

ANDHRA PRADESH PUBLIC SERVICE COMMISSION: HYDERABAD

**SCHEME AND SYLLABUS FOR RECRUITMENT TO THE POST OF
DEPUTY EDUCATIONAL OFFICER/GAZETTED HEAD MASTERS GRADE-1 IN
A.P. EDUCATIONAL SERVICE.**

SCHEME

WRITTEN (OBJECTIVE TYPE) EXAMINATION

PART: A			
i) GENERAL STUDIES	150 Questions	150 Minutes	150 Marks
ii) <u>OPTIONAL SUBJECTS (2)</u>			
Optional – I	150 Questions	150 Minutes	150 Marks
Optional – II	150 Questions	150 Minutes	150 Marks
PART: B			
INTERVIEW (ORAL TEST)			50 Marks

N.B : THE CANDIDATES HAVE TO CHOOSE **TWO OPTIONAL SUBJECTS NOT MORE THAN ONE** FROM THE FOLLOWING THREE (3) DIVISIONS

Subject Code	Division-I	Subject Code	Division-II	Subject Code	Division-III
01	Telugu Literature	09	Chemistry	16	Public Administration
02	English Literature	10	Geology	17	Political Science
03	Hindi Literature	11	Philosophy	18	Commerce
04	Urdu Literature	12	History	19	Physics
05	Mathematics	13	Botany	20	Geography
06	Statistics	14	Anthropology	21	Psychology
07	Zoology	15	Sociology		
08	Economics				

N.B.: Candidate should mention and encode the **SUBJECT CODE** as given above only in relevant column of the Application.

SYLLABUS**GENERAL STUDIES****I. SCIENCE AND TECHNOLOGY:**

- General Science and Technology
- Role and impact of Science and Technology on India's development.

(Questions will cover general appreciation and understanding of matters of everyday observation and experience as may be expected of a well-educated person who has not made a special study of Science and Technology disciplines.)

II. INDIAN HISTORY AND CULTURE:

- Modern Indian History from 19th century to the present.
- Nationalist Movement and Constitutional development.
- Indian culture and Heritage including Architecture., Fine Arts, Dance forms, Music, Paintings, Folk Arts and Performing Arts.
- History of Andhradesa Society, culture, Geography and Economic Development.

III. INDIAN POLITY:

General and broad understanding of the structural (institutions) and functional (Processes) aspects of Indian Political system

IV. INDIA ECONOMY AND GEOGRAPHY OF INDIA:

- Structure of National Economy.
- Economic development (including planning) since Independence.
- Economic Reforms.
- Physical, Economic and Social Geography of India.

V. CURRENT EVENTS:

Current Events of Regional, National and International importance

VI. GENERAL MENTAL ABILITY (reasoning and analytical abilities)

1. ENGLISH LITERATURE

I. TOPICS AND MOVEMENTS:

The Renaissance: Elizabethan and Jacobean Drama; Metaphysical Poetry; The Epic and the Mock-epic
Restoration Drama; The Romantic Movement; The Rise of the Novel; The Victorian Age.

Modernism: Poets of the Thirties; The Stream of Consciousness Novel; Absurd Drama; Colonialism and Post-Colonialism; Indian Writing in English; Marxist, Psychoanalytical and Feminist approaches to literature; Post Modernism.

II. POETRY: SELECTED POETS AND POEMS:

John Donne
Canonization
Death be not proud
The Good Morrow
On his Mistress going to be
The Relic;
I wonder by my troth

John Milton; Paradise Lost, I, II, IV, IX Alexander Pope; The Rape of the Lock; William Wordsworth

- Ode on Intimations of Immortality
- Tintern Abbey
- Three years she grew
- She dwelt among untrodden ways
- Michael
- Resolution and Independence
- The world is too much with us
- Milton, thou shouldst be living at this hour
- Upon Westminster Bridge

Alfred Tennyson; In Memoriam.

William Butler Yeats

- Ester 1916
- The Second coming
- A prayer for my daughter
- Sailing to Byzantium
- The Tower
- Among School Children
- Leda and the Swan
- Meru
- Lapis Lazuli
- The Second Coming
- Byzantium

T.S. ELLIOT:

The Love song of J. Alfred Prufrock
Journey of the Magi
Burnt Norton

W.H. AUDEN:

Partition
Museedes Beaux Arts
In Memory of W.B. Yeats
Lay your sleeping head, my love
The Unknown Citizen
Consider
Mundus Etfans
The Shield of Achilles
September 1, 1939
Petition

PHILIP LARKIN:

Next
Please
Deceptions
Afternoons
Days
Mr. Bleaney

A.K. RAMANUJAN, The following Poems:

Looking for a Causim on a swing
A River
Of Mother's among other things
Love Poem for a Wife 1
Small Scale Reflections on a Great House
Obituary

(All these poems are available in the anthology Ten Twentieth Century Indian Poets. Edited by R. Parthasarthy, published by Oxford University Press, New Delhi).

III. FICTION:

Jonathan Swift – Gulliver's Travels
Jane Austen – Pride and Prejudice
Henry Fielding – Tom Jones
Charles Dickens – Hard Times
George Elliot – The Mill on the Floss
Thomos Hardy – Tess of the d ' Urbervilles
Mark Twain – The Adventures of Huckleberry Finn
Joseph Conrad – Lord Jim
James Joyce – Portrait of the Artist as a Young Man
D.H.Lawrence – Sons and Lovers
E.M. Forster – A Passage to India
Virginia Woolf – Mrs. Dalloway
Raja Rao – Kanthapura
V.S. Naipal – A House for Mr. Biswas

IV. DRAMA :

William Shakespeare: King Lear and the Tempest
Henrik Ibsen : A Doll's House
John Osborne: Look Back in Anger
Samuel Beckett: Waiting for Godot

5. ECONOMICS

- 1) Market Structure – Types of markets and price determination under different markets – Theories of distribution – Criteria for welfare.
- 2) Money – Functions of money – Quantity theory of money – Demand for and supply of money – Real balance effects – Money multiplier – Budget deficit and money supply – High powered money – Theories of inflation – control of inflation.
- 3) Modern monetary system – Banks – Non-Bank financial intermediaries – Central Bank – Credit creation and control of credit under closed and open economics – Money markets in India and their role.
- 4) Full Employment – Classical theory and Say's Law – Under employment equilibrium – Keynes's theory of employment and income determination – critiques of Keynesian theory.
- 5) Public Finance and Fiscal Policy – Forms of Taxes and Subsidies - Incidence of Taxation – Public expenditure and its growth – Recent fiscal policies and their effects stabilization policies in India.
- 6) Theories of international trade – Terms of Trade Balance of payments adjustments – Import substitution India's external borrowings – IMF-IBRD-WTO-Exchange rate – Devaluation Rupee convertibility – Impact of liberalization on pattern of Trade in India.
- 7) Theories of Growth – Classical and neo-classical theories - The Harrod model – Wage goods strategy – Contributions of Vakil, Gadgil and Rao – Factors determining savings to income ratio and the capital – Output ratio. Poverty in India – Urban – Rural and its measurement. Employment and policies of unemployment adopted by the Government.
- 8) Indian economy since Independence – Land systems – Agriculture Land holdings – Green Revolution and technological changes – Regional disparities in agricultural growth – Changes in occupational distribution – Role of agriculture in export.
- 9) Industrialization in India – Role of public and private sectors – Role of Small Scale and Cottage Industries in the post – Liberalization period – Economic planning in India – Plans and Social Justice – Self-reliance in growth and development.
- 10) State Level planning in Andhra Pradesh – Sources of Revenues and Income – Expenditure pattern of Govt. in A.P. Micro level planning – Effect of Janma Bhoomi in over all development of A.P.

6. HISTORY

PART – I

Indian History upto 1200

THE INDUS CIVILIZATION:

The Vedic Age – Early and Later Vedic Ages

Jainism and Buddhism

The Mauryan Empire – Political History, Administration, Social & Economic conditions – Art and Architecture.

THE POST MAURYA PERIOD:

Kushans – Satavahanas – Ikshwakas – Political History, Economy & Society, Rise of Mahayana and theistic cults – Art – Gandhara, Mathura, Amaravati Schools of Art.

THE GUPTAS:

Political History, Administration, Society, Religion architecture, Art & Literature & Economy.

Harshavardhana and his times – Chalukyas of Badami & Pallavas, Society, Administration & Art – Sankaracharya and his philosophy

Rashtrakutas, Eastern Chalukyas, Kalyani Chalukyas and Cholas – Political History, Administration, Society, Economy, Art and Literature

Arab conquest of Sind & Ghazni & Ghori's campaigns

PART - II

INDIAN HISTORY 1200-1765 AD

DELHI SULTANATE - Slave dynasty, Khiljis, Tughlaks, Sayyads & Lodis, Political History, Administration Art and Architecture, Literature, Society & Economy Influence of Islam on Indian culture-Sufism & Bhakti movement.

SOUTH INDIAN STATES - Kakatiyas, Musunuri, Velama, Reddi Kingdoms, & Bahamani & Vijayanagara empires – Political History, Administration, Society, Literature, Art & Architecture.

THE MUGHAL EMPIRE - Babar, Humayun, Sher Shah, Akbar, Jahangir, Shah Jahan & Aurangzeb

Political History, Administration, Society, Art & Architecture, Literature, Economic life

QUTUBSHAHIS OF GOLKONDA - Contributions to culture establishment of European trading companies Rise of Marathas – Sivaji – Peshwas – Administration Asafjahis, Salarjung Reforms.

PART – III

INDIAN HISTORY 1765 – 1947

Establishment of British Rule in India – Karnatic Wars – Robert Clive – Governors General – Warren Hastings – Cornwallis – Wellesley – Lord Hastings – William Bentinck – Reforms – Dalhousie.

Revolt of 1857 – Causes, Course & Results

Socio religious reform movements with special reference to Bengal – Maharashtra and Andhra

Raja Ram Mohan Roy – Brahma Samaj – Arya Samaj

Theosophical movement – Prarthana Samaj

The Important Viceroys

Lord Rippon, Lord Curzon

Rise of Indian National Movement – Establishment of Indian National Congress, Moderates and Extremists – Home Rule Movement – Annie Besant

Emergence of Gandhiji – Non Co.operation, Civil Disobedience and Quit India Movements – British official response to National Movement – Constitutional changes – 1909, 1919 & 1935 Acts.

Rise and growth of communalism

Political ideologies of the Muslims Sir Sayyad Ahmad Khan – Aligarh movement – Muslim League, Jinnah

Khilaphat Movement, Indian National Army

The partition of India

Achievement of Freedom

Freedom Movement in Andhra

Telangana Armed Struggle

Movement for separate Andhra and

Emergence of Andhra Pradesh in 1956

PART – IV

WORLD HISTORY 1500 – 1950

Renaissance & Reformation –

Counter Reformation

Geographical discoveries –

Emergence of Nation States – Mercantilism

Thirty years War – Ascendancy of France

The age of Enlightenment

The American Revolution & its significance

French Revolution & Napoleonic Era 1789 – 1815

Industrial Revolution – its stages in Europe

Unification of Italy & Germany

The American Civil War

Colonialism and imperialism in Asia

and Africa - in 19th and 20th centuries –

China & Western powers – Emergence of Japan as a great power

Dismemberment of Ottoman Empire – Balkan Wars

The First World War – Causes & Results,

Peace of Paris – The League of Nations

Russian Revolution

Facism in Italy

Nazism in Germany

Second World War

U.N.O.

7. ZOOLOGY

1. PROTOZOA: Locomotion organellae, nutrition, reproduction, structure & pathology of Leishmanra donovani
2. PORIFERA: Types of cells & Types of spicules, Regneration and development.
3. COELENTARATA: Polymorphism in Siphonophora, coral formation, structure and development of Acnidaria
4. HALMINTHU: Structure & Life History of Echinococcus, Sctistosoma and Wuchereria.
5. ANNELIDA: Matamerism, Coelom & Coalomducts
6. ARTHROPODA: Orustacian Larvae, Parasitic Orustaeaa, Useful & harmful insects, respiration in scorpion, Phylogenetic importance of Peripatus.
7. MOLLUSOA: Pearl formation: Torsien & detorsion
8. ECHINODERMATA: Echinoderm Larvae
9. PROTOCHORDATES: Origin of Chordates, Retrogressive metamorphosis filter feeding in protochordates.
10. CHORDATA:
 - i) Cytosomes : Salient features with examples.
 - ii) Pisces: Air bladder, Migration & electric organs in fishes Weberian ossicles and evolutionary significance of Latemeria.
 - iii) Amphibia: Extinct amphibia, origin of tetrapoda, parental care in Amphibia
 - iv) Reptilia: Mesozoic reptiles, Poisonous and non-poisonous ophidians Nature of Poison & Poisonous apparatus of Ophidians.
 - v) Aves: Migration of Birds, Flight adaptations.
 - vi) Mammals: Egglaying mammals, adaptive radation of marsupials, origin of Molariform tooth
 - vii) Comparative Anatomy: Integument, Digestive, respiratory, Nervous & Urinogenital system of Anamniota & Amniota.
11. ECOLOGY, ETHOLOGY, BIostatISTICS & ECONOMIC ZOOLOGY:
 - i) Ecoystem: Energy flow, Bio-geo chemical cycles, Food Chains & tropic levels.
 - ii) Pollution: In air, water & Land.
 - iii) Wild Life: Conservation & its laws.
 - iv) Ethology: Role of hormones & Pheremones on animal behaviour. Neuro-Endocrine control of animal behaviour.
 - v) Bio-Statistics: Frequency distribution standard deviation, standard error.
 - vi) Economic Zoology: Parasitism, commensalism & host-parasitic interaction, Insect pests of crops, Pisciculture & induced breeding.
12. CELL BIOLOGY: Structure & function of cell and cytoplasmic constituents-Nucleus, Plasma membrane, mitochondria, Golgibody, endoplasmic reticulum, ribosomes, Watson-Crick Model of DNA, replication of DNA, Protein synthesis, Types of RNA.
13. GENETICS: Recombination linkage and Linkage maps, multiple alleles, mutation, Chromosome number and form, regulation of gene expression, Genetic diseases and engenics.
14. EVOLUTION: Hardy-Weinberg law, concept of species & sub-species, Zoological nomenclature & international code, Fossils, Geological eras, Phylogeny of horse & Elephant, origin and evolution of man, Zoo-geographical realms.
15. BIOCHEMISTRY: Structure of Carbohydrates, Lipids, Amino acids, Proteins, Nuclear Acids, Glycolysis, Krieb's Cycle, Energy conservation & release, ATP, Cyclin AMP. Types of Engymes, Mechanism of Enzyme action, Immunoglobulins & Immunity, Hormones & their functions.
16. PHYSIOLOGY: Composition of blood, blood groups, Coagulation, Breathing & its regulation, Nephron & Urine formation, Temperature regulation, Neurotrans-mittors, Types of muscles & their contraction, Chemistry of digestion and absorption. Role of hypothalamus, Pituitary, thyroid, parathyroid, physiology of reproduction in human being.
17. EMBRYOLOGY: Gametogenesis, Types of Eggs, cleavage, gastrulation in amphioxus, Frog and Chick, Fate maps in chick, Types of placenta in mammals, Organogenesis of CNS, Sense organs, heart and kidney in vertebrate embryo.

8. ANTHROPOLOGY

- 1.1. Anthropology – Definitions, meaning and scope;
- 1.2. Anthropology's relationship with other disciplines – History, Economics, Political Science, Sociology, Psychology, Life Sciences and Medical Science;
- 1.3. Main branches of anthropology, their scope and relevance inter-relationship of one with the other:
 - a) Social-cultural anthropology
 - b) Physical/Biological Anthropology
 - c) Archaeological anthropology
- 1.4. Human Evolution and Emergence of Man: Organic evolution-Theories of evolution in historical perspectives – Pre Darwinian, Darwinian and Post-Darwinian period. Modern synthetic theory of evolution. Origin and evolution of man- "Homoerectus" and Homo Sapiens".
- 1.5. Phylogenetic status – Characteristics and distribution of the following:
 - a) Pre-pleistocene fossil primates – Oreopithecus
 - b) South and East African hominids – Plesianthropus/Australopithecus Africanus, Paranthropus Australopithecus.
 - c) Paranthropus – Homo erectus – Homo erectus Javanicus, Homo erectus pekinensis.
 - d) Homo Heidelbergensis.
 - e) Neanderthal man – La chappelle – Aus-saints (Classical) Mt.Carmelites types (Progressive)
 - f) Rhodesian man
 - g) Homo Sapiens – Cromognon, Crimaldi chancelede
 - h) Recent advances in understanding fossil types.
- 1.6. Evolutionary trend and classification of the Order Primates, Relationship with other mammals; Comparative anatomy of man and apes; primate locomotion; Terrestrial and arboreal adaptation; Skeletal changes due to erect posture and its implications.
- 1.7. Cultural evolution-Broad outlines of pre-historic cultures of a) Paleolithic b) Mesolithic c) Neolithic d) Chalcolithic e) Copper – Bronze age and Iron Age.
- 2.1. Family- Definition and typology of family; Family household and domestic groups joint family basic structure and function; stability and change in family – impact of urbanization, industrialization, modernization, education and feminist movements; Debate on universality of family.
- 2.2. Concept of kinship – definitions and meaning of kin, kinship descent and affinity; incest, exogamy and endogamy; Decent rules – Unilineal, bilateral and double descent; Descent systems and descent groups; political and jural aspects of descent systems, filiation and complementary filiation; kindreds; kinship terminologies – criteria of classification; major kinship terminological systems; Alliance and Descent theories.
- 2.3. Marriage – Definition; Forms of Marriage; Ways of acquiring mates; Debate on universal definition of marriage; preferential prescriptive and proscriptive marriages; Dowry Bride price, prestation; Divorce and marital stability.
- 3.1. Concept of culture – Definitions, meaning and nature and characteristics of culture; Relationship between culture and civilization. Concept of society; concept of social change and culture change.
- 3.2. Social structure and social organisation: Role – analysis and social network; concept of institutions, Groups and community; social stratification – principles and forms status, class and power, gender; nature and types of mobility.
- 3.3. Approaches to the study of culture and society – Classical evolution, neo-evolutionism, historical particularism and diffusionism, structural functionalism, Culture – personality approaches; Transactionalism, symbolism, cognitive approach and new ethnography, post – structuralism and post-modernism.
- 4.1. Definitions and functions of religion; Anthropological Approaches to the study of religion – evolutionary, psychological and functional; magic, witchcraft and sorcery – definitions and functions; Religious functionaries and their functions – Priest, Shaman, Medicine man and Sorcerer. Symbolism in religion and rituals. Ethnomedicine Myths and Rituals – definitions and approaches to their study.
- 5.1. Meaning and scope of economic anthropology; principles governing production, distribution and consumption in communities subsisting on hunting – gathering, fishing, pastoralism, horticulture and other economic pursuits; Formalist and substantivist debate – Dalton, Kari-Polyanny and Marx approaches and new economic anthropology; exchange-gifts, barter, trade, ceremonial exchange and market economy.
- 6.1. Political organizations of band, Tribe, chiefdom, State salient features; concept of power, authority and legitimacy; social control, law and justice in tribal and peasant societies.

- 7.1 Development anthropology – meaning and scope; applied – Action and Development anthropology. Anthropological perspective on the meaning of development; models of development; critic of classical developmental theories; concepts of planning and planned development; cultural ecology and sustainable development; Displacement and rehabilitation.
- 8.1 Anthropological Research – Methodology – Methods and Techniques; Research Design; Comparative methods nature, purpose and methods of comparison in social anthropology; Basic techniques in primary data collection – interview participant and other forms of observation, schedules, questionnaires case-study, extended caste study, life histories genealogical method, oral history; Rapid Rural Appraisal (RRA) and participatory Rural Appraisal (PRA) approaches.
- 9.1 Human Genetics: Concept, scope and its major branches method for study of genetic principles in man-Family Study (Pedegree analysis, twin study, poster child, cotwin method, cytogenetic method, chromosomal and karyotype analysis) biochemical methods, immunological methods, D.N.A. technology and recombinant Technologies.
- 10.1 Mendelian genetics in man-family study, single factor, multifactor, lethal, sub-lethal, and polygenic inheritance in man.
- 10.2 Concept of genetic polymorphism and selection, Mendelian population, Hardy-weinberg law; causes and changes which bring down frequency – mutation, isolation, migration, selection in breeding and genetic drift, consanguineous and non-consanguineous mating, genetic load, genetic effect of consanguineous and cousin marriages.
- 11.1 Concept of race, race and racism; Racial criteria, racial traits in relation to heredity and environment; biological basis of racial classification, racial differentiation and race-crossing in man. Racial classification of human groups; principal living peoples of the world-their distribution and characteristics; Racial Classification of populations in India.
- 12.1 Age, sex and population variation in genetic marker-ABO, RH blood groups, HLA, HP transfemn, Gm, Blood enzymes. Impact of smoking air pollutions alcoholism, drugs and occupational hazards on health.
- 13.1 Concepts and methods of Ecological anthropology, Adaptation - Social and cultural deterministic theories; Sustainable development; biological adaptation – climatic environmental, nutritional and genetic.
- 14.1 Concept of Ethnicity; Ethnic issues and problems at rural, tribal, urban and international levels. Concept of ethnic boundaries; ethnicity and concept of nation-state.
- 15.1 Human growth and development – Stages of growth prenatal natal, infant, childhood, adolescence, maturity; factors affecting growth and development-genetic, environmental, biochemical, nutritional cultural and socio-economic.
- 16.1 Reproductive biology, demography and population study; Reproductive physiology of male and female; Biological aspects of human fertility. Relevance of menarche, menopause and other bioevents of fertility; fertility patterns and differentials;
- 16.2. Biological and socio-ecological factors; influencing fecundity, fertility, natality and mortality; Biological consequences of population control and family welfare. Methods of studying population growth.
- 16.3. Demographic research methods – census, registration system, sampling methods, duel reporting system.
- 17.1 Evolution of Indian culture and civilisation – prehistoric (Paleolithic, Mesolithic and Neolithic), Protohistoric (Indus civilisation) Vedic and post-Vedic beginnings. Contribution of tribal cultures.
- 18.1 Demographic profile of India-Ethnic and linguistic elements in Indian population and their distribution. Linguistic &religious minorities social, political and economic dimensions of.
- 19.1 The basic structure and nature of traditional Indian social system - varnashrama, purusharthas, karma, rina and Rebirth. Theories on the origin of caste system; Jajmani system; Structural basis of inequality in traditional Indian society. Impact of Buddhism, Jainism, Islam, Christianity on Indian society.
- 19.2 Approaches to the study of Indian society and culture-traditional and contemporary.
- 20.1 Emergence, growth and development of anthropology in India Contributions of 19th and 20th Century scholar-administrators and Indian anthropologists.
- 21.1 Concept of Peasant society – Indian Village; Village studies and tribal studies in India Salient features of Indian villages, impact of market economy, urbanization and industrialization on Indian Villages.
- 22.1 Tribal situation in India-biogenetic variability, linguistic and socio-economic characteristics of tribal populations and their distribution. Problems of Tribal communities – land alienation poverty, indebtedness, low literacy, unemployment health and nutrition.

- 22.2 Tribals and forests; development of forest policy for tribal habitats, joint forest management, development projects-tribal displacement and problems of rehabilitation, impact of urbanization and industrialization on tribal populations.
- 22.3 Problems of exploitation and deprivation of SCs and STs and other backward classes. Constitutional safeguards for SCs and STs impact of modern democratic institutions, development programmes and welfare measures on STs and weaker sections.
- 23.1 Social change and contemporary tribal societies emergence of ethnicity, tribal movements and question of identity, impact of Hinduism, Christianity, Islam and other religions on tribal societies, Tribe and nation-state - a comparative analysis of tribal communities in India and other countries.
- 24.1 Emergence of tribal development approach and policy, administration of tribal/scheduled areas – historical perspective; evolution of development plans and programmes; Tribal sub-plans; Role of NGOs in Tribal development.
- 25.1 Role of anthropology in tribal and rural development; anthropological perspectives on regionalism, Communalism, ethnic and political movements.

9. BOTANY

1. MICROBIOLOGY AND PLANT PATHOLOGY: Viruses and bacteria; Structure and reproduction. General account of infection, Importance of plasmids. Application of microbiology in agriculture, industry and medicine.
Important plant diseases caused by viruses, bacteria and fungi. Molecular basis of infection and disease resistance. Physiology of parasitism and control measures
2. CRYPTOGAMS : General account of Algae, Fungi, Bryophytes and Pteridophytes. Structure and reproduction from evolutionary point of view. Economic importance of Algae and Fungi.
3. PHANEROGAMS :
Gymnosperms : Classification and distribution of gymnosperms. Salient features of cycadales, coniferales and Gnetales.
Angiosperms : Systematics, Anatomy, Embryology and Palynology;

Give an account of various systems of Angiosperm classification. Salient features of Magnoliaceae, Brassicaceae, Leguminosae, Malvaceae, Euphorbiaceae, Solanaceae, Verbenaceae, Rubiaceae, Asteraceae (Compositae) and poaceae (Gramineae).

Development of male and female gametophytes, pollination and fertilization. Polyembryony, Apomixis and the application of palynology.
4. PLANT UTILITY AND EXPLOITATION: Plants as sources for food, fodder, fibres, timber, spices, drugs, narcotics, dyes, gums and resins. Importance of Ethnobotany. Energy plantation and Botanical gardens.
5. MORPHOGENESIS: Totipotency, Cell, tissue, protoplast, and organ culture. Somatic hybridisation and its significance in crop improvement.
6. CELL BIOLOGY: Structure of prokaryotic and Eukaryotic cells. Membranes – Structure (recent models) and function of membranes. Ultra structure and function of Nucleus, chloroplast, mitochondria, ribosomes and peroxisomes. Cell signaling and cell receptors. Signal transduction. Mitosis and Meiosis. Molecular basis of cell cycle. Numerical and structural variations in chromosomes their significance.
7. GENETICS, MOLECULAR BIOLOGY AND EVOLUTION: Concept of gene. Quantitative genetics. Linkage, methods of gene mapping. Sex chromosomes and molecular basis of sex differentiation. Mutation (Molecular basis) and its significance. Cytoplasmic inheritance and male sterility. Structure and synthesis of nucleic acids and proteins. Genetic code and regulation of gene expression.
Organic evolution: Mechanism and theories. Role of nucleic acids in origin and evolution.
8. PLANT BREEDING, BIOTECHNOLOGY AND BIostatISTICS: Methods of plant breeding. Importance of apomixis in plant breeding. Recombinant DNA technology. Role of molecular markers in plant breeding. Transgenic crops. Standard deviation. Tests of significance (Z-test and Chi-square tests) Probability and distributions (Normal and binomial correlation and regression coefficients).
9. PHYSIOLOGY AND BIOCHEMISTRY: Water relations, Mechanism of Stomatal movement. Micronutrients, Mechanisms of ion uptake.
Photosynthesis – Chloroplast pigments, Photochemical reactions, photophosphorylation and path of carbon in C₃, C₄ and C₄ M plants. Photorespiration. Respiration – Aerobic anaerobic and fermentation processes. Electron transport chain and oxidative phosphorylation. ATP synthesis – (Chemiosmotic hypothesis). Biochemistry of nitrogen fixation. Enzymes – Mechanism of enzyme action, Cofactors and Isozymes. Role of phytohormones (Auxins, Gibberellins, Cytokinins and Abscisic acid) on growth and development. Application of phytohormones in Agriculture and horticulture. Photoperiodism, Vernalization and flowering. Stress physiology (Heat, water and salinity).

10. ECOLOGY AND PHYTOGEOGRAPHY: Concepts and dynamics of community. Plant succession. Concepts of biosphere. Ecosystems. Pollution and its control.

Afforestation and social forestry. Endangered plants. Red Data Book, Sovereign Rights and Intellectual property rights. Global warming.

10. CHEMISTRY

1. ATOMIC STRUCTURE: Quantum theory, Heisenberg's uncertainty principle, Schrodinger's wave equation, particle in one dimensional box, quantum numbers, shape of s, p, d, and f orbital.
2. CHEMICAL BONDING: Ionic bond, lattice energy, Born-Haber cycle Co-valent bond, dipole moments, valence bond theory, resonance, Molecular orbital theory, bonding in homo and heteronuclear molecules, H₂ to Ne₂, NO, HF, CN, Be H₂, CO₂ bond order.
3. SOLID STATE: Crystal systems and crystallographic groups. Unit cell, laws of rational indices. Bragg's law. Structures of NaCl, ZnS, CsCl, CaF₂. Stoichiometric and non-stoichiometric defects. Semi conductors.
4. THE GASEOUS STATE: Equation of state for real gases. Critical phenomena. Maxwell's distribution of speeds. Intermolecular collisions and effusion.
5. THERMODYNAMICS AND STATISTICAL THERMODYNAMICS: Second law of Thermodynamics, entropy changes in various processes. Free energy, criterion for equilibrium. Relation between equilibrium constant and thermodynamic quantities. Nernst heat theorem – Third law of thermodynamics – Micro and Macro states, canonical ensemble and canonical partition function – electronic, rotational and vibrational partition functions and thermodynamic quantities – Chemical equilibrium in ideal gas reaction.
6. PHASE EQUILIBRIA AND SOLUTIONS: Phase equilibria in pure substances, Clausius – Clapeyron equation – partial molar quantities, excess thermodynamic functions.
7. ELECTROCHEMISTRY: Debye – Huckel theory of strong electrolytes – Debye - Huckel limiting law – Galvanic cells, electrochemical series – measurement of EMF of cell, Fuel cells and batteries – Double layer at the interface, current density, overpotential, voltametry, polarography, amperometry, cyclic – voltametry.
8. CHEMICAL KINETICS: Rate equations for zero, first, second and fractional order reactions. Rate equation for reverse, parallel, consecutive and chain reactions – Effect of temperature and pressure on rate constants. Study of fast reactions; stopped flow, relaxation methods. Collision and Transition state theory equations.
9. PHOTOCHEMISTRY: Decay of excited states by different routes. Photochemical reactions H₂ – C₁₂, H₂ – Br₂, H₂ – I₂ Quantum yields.
10. SURFACE PHENOMENA AND CATALYSIS: Adsorption isotherms, Langmuir and BET Isotherms, heterogeneous catalysis.
11. BIO INORGANIC CHEMISTRY: Metal ions in biological systems and their role in ion transport across the membranes. Ionophores, photosynthesis, nitrogen fixation, oxygen-uptake proteins, cyclochromes and ferredoxins.
12. CO-ORDINATION CHEMISTRY: metal complexes, valence bond theory, crystal field theory, electronic spectra of metal complexes, IUPAC nomenclature and isomerism in co-ordination compounds. Stereochemistry of complexes with 4 and 6 co-ordination numbers, trans effect. Thermodynamic and kinetic stability of complexes – structure of metal Carbonyls, carboxylate anions, carbonyl hydrides and metal – nitrosyl compounds – metal-olefin complexes, alkyne – complexes and cyclopenta dienyl complexes. Insertion reactions, fluxional molecules metal – metal bonds and metal-atom clusters.
13. GENERAL CHEMISTRY OF 'f' BLOCK ELEMENTS: Lanthanides and actinides; oxidation states, magnetic and spectral properties – Lanthanide contraction.
14. NON-AQUEOUS SOLVENTS: Reactions in liquid NH₃, HF, SO₂, H₂SO₄, Coordination model of non-aqueous solvents fluorosulphuric and super acids.
15. DELOCALISED CO-VALENT BONDING: Aromaticity and anti aromaticity, annulenes, azulenes, tropolones, kekulene, fulvenes, sydnones.
16. REACTION MECHANISMS: General methods (kinetic and non-kinetics), use of isotopes, intermediate trapping, stereochemistry, energy of activation, thermodynamic and kinetic control of reactions. Reactive intermediates, carbonium and carbanions, free radicals, carbenes, benzynes S_N1, S_N2, S_Ni, and S_{RN}1 substitution reaction Elimination reactions E1, E2 and E1cb addition reactions to C=C and C=C = O, C=N, conjugated olefins and carbonyls. Rearrangements; Hoffmann, Beckmann, Baeyer-Villiger, Fries, Favorskii, Claisen, Cope, Stevens and Wagner-Meerwein. Pericyclic reactions Classification and examples Woodward-Hoffman rules, Electrocyclic and cycloaddition reactions (2+2 and 4+2) and Sigmatropic shifts (1,3,3,3, and 1,5) FMO approach.

17. POLYMER CHEMISTRY: Polymer solutions and their thermodynamic properties number and weight average molecular weights, molecular weights by sedimentation, light scattering osmotic pressure viscosity, end group analysis, Bio-polymers – basic binding in proteins, DNA and RNA.
18. SYNTHETIC USES OF REAGENTS: Important synthetic reactions using OSO_4 , HIO_4 , CrO_3 , $\text{Pb}(\text{OAc})_4$, SeO_2 , NBS, LiAlH_4 , $n\text{-BuLi}$, MCPBA, Na in Liq, NH_3 .
19. PHOTOCHEMISTRY: Singlet and triplet states, Norrish I and II type reaction.
20. SPECTROSCOPY: Rotational spectra of diatomic molecules, rotational constants vibrational spectra of linear tri atomic molecules. Specific frequencies of functional groups in polyatomic molecules.
Electronic spectra; Singlet and Triplet states $n\text{-}\pi$, $\pi\text{-}\pi^*$ transitions. application to conjugated double bonds and carbonyls – Woodward – Fieser rules.
NMR – Chemical shift, coupling constants, application to simple organic molecules, Mass Spectra; parent peak, base peak, daughter peak, metastable peak, McLafferty rearrangement.

ESR: Inorganic complexes and free radicals.

11. MATHEMATICS

ALGEBRA:

Groups, Subgroups, Normal sub groups, Homomorphism of groups : Quotient groups, Isomorphism Theorems, Sylow's Theorems, Permutation groups, Unique Factorization Domains and Euclidean Domains. Field Extensions, Finite Extensions, Finite Fields.

LINEAR ALGEBRA:

Vector Spaces, Linear Dependence and Independence Subspaces, Bases, Dimension, Finite Dimensional Vector Spaces, Linear transformations, Matrix of a linear transformation, Matrices, Eigen values and Eigen vectors, Cayley-Hamilton Theorem. Rank, row and column reduction, Echelon form, equivalence, congruence and similarity, Reduction to canonical form. Symmetric, Skew symmetric, Hermitian, Skew Hermitian, Unitary and orthogonal matrices, their eigen values and eigen vectors. Quadratic forms, positive definite quadratic forms, simultaneous reduction of pair of quadratic forms to normal forms. Sylvester's law of inertia.

CALCULUS:

Real Numbers, Real valued functions, limit of a function, continuity, Differentiability, Mean value theorems, Taylor's Theorem with remainders, Indeterminate forms, Maxima and Minima, Lagrange's method of Multipliers, Jacobians, Riemann's definition of definite integrals; Indefinite, infinite and improper integrals, Double, Triple and Repeated Integrals Beta and Gamma Functions. Areas, Surface and Volumes.

REAL ANALYSIS:

Real number system, ordered sets, Bounds, ordered field. Sequences, Cauchy's sequence, completeness, continuous functions, uniform continuity, properties of continuous functions on compact sets. Riemann Integration. Functions of several variables, Differentiation, Change of the order of partial derivatives, Maxima and Minima and Implicit function theorem. Series, convergence and Divergence. Tests of convergence. Absolute and conditional convergence of series of real terms. Rearrangement of series, uniform convergence.

COMPLEX ANALYSIS:

Analytic functions, Cauchy – Riemann equations, Cauchy's Theorem, Cauchy's Integral Formula. Taylor's and Laurent's series. Singularities, Cauchy's Residue theorem. Calculus of Residues, Contour Integration. Bilinear transformations and conformal mappings.

ORDINARY DIFFERENTIAL EQUATIONS:

Formation of ordinary Differential equations. Order and Degree, Differential equations of first order and first degree. Orthogonal Trajectories – Differential equations of first order but not first degree. Singular solutions. higher order linear differential equations with constant Co-efficients, Cauchy-Euler equations. Second order linear differential equations with variable coefficients.

PARTIAL DIFFERENTIAL EQUATIONS:

Formation of partial differential equations, solutions of equations of type $\text{dx}/P = \text{dy}/Q = \text{dz}/R$, Pfaffian differential equations. Partial differential equations of first order, orthogonal surfaces. Charpit's method, Linear Partial differential equations of the second order with constant coefficients, Equations of vibrating string, Heat equation, Laplace's equation.

GEOMETRY:

Straight lines, plane, sphere, cone, cylinder, paraboloid, Ellipsoid, Hyperboloid of one and two sheets and their properties. Shortest distance between two skew lines, curves in space, curvature and torsion, Serret – Frenet's Formulae.

VECTOR ANALYSIS:

Scalar and vector fields, Dot, Cross and Triple products, Differentiation of vector functions, Gradient, Divergence and Curl in Cartesian, Cylindrical and Spherical coordinates and their physical interpretation. Higher order derivatives, Vector identities and vector equations. Applications to Geometry. Greens, Gauss and Stoke's Theorems.

OPERATIONS RESEARCH:

Linear Programming problems. Basic, Basic feasible and optimal solution. Graphical and simplex method solution. Duality, Transportation and assignment problems. Rectangular games, pure strategy and mixed strategy, saddle point, value of the game and optimal strategy. Principle of Dominance, Algebraic method. Relation between game theory and LPP.

12. SOCIOLOGY

1. Sociology as a science and as an interpretative discipline, Impact of industrial and French revolution on the emergence of Sociology; Sociology and its relationship with history, economics Political Science and anthropology.
2. Problem of Objectivity and value-neutrality – elements of Scientific method; concepts, theory and fact, hypothesis Research Designs – Descriptive, exploratory and experimental designs.
3. Participant and quasi-participant observation – interview, questionnaire, schedule, case study, sampling size reliability and validity.
4. Pioneering contributions to Sociology :
 - a) Karl Marx: Historical materialism, mode of production, Alienation and class struggle.
 - b) Emile Durkheim; Division of Labour, Social fact, Religion and Society.
 - c) Max Weber: Social Action; Ideal types, Authority, Bureaucracy, Protestant ethic and the spirit of capitalism.
 - d) Talcott parsons: Social System, Pattern variables.
 - e) Robert K. Merton; Latent and Manifest Functions, Anomie Conformity and deviance, Reference groups.
5. Marriage and Family:
Family structure and function; personality and Socialization; Social control; Family descent and property; Changing structure of Marriage and Family; Divorce and its implications; Role conflicts
6. Social Stratification:
Concepts – Hierarchy, inequality and stratification Theories of Stratification– Marx, Davies and Moore – Forms and different functions of stratification – Class – Different conceptions of class; Class in itself and class for itself; Caste and Class
7. Social Mobility:
Types of mobility – intra-and intergenerational mobility; vertical and horizontal mobility; Social mobility and change
8. Economic System:
Sociological dimensions of Economic Life, Social Aspects of division of Labour, Industrialization and social change; social determinants of Economic development
9. Political System:
Community power, power of the elite-class power, organizational power authority and legitimacy – pressure groups and political parties, voting behaviour; Democratic and Authoritarian forms
10. Educational System:
Education and culture; problems of universalisation of primary education; role of community and state intervention in education; Education as an instrument of social control and social change; Education and modernization.
11. Religion:
The sacred and the profane; social functions and dysfunctions of religion; Monistic and pluralistic religion; Religion, sect and cults; magic, religion and science
12. Science and Technology:
Ethics of science; social responsibility of science; Social consequences of science and technology; Technology and social change

13. Social Movements:
Genesis of Social movements, ideology and social movements, social movements and Social change.
14. Social Change and Development:
Continuity and change as fact and as value, theories of social change-Marx, parsons and Sorokin, Social polity and social development.
15. Historical Mooring's of Indian Society:
Traditional Hindu Social organisation; Impact of Buddhism, Islam and the West-Factors in continuity and change
16. Caste System:
Cultural and structural views about caste; mobility in caste; change and persistence of caste in Modern India; Issues of inequality and social justice; Views of Gandhi and Ambedkar on caste; Caste and Indian Polity; Backward Class movements; Social backwardness and social justice, Emergence of Dalit consciousness.
17. Class Structure:
Agrarian and Industrial class structure – Emergence of Middle Class: Elite formation in India.
18. Marriage and Family:
Marriage among different ethnic groups; its structural and functional aspects; Impact of Legislation and socio-economic change on marriage and family; generation gap
19. Agrarian Social Structure:
Present society and Agrarian systems; Land Tenure systems; social consequences of Land Reforms and Green revolution; emerging agrarian class structure; Agrarian unrest
20. Industry and Society:
Trade Unions and Human Relations; market economy and its social consequences; Liberalization; Privatization and globalization.
21. Political Processes:
Political parties and their social base; Regionalism, pluralism and national unity; Panchayat Raj and Nagarpalekas and 73rd and 74th Constitutional amendments.
22. Education:
Directive Principles of state policy and primary education; Educational equality and change; education and social mobility; Educational problems of disadvantage groups
23. Religion and Society:
Regional distribution of religious groups; Educational levels of different groups; problems of religious minorities; communal tensions; conversions, religious minorities & fundamentalism
24. Tribal Societies:
Problems of Tribal communities – Land alienation; poverty, indebtedness, health and nutrition; education; Tribal Development after independence; Isolation, Assimilation and integration
25. Population Dynamics:
Population growth, composition and distribution – Birthrate, Death rate and migration – Consequences of population growth; population policy and Family Welfare Programmes
26. Dimensions of Development:
Strategy and ideology of planning bonded labour, strategies of rural development – Poverty alleviation programmes; environment, housing, slums and unemployment.
27. Social Change:
Sanskritization and modernization – Agents of change – Mass media, education and communication; change and modernization
28. Social Movements:
Arya Samaj, Satya Shodhak Movement, S.N.D.P. Movements, Peasant Movements – Telangana & Naxalbari Movements, Backward caste movements; Self-respect movement in South India.
29. Women and Society:
Women: Special Problems – Dowry, atrocities, discrimination, existing programmes for Women and their impact; Child Welfare Programmes.
30. Social Problems:
Prostitution, Aids, Drug addiction & Corruption

13. STATISTICS

PROBABILITY: Sample space and events, probability measure and probability space, random variable, distribution function of a random variable; discrete and continuous type random variable; probability mass function and probability density function. Vector-valued random variable, marginal and conditional distributions; stochastic independence of events and of random variables; expectation and moments of a random variable; conditional expectation. Convergence of a sequence of a random variable – in distribution, in probability, in p-th mean and almost everywhere. Chebychev's and Khinchine's weak laws of large numbers.

Probability generating function, Characteristic function, inversion theorem, continuity theorem; Lindbergh and levy forms of Central limit theorem; Standard discrete and continuous probability distributions their interrelations and limiting cases

Statistical Inference: Consistency, unbiasedness, efficiency, sufficiency, minimal sufficiency, completeness, factorization theorem, exponential family of distribution and its properties, uniformly minimum variance unbiased (UMVU) ESTIMATION. Rao-Blackwell and Lehman-Scheffe theorems, Cramer-Rao inequality, minimum variance bound estimators and its properties. Estimation by the method of moments, maximum likelihood, least-squares, minimum chi-square methods properties of Maximum likelihood estimators. Prior and posterior distributions, Bayes estimators.

Non-randomized and randomized tests, critical function, MP tests, Neyman-Pearson-Lemma, UMP tests, monotone likelihood ratio, UMPU tests, likelihood ratio tests chi-square goodness of fit test. Confidence bounds.

Kolmogorov's test for goodness of fit, sign test, Wilcoxon signed – rank test, Kolmogorov – Smirnov two-sample test, run test, Wilcoxon – Mann – Whitney test and median test. Wald SPRT and its properties, OC and ASN functions, Wald's fundamental identity.

Linear Inference and Multivariate Analysis: Theory of least squares and analysis of variance. Gauss-Markov theory, normal equations and least squares estimates. Regression analysis, linear regression, multiple regression, multiple and partial correlations

Multivariate normal distribution Mahalanobis' D^2 and Hotelling's T^2 statistics; Discriminant analysis. One-way MANOVA, Principal component analysis

SAMPLING THEORY AND DESIGN OF EXPERIMENTS: Simple random sampling with and without replacement, stratified random sampling, systematic sampling; cluster sampling, two-stage sampling; ratio and regression methods of estimation. Probability proportional-to-size sampling, Horvitz-Thompson estimator, non-sampling errors.

CRD, RBD, LSD and their analysis. Incomplete block design BIBD, missing plot technique, factorial designs : 2^n , 3^2 and 3^3 .

INDUSTRIAL STATISTICS: Process and product control, general theory of control chart, \bar{X} , R, s,p, np and C charts. Cumulative-sum chart. Producer's and consumer's risks; AQL, LTPD, AND, AOQL. Single, double, multiple and sequential sampling plans for attributes. OC, ASN, AOQ and ATI curves.

Concepts of reliability, reliability of series and parallel systems.

Optimization Techniques: The structure and formulation of Linear-Programming (LP) problem, the simplex procedure; the two-phase method and the M-technique with artificial variables. Transportation and assignment problems.

Homogeneous, discrete-time Markov chains, transition probability matrix, classification of states. Continuous-time Markov process-poisson process, elements of queuing theory; M/M/1, M/M/k queues.

Quantitative Economics and Official Statistics: Determination of trend, seasonal and cyclical components. Commonly used index numbers-Laspeyres, Paasche's and Fisher's index numbers. Index numbers of agricultural and industrial production. Tests for index numbers like time-reversal test, factor reversal test and circular test. Present official statistical system in India relating to population, agriculture, industrial production, trade and prices, Methods of collection of official statistics, their reliability and limitation, and the principal publications containing such statistics, various official agencies responsible for data collection and their main functions

Demography and Psychometry: Demographic data from census, registration, NSS and other surveys. Vital rates and ratios, measures of fertility, reproduction rates, morbidity rate, standardized death rate, complete and abridged life-tables, construction of life tables from vital statistics. Logistic and population growth curves.

Methods of standardization of scales and tests, Z – scores, standard scores, T-scores, percentile scores, intelligence quotient and its measurement and uses.

14. COMMERCE

Accounting, Finance and Organizations Theory

Accounting: Financial Accounting, Cost Accounting Taxation Auditing.

1) Financial Accounting: Accounting as a financial information system – Accounting concepts and conventions - Accounting standards eq: Accounting for Depreciation, Research and Development costs, revenue recognition.

Company Accounts: -

- i) Issue of shares at discount, premium forfeiture of shares, company final accounts.
- ii) Amalgamation, Absorption and reconstruction of companies
- iii) Valuation of shares and goodwill.

2) Cost Accounting: i) Nature and functions of cost Accounting – Important concepts of cost accounting. ii) Job Costing iii) Process Costing iv) Marginal Costing v) Fixed and variable costs vi) Cost – Volume profit relationship and its aid in decision making. vii) Budgetary control, fixed budget and flexible budget, functional budgets including cash budget, sales budget, purchases budget, Master budget viii) Standard Costing Variance analysis.

3) Taxation : i) Important definitions ii) Incomes which do not form part of total income. iii) Simple problems of computation of income under various Heads i.e., Salaries, Income from House property, profits and gains from business or profession, capital gains, Income from other sources. iv) Aggregation of income and set off/carry forward of losses. v) Deductions to be made in computing total income. vi) Recent reforms in taxation.

4) Auditing:

- i) Audit of cash transaction, expenses, incomes, purchases, sales.
- ii) Valuation and verification of assets, with special reference to fixed assets, and current assets – legal cases.
- iii) Verification of liabilities.
- iv) Audit of limited companies appointment, removal powers duties and liabilities of company auditor.
- v) Auditor's Report.
- vi) Audit of different organizations like clubs, hospitals, Educational Institutions Charitable Societies.

5) Business Finance and Financial Institutions :

- a) (i) Objectives of financial Management – Profit maximization Vs. Wealth Maximization – Risk return relationship – Time value of Money.
ii) Management of working capital: Concepts of working capital; Cash Management, Receivables Management, Inventory Management.
- b) Capital Budgeting : Techniques of capital budgeting – Net present value (NPV) Internal Rate of Return (IRR), Profitability Index (PI), Pay Back Period, Accounting Rate of Returns (ARR) Risk Analysis in capital Budgeting-Technics - Risk adjusted discount rate, certainty equivalent co-efficients.
- c) Cost of Capital :
 - i) Cost of equity, cost of debt, cost of internal resource, cost of preference capital, weighted average cost of capital.
 - ii) Capital structure – Financial leverage, Operating leverage combined leverage , EBITs-EPS analysis.
 - iii) Capital Structure theories – Modigliani and Miller approach Net income approach – Net operating income approach.
- d) Dividend Decision :
 - i) Determinants of dividend policy.
 - ii) Dividend theories walter model, Gordon Model.
- e) Money Market : Organisation and working of capital market, money market in India – Role of Indian Financial Institutions. IDBI, ICICI, IFCI, SFCS. Role of International financial Institutions – International Monetary Fund, World Bank.
- f) Indian Stock Market : Functions of Securities and Exchange Board of India (SEBI) , National Stock Exchange (NSC).
- g) Recent monetary and credit policies of Reserve Bank of India.. Reforms in financial and Banking sector.

6) Organisation Theory and Industrial Relations :

- a) Nature and concept of organizations – Organisational goals, formal and informal organizations – Line and staff, functional organizations.
- b) Motivation and Morale : Theories of motivation – leadership theories and styles, Management of conflict in organisation. Organisational culture, organisation growth, change and adaptation. Organisational control and effectiveness.
- c) Industrial Relations : Nature and scope of Industrial relations. Trade union movement in India – Origin – Growth – Problems – Industrial disputes – Sources- Strikes and lockouts – Settlement.
- d) Worker's participation in Management – Problems and prospects. Industrial Relations in Public Enterprises – Absenteeism and labour turn over in Indian Industries causes – ILO and India. Role of personnel department in the organisation. Significance of Human Resources Development (HRD) in the Organizations.

15. GEOGRAPHY

Section – A : PHYSICAL GEOGRAPHY

- (i) Geomorphology : Origin and evolution of the earth's crust, the interior of the earth; geosynclines; continental drift; isostasy; plate tectonics; mountain building; volcanicity; earthquakes; concepts of geomorphic cycles; landforms associated with fluvial, glacial, arid, coastal and karst cycle.
- (ii) Climatology : Temperature and pressure belts; heat budget; atmospheric circulation; planetary and local winds; monsoons and jet streams; air masses and fronts; temperate and tropical cyclones; types and distribution of precipitation; classification of world climate by Koppen and Thornthwaite; hydrological cycle.
- (iii) Oceanography: Bathymetric relief and currents of Atlantic, Indian and Pacific Oceans; temperature and salinity; tides and waves; coral reefs and their formation; marine resources – biotic, mineral and energy resources.
- (iv) Biogeography : Genesis of soils; classification and distribution of soils; soil profile; soil erosion and conservation; Factors influencing world distribution of plants and animals; problems of deforestation and conservation measures.
- (v) Environmental Geography : Man-Environment relations; ecology, ecological balance and ecosystem approach; environmental quality, degradation and conservation, environmental hazards; problems of pollution; global warming.

Section - B : HUMAN GEOGRAPHY

- (i) Perspectives in Human Geography : Concept of areal differentiation; regional synthesis; dualism and dichotomy, environmentalism and possibilism; quantitative revolution and locational analysis; Marxism, radicalism and behavioural concepts. Systems analysis; cultural regions of the world.
- (ii) Economic Geography : World economic activities; concept of resource and resource classification; world resources and their distribution; world agriculture – Types and regions; Von Thiinen's model of agricultural location; famines – causes, effects and remedies; world industries – location patterns of major industries – Iron and steel, Ship and building, automobile, cement and paper; industrial regions of the world; Weber's model of industrial location; patterns of world trade.
- (iii) Population and settlement Geography : Growth and distribution of world population; Demographic transition; types of migration causes and consequences of migration; concepts of over-under-and optimum population; types and patterns of rural settlements; hierarchy of urban settlements; functional classification of towns; concepts of primate city, rank-size rule, rural-urban fringe, Urban Sprawl satellite towns; urban land use models; Central place. Theory of Christaller and Losch.
- (iv) Regional Planning : Concept of Region; Types of regions and methods of regionalisation; growth centres and growth poles; regional imbalances.

Section. C: GEOGRAPHY OF INDIA WITH SPECIAL REFERENCE TO ANDHRA PRADESH :

- (i) Physical Setting : Location, Structure and relief; drainage system; climate-monsoons, cyclones, floods and droughts; climatic regions, natural vegetation; soil types and their distribution.
- (ii) Resources : Distribution, production, utilization and conservation of land, water, mineral and power resources.
- (iii) Agriculture: Irrigation and multi purpose projects; Agricultural mechanization, hybridization and fertilizer application; size of land holdings; land tenure and land reforms; major food grain and commercial crops-their distribution, production and consumption; crop combination regions; Cropping intensity agricultural types, agricultural regions and agro climatic zones; livestock resources and white revolution; major fishing zones and blue revolution; green revolution and its socio-economic and ecological implications; problems and prospects of agriculture during Five Year Plans.
- (iv) Industry : Evolution and locational patterns of industries – iron and steel, cotton, ship building paper, cement, jute, sugarcane, fertilizer, automobile, drugs and pharmaceutical; industrial regions.
- (v) Transport and Trade : Types and development of transport net works – road, railway, airway, water way and pipe line; growing importance of ports on national and international trade; foreign trade composition and trade balance.
- (vi) Population and settlements: Racial and ethnic diversities, religions; major tribes; Languages: growth, distribution and density of population; demographic attributes – sex-ratio, age structure, literacy, work force, migration; population problems and policies; Types and patterns of rural settlements; census definition of urban areas; morphology of Indian Cities; functional classification of Indian cities; slums and associated problems.
- (vii) Regional Development and Planning: Developmental programmes during Five Year Plans; integrated rural development programmes; Command area development; watershed management; planning for backward area, desert drought prone, hill and tribal area development.

16. PHYSICS

1. **Mechanics** : Conservation Laws Motion of rocket under constant force – Motion of rigid bodies, angular momentum – Kepler's Laws – Variation of mass with velocity, Mass energy equivalence - Fluid dynamics, Turbulence, Boussinesq equation with simple applications.
2. **Thermal Physics** : Laws of thermodynamics – Entropy Carnot's cycle – Isothermal adiabatic changes – Thermodynamics Potentials Maxwell's relations – The Clausius-Clapeyron equation, reversible cell – Joule Kelvin effect, Stefan – Boltzmann Law, Kinetic theory of Gases.
Specific heats of gases, Black body radiation; specific heat of Solids – Einstein & Debye's theories
Wien's Law, Planck's Law.
3. **Waves and oscillation**: Simple harmonic motion – stationary and traveling waves – Damped harmonic motion. Forced oscillations and resonance wave equation. Harmonic solution, plane and spherical waves, superposition of waves, phase and group velocities, Beats, Huygen's principle, interference, diffraction Fresnel and Fraunhofer polarization, production and detection of polarized light (Linear, circular and elliptical).
Laser sources: Helium – Neon and Ruby lasers principle of Holography and its application.
4. **Electricity and Magnetism** : Coulomb's Law. Electric field Gauss's Law Electric Potential, Biot-Savart Law and applications Faraday's Laws of Electromagnetic induction and Lenz's Law. Self and Mutual inductances. Alternating currents L C R Circuits, series and parallel resonance circuits quality factor. Kirchhoff's Laws, Maxwell's equations and transverse nature of electromagnetic waves – Poynting Vector.
5. **Modern Physics** : Bohr's theory of Hydrogen atom. Electron Spin, X-ray spectra – Stern Gerlach Experiment and spatial Quantization.
Bohr model of atom. Spectral terms, fine structure of spectral lines. J-J and L-S coupling schemes. Zeeman effect. Pauli's exclusion principle, electronic band spectra, Raman effect, Photoelectric effect and Compton effect. De-broglie waves – particle duality and uncertainty principle.
Radio activity - α , β , and γ Radiation (alpha, beta, gamma) nuclear binding energy, Nuclear fission and fusion. Particle accelerators : Cyclotron, Linear accelerators.
6. **Electronics** : BAND theory of solids – Conductors insulators and semi-conductors, Intrinsic and extrinsic semi-conductors P-N Junction. Thermistor, Zener diodes, reverse and forward biased P-N junction, solar cell.
Use of diodes and transistors, for rectification, amplification, modulation and detection of r.f. waves.

17. POLITICAL SCIENCE

1. Main features of ancient Indian Political thought :
Kautilya – Arthashastra as a state craft Greek thought – PLATO, ARISTOTLE.
European Medieval thought : S.T. Thomas Aquinas, Machiavelli, Hobbes, Locke, Rousseau, J.S. Mill, Hegel, Marx, Lenin, Mao tse Tung.
2. **Nature and scope of political science** :
Behaviouralism and Post behaviour developments – System Theory.
Marxist approach to political analysis.

CONCEPTS:
3. Sovereignty, Monistic and Pluralistic analysis of sovereignty.
4. Rights, Liberty, Equality, Justice, Social Justice.
5. Theory of Democracy, Fascism.
6. Structural – Functional approach.
7. Political Institutions: Legislature, Executive and Judiciary, parties – Pressure groups, Electoral system. Bureaucracy – Weber's Theory.
8. Political Process: Political Socialization, Modernization.
9. Indian Political System: Phases of Freedom Movement, Constitutional Development.
Modern Indian Social and Political thought:
Raja Rammohan Roy, Dadabhai Nauroji, Gokhale, Tilak, Sri Aurobindo, Gandhi, Ambedkar and Nehru.
10. The structure of Indian Constitution: Preamble, Fundamental Rights, Directive Principles, Fundamental Duties, Union Government, Parliament, Cabinet, Supreme Court and Judicial Review, Indian Federalism, Panchayati Raj, Secularism – National Integration, Political Parties National and Regional, Coalition system.
11. Concepts of International Politics: Power, National Interest, Balance of Power, National Security.
12. Determinants of Foreign Policy: National Interest, Ideology, Geo-Political, Pax Britannica, Pax Americana.

13. The Cold War – Post Cold War, Détente, Entente.
14. Non-alignment Movement.
15. Present International Economic Order: Aid, Trade, New International Economic Order, WTO Globalization and Liberalization.
16. International Court of Justice.
17. The UNO and its specialised Agencies.
18. Regional Organisation: OAS, OAU, ASEAN, Arab League, EEC.
19. Disarmament: SALT-I, SALT-II.
20. Impact of Nuclear Weapons in International relations: Nuclear Non Proliferation Treaty (NPT) C.T.B.T.
21. Palestine Problem: Conflict and Cooperation in South Asia. Role of SAARC.
22. Major Powers: USA and Unipolar, Russia's Foreign Policy, China's Foreign Policy.
23. Third World in International Relations: The North-South "Dialogue".
24. India's Foreign Policy; Indo-Pakistan Relations; India and Nuclear Option.

18. PSYCHOLOGY

1. Scope of Psychology in Social and behavioural sciences. General design of Psychological research – types of Psychological Research-Characteristics of Psychological measurement.
2. Cognitive Processes Perception: Perceptual Organisation Person Perception – Perceptual defence – Perceptual Abnormalities – Theories of perception.
3. Learning: Cognitive, Operant and classical conditioning approaches – learning phenomena. Extinction – Discrimination and generalization.
4. Remembering: Short term memory, Long term memory, Measurement of memory, Forgetting – theories of forgetting, Altered States of consciousness – sleep, dream, meditation and hypnotic trance.
5. Thinking: Problem solving, Piaget's concept of development of thinking, Information processing, convergent and divergent thinking.
6. Motivation: Approaches to motivation – Psychoanalytic theory drive theory, Need Hierarchy theory, and Vector valence approach, Nature of achievement motivation.
7. Personality: Concept of personality – theories of personality Freud. Allport, Cattell, Murray, Rogers, Bandura – measurement of personality – Projective tests, questionnaire, Rating scales, Psychometric tests. The Indian approach to personality – Concept of gunas.
8. Intelligence: Nature of Intelligence – theories of Intelligence – Measurement of intelligence.
9. Attitudes: Formation of attitudes – theories of attitudes and attitude change – Attitude measurement – types of attitudes scales.
10. Individual Differences: Measurement of individual differences – Types of Psychological tests – Characteristics of a good psychological test.
11. Psychological Disorders: Classification of disorders – Neurotic – Psychotic – and Psycho physiological disorders. Theories of Psychological disorder.
12. Social change: Characteristics of social change – Psychological basis of change – steps in the change process resistance to change. Mass media and their role in social change – Impact of television.
13. Prejudice: Nature of prejudice – Manifestation of prejudice – Development of prejudice.
14. Language and communication: Psychological basis of language – Non-verbal communication – effective communication – source and receiver characteristics – persuasive communication – psychological basis of effective advertising.
15. Problems of contemporary society: Alcoholism and drug addiction – Juvenile delinquency – Crime – Rehabilitation of the deviant – Problems of the aged – Problems of stress and coping.
16. Nature, Origin and development of human behaviour, heredity and environment – the process of Socialization.

17. Therapeutic approaches to behaviour – Psychodynamic approach, Behaviour therapy, Client centered therapy, Cognitive therapy.
18. Personnel Selection: Training – Job designing – Leadership training – Participatory management.
19. Small groups – Properties of groups – Theories of group behaviour – measurement of Group behaviour – Interaction process analysis – Interpersonal relations.
20. Psychology and the learning process – The learner – School as an agent of socialization – Gifted and retarded children and problems related to their training.

19. PUBLIC ADMINISTRATION

1. BASIC PREMISES: Meaning, scope and significance of Public Administration, Evolution of Public Administration as a discipline New Public Administration.
2. THEORIES OF ORGANISATION: Scientific Management (Taylor). The Bureaucratic Theory of organisation (Weber), The classical Theory of Organisations (Henry Fayol), Luther Gullick, Lyndall Urwick and others). The Human Relations. Theory of organisation (Elton Mayo and others, Behavioural Approach, System approach, Contingency approach)
3. PRINCIPLES OF ORGANISATION: Hierarchy, Unity of Command, Co-ordination, Span of Control, Centralization and decentralization, Delegation and control.
4. Decision Making with Special reference to the contribution of Herbert Simon, Theories of Leadership, Communication, Morale and Motivation (Maslow and Herzberg). Theory of Authority and functions of Executive (Chester Barnard)
5. STRUCTURE OF ORGANISATION: Departments, corporations, companies, Boards and Commissions, Project Organisation, Matrix Organisation, Task force, Line Staff and Auxiliary Agencies.
6. Personnel Administration: Bureaucracy and Civil Services Recruitment, Training and Promotion, Employer – Employees Relation. Integrity in Administration, Generalists and Specialists – Central Personnel Agencies.
7. FINANCIAL ADMINISTRATION: Concept of Budget, Principles of Budget, Preparation and Execution of the Budget, Zero Based Budgeting Deficit Financing, Finance Commission Role of Finance Ministry C & AG.
8. ACCOUNTABILITY AND CONTROL: The concept of Accountability and control, Legislative, Executive and Judicial control over Administration, Citizen and Administration. Lok Pal and Lok ayukta Citizens Charter.
9. ADMINISTRATIVE REFORMS: Sarkaria commission, O & M Work Study, Work Simplification and Work Measurement Administrative Reforms; Processes and obstacles Good Governance.
10. ADMINISTRATIVE LAWS: Significance of Administrative Law, Delegated Legislation Meaning, Types, Advantages, Limitations, Safeguards, Administrative Tribunals.
11. COMPARATIVE AND DEVELOPMENT ADMINISTRATION: Meaning, Nature and Scope of Comparative Public Administration contribution of Fred Riggs with particular reference to Prismatic Society.
The concept, scope elements and significances of Development Administration – Time Orientation (Hahn-Been-Lee) Politics of Development Administration (Milton J Esman) Elements of Development Administration (Weidner) Institution Building, Innovations in Developing Countries.
12. INDIAN ADMINISTRATION: Evolution of Indian Administration – Ancient, Moghul and British periods, Socio-Economic and Political context of Indian Administration.
13. CONSTITUTIONAL CONTEXT OF INDIAN ADMINISTRATION: Constitution, Parliamentary Democracy, Federalism President, Prime Minister, Council of Ministers, Cabinet and Cabinet Committees, Public Accounts Committee, Estimates Committee, Committee on public undertakings.
14. STRUCTURE OF CENTRAL ADMINISTRATION AND CONSTITUTIONAL AUTHORITIES : Ministries, Departments – Cabinet Secretariat, Prime Minister Office – Election Commission, Commission for SCs & STs – Central Vigilance Commission, Centre-State relations, Legislative, Administrative and Financial, Issues in Centre-State relations.
15. PUBLIC SERVICES AND PLANNING MACHINERY: All India Services, Central Services, State Services, Local Civil Services, UPSC and APPSC, Planning Commission, National Development Council, Planning machinery at State and District levels, Micro planning.
16. PUBLIC UNDERTAKINGS: Forms – Boards of Management, Workers participation in Management, Financial and personnel management of public undertakings, Disinvestment – Public Undertakings Globalisation and its impact on public undertakings Issues in Public undertakings.
17. STATE ADMINISTRATION: Governor, Chief Minister, Council of Ministers, Secretariat, General Administration Department. Chief Secretary, Directorates – Relationship between Secretariat and Directorate.

18. **DISTRICT & LOCAL ADMINISTRATION:** Role and importance of District Collector, DRDA, Special Rural Development Programmes, Peoples participation in Rural Development.

19. **LOCAL GOVERNMENT:** Panchayat Raj, Urban Local Government Features, Forms, Problems, Autonomy of Local Bodies 73rd and 74th Constitutional Amendments – Trends and issues in Local Government.

20. **ADMINISTRATION FOR WELFARE:** Administration for the Welfare of weaker sections with particular reference to SCs, STs and Minorities – Empowerment of Women – DWACRA, Self Help Groups.

20. GEOLOGY

1. GENERAL GEOLOGY: Origin and Age of the Earth – Volcanoes, Earthquakes and Mountains – Geosynclines, Island arcs, Isostasy – Continental drift – Origin of Continents and Oceans.

2. GEOMORPHOLOGY: Geomorphic Cycles, Relief features, topography and its relation to structures and lithology. Major landforms and Drainage systems in Andhra Pradesh. Geomorphic features of Indian subcontinent with special reference to those of Andhra Pradesh.

3. STRUCTURAL GEOLOGY: Rock deformations. Mechanics of folding and faulting – Unconformities – Genetic significance of linear and planar structures. Tectonic framework of India.

4. PALAEOONTOLOGY: Micro and Macrofossils – Modes of preservation of fossils. Morphology, classification and geological history of Brachiopods, Lamellibranchs, Gastropods, Ammonoids, Trilobites, Echinoids and Corals. Principal groups of vertebrates, their morphological characters and life through ages – dinosaurs – Siwalik Vertebrates. Study of horse, elephant and man. Gondwana flora and its importance. Vertebrate fauna of Andhra Pradesh. Types of microfossils and their significance with special reference to K.G. basin petroleum exploration.

5. STRATIGRAPHY: Principles of Stratigraphy. Stratigraphic classification and nomenclature. Standard stratigraphical scale. Detailed study of various geological systems of India with special reference to those of Andhra Pradesh.

6. CRYSTALLOGRAPHY: Lattice symmetry – Classification of crystals into 32 classes of symmetry. Twinning and Twin laws and crystal irregularities.

7. OPTICAL MINERALOGY: Nicol prism, Isotropism, anisotropism, concepts of optical indicatrix, pleochroism, interference colours and extinction and dispersion, Optical accessories.

8. MINERALOGY: Crystal Chemistry – types of bondings. Ionic radii and coordination number. Isomorphism, polymorphism and pseudo – morphism. Structural classification of silicates. Detailed study of rock forming minerals, their physical, chemical and optical properties and uses, if any.

9. PETROLOGY: Magma – its generation, nature and composition. Textures, structures and classification of igneous rocks. Petrography and petrogenesis of Granites, Charnockites and Deccan basalts. Important ornamental/decorative rock types of Andhra Pradesh. Processes of formation of sedimentary rocks. Diagenesis and lithification. Textures, structures of sedimentary rocks and their significance. Petrography of common rock types. Heavy minerals and their significance. Elementary concepts of depositional environments. Sedimentary facies and provenance. Textures, structures and nomenclature of metamorphic rocks. Types of metamorphism – Metamorphic grades, zones and facies. Petrography and petrogenesis of some important metamorphic rocks.

10. ECONOMIC GEOLOGY: Concepts of ore, ore mineral, gangue and tenor of ores. Processes of formation of mineral deposits. Controls of ore deposition. Study of important metallic and non-metallic deposits, oil and natural gas fields and coal formations of India with special reference to those of Andhra Pradesh.

11. APPLIED GEOLOGY: Essentials of prospecting and exploration techniques. Principal methods of mining and sampling. Application of geology in Engineering works such as dams, tunnels, bridges, roads etc. Elements of soil. Groundwater geology. Use of aerial photographs in geological investigations. Geological aspects of important dams, tunnels and bridges of Andhra Pradesh.

21. PHILOSOPHY

1. Plato: Theory of ideas
2. Aristotle: Form, matter and causation
3. Descartes: Cartesian method and certain knowledge, mind-body dualism
4. Spinoza: Substance, attributes and modes
5. Leibnits: Theory of monadology
6. John Locke: Theory of knowledge, rejection of innate ideas
7. Berkely: Theory of perception
8. Hume: Theory of knowledge, causality
9. Kant: Distinctions between synthetic and analytic judgements and between apriori and aposteriori judgments, space and time.
10. Hegal: Dialectical method
11. Logical positivism: Verification theory and rejection of metaphysics
12. Existentialism: Kierkegaard, Sartre

13. Carvaka: Theory of knowledge
14. Jainism: Theory of reality, saptabhingi naya
15. Buddhism: Pratityasamutpada (Dependent origination) – Ksanikavada (Momentariness)
16. Samkhya: Prakriti and purusa, theory of causation
17. Nyaya-vaiesika: Theory of pramana, categories, Theory of causation, Theory of Atomism
18. Mimamsa: Concept of Dharma
19. Vedanta: Schools of Vedanta, Sankara, Ramanuja and Madra (Brahman, Isvara, Atman, Jiva, Jagat, Maya, Avidya)
20. Political ideals: Equality, Justice and Liberty
21. Sovereignty: Austin, Laski, Kautilya-Arthasastra
22. Theories of Democracy
23. Marxism
24. Secularism and national integration
25. Theories of punishment
26. Violence and human co-existence, sarvodaya
27. Notions of God: Personalistic, impersonalistic, naturalistic
28. Problem of evil
29. Religious knowledge: Reason, revelation and mysticism
30. Religion and morality

Sd/- Secretary
26/12/2006