequalities, Poverty and Unemployment


3. Planning and Public Policy


4. Agricultural Sector

Pricing – Food Security in India

5. Industrial and Service Sectors


VII. Telangana Economy

1. Telangana Economy: Human Resources


2. Gross State Domestic Product, Poverty and Unemployment


3. Agricultural Sector


4. Industrial Sector


5. Service and Infrastructural Sectors


VIII. Quantitative Methods for Economic Analysis

1. Mathematical Foundations of Economic Analysis
Need and Importance of Quantitative Methods in Economics – Meaning and Basic Concepts of Mathematics: Constants and Variables – Functions: Linear, Non-Linear Functions – Equations and Graphs of Linear, Quadratic and Cubic Functions – Concept of Derivative — Rules of Differentiation with respect to Cost, Revenue, Price and Demand Functions – Application of Maxima and Minima in Economic Analysis

2. Introduction to Statistics


3. Measures of Central Tendency and Dispersion

Measures of Central Tendency: Mean, Median, Mode, Geometric Mean and Harmonic Mean – Properties of Good Average – Comparison of Different Averages – Measures of Dispersion – Absolute and Relative Measures of Dispersion: Range, Quartile Deviation, Mean Deviation, Standard Deviation, Coefficient of Variation and Variance

4. Correlation and Regression

Correlation: Meaning and Types – Karl Pearson's Correlation Co-efficient – Spearmen's Rank Correlation – Regression: Meaning and Uses of Regression – Estimation and Interpretation of Regression Line

5. Index Numbers and Time Series Analysis


IX. Banking and Economics of Infrastructure

1. Commercial and Central Banking

Commercial Banks: Concept and Types – Functions and Principles of Commercial Banks – Balance Sheet of Commercial Banks – Process of Credit Creation – Social Responsibility, Importance and Growth of Commercial Banks in India – Central Banking – Functions of Reserve Bank of India – Concept and Objectives of the Monetary Policy – Instruments of Monetary Policy – Financial Sector Reforms in India

2. Financial and Investment Banking


4. Infrastructure and Economic Development


5. Physical Infrastructure


X. Economics of Environment

1. Introduction to Environmental Economics


2. Resource Allocation


3. Environmental Valuation


4. Sustainable Development

Impact of Environment on GNP – Limits to Growth – Sustainable Development: Concept and Rules – Modern and Neo-Classical Views on
5. Environmental Pollution and Policies

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Paper – II: Civics

I. Public Policy
   a) Introduction to Public Policy: Nature, Scope and Importance of Public Policy, Public Policy as a Policy Science
   b) Theories: Systems, Structural-Functional, Incremental, Elite, Group Theory
   c) Public Policy Making: Role of Legislature, Executive, Judiciary, Bureaucracy, Political Parties, Pressure Groups, Mass Media

II. Research Methodology
   a) Social Science Research: Importance and Objectivity in Social Science Research – Scientific Method
   b) Research Methods – Historical, Analytical, Descriptive, Exploratory, Case Study Method
   c) Research Design: Selection of Research Problem and Hypotheses
   d) Data Collection: Primary and Secondary Sources
   e) Data Analysis, Interpretation and Report Writing

III. Public Administration
   a) Introduction: Meaning, Nature, Scope and Importance of Public Administration
   d) Union Government: Parliament, President, Prime Minister, Council of Ministers, Cabinet, Cabinet Secretariat, Prime Minister’s Office (PMO)
   e) State Government: State Legislature, Governor, Chief Minister and Council of Ministers, Secretariat and Directorates
   f) District Administration: District Collector, Special Agencies – District Rural Development Agency, Integrated Tribal Development Agency
   h) Constitutional Bodies: Comptroller & Auditor General, Finance Commission, Election Commission, Commissions for SC, ST, BCs, Women and Minorities

IV. Political Science
(a) Introduction: Definition, Meaning, Nature, Scope and Importance of Political Science
(b) State: Essential Elements – Sovereignty and Theories of Sovereignty:
   Monistic and Pluralistic Theories of Sovereignty - Theories of Origins of State
   Divine Origin, Social Contract, Historical and Evolutionary – Sphere of State
   Activity: Laissez Faire, Anarchist, Fascist, Socialist, Marxist, Welfare State
(c) Basic concepts: Law, Liberty, Equality, Rights and Justice
(d) Governments: Classification of Governments – Traditional and Modern
   - Forms Governments: Unitary, Federal, Presidential and Parliamentary
(e) Democracy: Direct Democracy and Indirect Democracy – Direct Democratic Devices
(f) Theory of Separation of Powers – Legislature, Executive and Judiciary and their functions
(g) Social and Political Movements: Separate Telangana Statehood Movement -
   Dalit and Tribal Movements, Women’s Movement and Environmental Struggles

V. India’s Foreign Policy: Determinants and Features, Non-Alingment and U.N.O.
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Paper- II: Commerce


