पद.....
संस्था का नाम.....
मुहर.....

नोट : यह प्रमाण-पत्र निदेशक / या अतिरिक्त/संयुक्त या उपनिदेशक डाइरेक्ट्रेट ऑफ पब्लिक इन्स्ट्रक्शन्स/शिक्षा ..... द्वारा व्यक्तिगत रूप से हस्ताक्षर होने पर मान्य होगा।

APPENDIX - 4

PLAN OF EXAMINATION : The competitive examination comprise three successive stages viz :-
(1) Preliminary Examination (Objective Type & Multiple choice). 2- Main Examination (Conventional Type, i.e. Written examination). 3- Viva- Voce (Personality Test).

PRELIMINARY EXAMINATION

The Preliminary examination will consist of two compulsory papers of which answer sheet be on OMR sheets. The syllabus is mentioned in **Appendix-5** of this advertisement.The papers shall be 200 marks each and of two hours durations. Both the papers shall be objective Type & multiple choice in which there shall be 150-100 questions Respectively. The timing of paper I will be from 9.30 to 11.30 A.M. and paper II from 2.30 to 4.30 P.M.

Note : (1) Paper-II of the Preliminary Examination will be a qualifying paper with minimun qualifying marks fixed at 33%. (2) It is mendatory for the Candidates to appear in both the papers of Preliminary Examination for the purpose of evaluation. Therefore a candidate will be disqualified in case he does not appear in both in papers. (3) The merit of the Candidates will be determined on the basis of marks obtained in Paper-I of the Preliminary Examination.

SUBJECTS FOR THE MAIN (WRITTEN) EXAMINIATION : The Written examiniation will consist of the following compulsory and optional subjects.The syllabus whereof is mentioned in **Appendix-6** of this advertisment.The candidates have to select any two subjects from the list of optional subjects for main examination. Each optional subject will consist of two papers.

(A) COMPULSORY SUBJECTS

1. Gereral Hindi	**150 marks**
2. Essay	**150 marks**
3. General Studies (i-Paper)	**200 marks**
4. General Studies (ii-Paper)	**200 marks**

General studies paper - I & Paper - II : Shall be objective type containing 150 questions and for solving the questions two hours time is allowed. For other compulsory and optional papers three hours time is allowed.Two hundred maximum marks has been allotted for each optional question paper.

Note :1. Timing of Examination Paper of 2 hours will be 9.30 am to 11.30 am and 2.30 pm to 4.30 pm. 2 . Timing of examination paper of 3 hours is 9.30 am to 12.30 pm & 2 pm to 5 pm. 3 . A candidate shall be required to obtain such minimum marks in the compulsory paper of General Hindi, as may be determined by the Government or the Commission, as the case may be. There shall be Two sections in all the question papers of all Optional subjects and each section will include Four questions. Candidates are required to answer only Five questions while they must select minimum, Two question from each section.

(B) OPTIONAL SUBJECT ARE AS BELOW

Agriculture	Zoology	Chemistry	Physics	Mathematics
Geography	Economics	Sociology	Philiosophy	Geology
Psychology	Botany	Law	Animal Husbandry & Veterinary Science	Statistics
Defence Studies	Management	Political Science & International Relations	History	Social Work
Anthropology	Civil Engineering	Mechanical Engineering	Electrical Engineering	English Lit.
Urdu Lit.	Arabic Lit.	Hindi Lit.	Persian Lit.	Sanskrit Lit.
Comerce & Accountancy	Public Administration	Agricultural Eniginnering		

Note: A candidate will not be allowed to offer more than one subject from the -

Group 'A'	**Group 'B'**	**Group 'C'**
1. Social Work	1.Mathematics	1. Agriculture
2. Anthropology	2.Statistics	2. Animal Husbandry and Veterinary Science
3. Sociology		
Group 'D'	**Group 'E'**	**Group 'F'**
1. Civil Engineering	1. English Literature	1. Political Science and International Relations
2. Mechanical Engineering	2. Hindi Literature	2. Public Administration
3. Electrical Engineering	3. Urdu Literature	**Group 'G'**
4. Agriculture Engineering	4. Arabic Literature	1. Management
	5. Persian Literature	2. Public Administration
	6. Sanskrit Literature	

(C) PERSONALITY TEST (VIVA-VOCE) TOTAL MARKS 200

The test will relate to the matter of general interest keeping the matter of academic interest in view and for general awareness, intelligence, character, expression power/personality and general suitability for the service.

APPENDIX- 5

SYLLABUS FOR THE PRELIMINARY EXAMINATION

PAPER - I General Studies-I
(200 marks) Duration:Two hours

- Current events of national and international importance.
- History of India and Indian National Movement.
- Indian and World geography - Physical, Social, Economic geography of India and the World.
- Indian Polity and governance - Constitution , Political System, Panchayati Raj, Public Policy, Rights issues etc.
- Economic and Social Development - Sustainable Development Poverty Inclusion, Demographics, Social Sector Initiatives, etc.
- General Issues on Environmental ecology, Bio-diversity and Climate Change- that do not require subject specialization.
- General Science

PAPER- II General Studies-II
(200 marks) Duration:Two hours

- Comprehension
- Interpersonal skills including communication skills.
- Logical reasoning and analytical ability.
- Decision making and problem solving.
- General mental ability
- Elementary Mathematics upto Class X level- Arithmatic, Algebra, Geometry and Statistics.
- General English upto Class X level.
- General Hindi upto Class X level.

Current events of national and international importance:- On Current Events of National and International importance, candidates will be expected to have knowledge about them.

History of India and Indian National Movement:- In History emphasis should be on broad understanding social, economic and political aspects of Indian history. In the Indian National Movement, the candidates are expected to have synoptic view of nature and character of the freedom movement, growth of nationalism and attainment of Independence.

Indian and world Geography - Physical, Social, Economic geography of India and the World:- In World Geography only general understanding of the subject will be expected. Questions on the Geography of India will relate to Physical, Social & Economic Geography of India.

Indian Polity and Governance - Constitution, Political System, Panchayati Raj, Public Policy, Rights Issues, etc:- In Indian Polity, Economic and Culture, questions will test knowledge of country's political system including Panchayati Raj and Community Development, broad features of Economic policy in India and Indian Culture.

Economic and Social Development - Sustainable Development, Poverty, Inclusion, Demographics, Social Sector initiatives, etc:- The candidates will be tested with respect to problems and relationship between Population, Enviornment and Urbanisation.

General issues on Environmental ecology, Bio-diversity and Climate Change - that do not require subject specialization. General awareness of the subject is expected from candidates.

General Science:- Questions on General Science will cover general appreciation and understanding of Science including matters of every day observation and experience, as may be expected of a well educated person, who has not made a special study of any scientific discipline.

Note:- Candidate are expected to have general awareness about the above subjects with special reference to Uttar Pradesh.

ELEMENTARY MATHEMATICS (UPTO CLASS X LEVEL)

(1) Arithmetic:- (i) Number systems: Natural Numbers, Integers, Rational and irrational numbers, Real numbers, Divisors of an Integer, prime integers, L.C.M. and H.C.F. of integrs and their interrelationship.
(ii) Average (iii) Ratio and proportion (iv) Percentage (v) Profit and Loss (vi) Simple and Compound interests (vii) Work and Time. (viii) Speed, Time and Distance
(2) Algebra:- (i) Factors of polynomials, L.C.M. and H.C.F. of polynomials and their interrelationship, Remainder theorem, simultaneous linear equations, quadratic equations. (ii) Set Theory: Set null set, subsets and proper subsets of a set, operations (Union, Intersections, difference, symmetric difference) between sets, Venn diagram.
(3) Geometry:- (i) Constructions and theorems regarding triangle, rectangle, square, trapezium and circles, their perimeter and area. (ii) Volume and surface area of sphere, right circular cylinder, right circular Cone and Cube.
(4) Statistics:- Collection of data, Classification of data, frequency, frequency distribution, tabulation, cumulative frequency. Representation of data - Bar diagram, Pie chart, histogram, frequency polygon, comulative frequency curves (ogives), Measures of Central tendency: Arithmetic mean, Median and Mode.

GENERAL ENGLISH UPTO CLASS X LEVEL

(1) Comprehension.
(2) Active Voice and Passive Voice.
(3) Parts of Speech.
(4) Transformation of Sentences.
(5) Direct and Indirect Speech.
(6) Punctuation and Spellings.
(7) Words Meanings.
(8) Vocabulary & usage.
(9) Idioms and Phrases.
(10) Fill in the Blanks.

सामान्य हिन्दी (हाईस्कूल स्तर तक) के पाठ्यक्रम में सम्मिलित किये जाने वाले विषय

(1) हिन्दी वर्णमाला, विराम चिह्न,
(2) शब्द रचना, वाक्य रचना, अर्थ,
(3) शब्द-रूप,
(4) संधि, समास,
(5) क्रियायें,
(6) अनेकार्थी शब्द,
(7) विलोम शब्द,
(8) पर्यायवाची शब्द,
(9) मुहावरे एवं लोकोक्तियाँ,
(10) तत्सम एवं तद्भव, देशज, विदेशी (शब्द भंडार)
(11) वर्तनी
(12) अर्थबोध
(13) हिन्दी भाषा के प्रयोग में होने वाली अशुद्धियाँ
(14) उ.प्र. की मुख्य बोलियाँ

APPENDIX- 6

RULES AND SYLLABUS FOR THE MAIN EXAMINATION

1. No candidate shall be admitted to the examination unless he holds a certificate of admission from the Commission. The decision of the Commission as to the eligibility or otherwise of a candidate for admission to the examination shall be final. **2. CANDIDATES ARE WARNED THAT THEY SHOULD NOT WRITE THEIR ROLL-NUMBERS ANYWHERE EXCEPT IN THE SPACE PROVIDED ON THE COVER OF THEIR ANSWER BOOK/BOOKS OTHERWISE THEY WILL BE PENALISED BY A DEDUCTION OF MARKS. ALSO THEY SHOULD NOT WRITE, THEIR NAMES ANY-WHERE OTHERWISE THEY MAY BE DISQUALIFIED. 3.** If a Candidate's handwriting is not easily legible, deduction may be made from the total marks. **4.** A candidate may answer question papers in English Roman Script or Hindi in Devnagri Script or in Urdu in Persian script provided that the language papers as a whole must be answered in any of the above script unless it is otherwise indicated in question paper. **5.** The question papers shall be in English in Roman Script and Hindi in Devnagri Script. **6.** The standard of knowledge required of candidates in compulsory and optional subjects will be such as a young man holding a Bachelor's Degree of a University is expected to have except where the syllabus indicating otherwise.

MAIN EXAMINATION

GENERAL STUDIES, PAPER- I

1. History of India-Ancient, Mediaeval, Modern **2.** Indian National Movement and Indian Culture **3.** Population, Environment and Urbanization in Indian Context **4.** World Geography, Geography of India and its natural resources. **5.** Current events of national and international importance. **6.** Indian Agriculture, Trade and Commerce. **7.** Specific knowledge of U.P. regarding education, culture, Agriculture, Trade Commerce, The methods of living and Social Customs.

History of India and Indian culture will cover the broad history of the country from about the middle of the nineteenth century and would also include questions on Gandhi, Tagore and Nehru. The part on current events of national and international importance will include questions also on sports and games.

GENERAL STUDIES, PAPER - II

1. Indian Polity, **2.** Indian Economy **3.** General Science (Role of Science and technology in the development of India including science in every day life) **4.** General Mental ability. **5.** Statistical Analysis, Graphs and Diagrams.

The part relating to the Indian polity will include questions on the political system in India and Indian constitution. The Indian economy will cover broad features of economic policy in India. The part relating to role and impact of science and technology in the development of India, questions will be asked to test the candidates awareness in this field Emphasis will be on the applied aspects. The part relating to statistical analysis, graphs and diagrams will include exercise to test the candidates ability to draw common sense conclusions from information presented in statistical graphical or diagrammatical form and to point out deficiencies limitation or inconsistencies there in.

ESSAY

There will be three sections in the question paper of **Essay.** Candidates will have to select one topic from each section and they are required to write essay in 700 words on each topic. In the three sections, topics of essay will be based on following sphere :

Section A : (1) Literature and Culture. **(2)** Social sphere. **(3)** Political sphere.
Section B: (1) Science, Environment and Technology. **(2)** Economic Sphere **(3)** Agriculture, Industry and Trade.
Section C (1) National and International Events. **(2)** Natural Calamities, Land slide, Earthquake, Deluge, Drought etc. **(3)** National Development programmes and projects.

सामान्य हिन्दी

(1) दिये हुए गद्य खण्ड, का अवबोध एवं प्रश्नोत्तर। (2) संक्षेपण। (3) सरकारी एवं अर्धसरकारी पत्र लेखन, तार लेखन, कार्यालय आदेश, अधिसूचना, परिपत्र (4) शब्द ज्ञान एवं प्रयोग (अ) उपसर्ग एवं प्रत्यय प्रयोग, (ब) विलोम शब्द, (स) वाक्यांश के लिए एकशब्द (द) वर्तनी एवं वाक्य शुद्धि (5) लोकोक्ति एवं मुहावरे।

1. AGRICULTURE : Paper- I (SECTION - A)

Ecology And its Relevance to man.natural resources. their management and conservation. Environment factors of cropdistribution and production. climatic elements as factor of crop growth. impact of changing environment on cropping pattern.Environmental pollution and associated hazards to crops animals and humans.cropping patterns in different agro.climatic zones of U.P.impact of high yieldingand short duration varieties on shifts in cropping patterns. Concepts of multiple cropping.multistorey.relay and intercropping and their importance in relation to sustainable crop production. package of practices for production of important cereals, pulses, oilseedes, fibre, suger and cash crop grown during Kharif and Rabi seasons in different regions of U.P. important features, scopes and propagation of various type of forestry plants with reference to agro, forestry and social forestry, weeds, their characteristics, dissemination and association with various field crops, their multiplication, cultural biological and chemical control of weeds.

Processes and factors of soil formation, classification of Indian soils including modern concepts. Mineral and organic constituent of soils and their role in maintaining soil productivity. Problems soil, extent and distribution in India and their reclamation. Essential plant nutrients and other beneficial elements in soils and plants, their occurrence, factors affecting their distribution, function and cycling on soil. Symboitic and non symbiotic nitrogen fixation. Principles of soil fertility and its evaluation for judicial fertiliser use. Soil conservation planning on water shed basis, erosion nitrogen and run off management in hillifeet hills and valley lands; processes and factors affecting them. Dryland agriculture and its problems. Technology for stabilising agriculture production in rained agriculture area of U.P.

SECTION-B

Water use efficiency in relation to crop production, criteria for scheduling irrigations, ways and means of reducing run off losses of irrigation water. Drainage of water-logged soils. Form management scope importance and characteristics, farm planning and budgeting. Economics of different types of farming systems.

Marketing and pricing of agriculture inputs and outputs, price fluctuations and their cost, role of co-operatives in agricultural economy, types and system of farming and factors affecting them. Agricultural extension, its importance and role, method of evaluation of extension programmes, diffusion, communication and adoption of innovations, people's participation and production and motivation, Farm mechanization and its role in agricultural production and rural employment Training programme for extension workers and farmers, Extension systems and programmes. Training & Visits, KVK, KGK, NATP and IVLP.

PAPER - II (SECTION-A)

Heredity and variation, Mendel's law of inheritance, Chromosomal theory of inheritance. Cytoplasmic inheritance. Sex linked, Sex influenced and sex limited charecters. Spontaneous and induced mutations. Role of chemicals in mutation. Origin and domestication and field crop. Morphological patterns of venetions in varieties and related species of important field crop. Cause and utilization of variation in crops improvement. Application of the principles of plant breeding to the improvement of major field crops, methods of breeding to self and cross-pollinated crops, Introduction, selection, hybridization, Male sterlity and self incompatibility, utilizator of mutation and polyploidy in breeding. Seed technology and its importance production, processing, storage and testing of seeds. Role of national and state seed organization in production, Processing and marketing of improved seeds. Physiology and its significance in agriculture, physical properties and chemical constitution of protoplasm, inhibition, surface tension, diffusion and osmosis, absorption and translocation of water, transpiration and water economy.

SECTION-B

Enzymes and plant pigments, Photosynthesis-modern concepts and factors effecting the process, aerobic and anaerobic respiration, Growth and development. Photoperiodisms and vernalization. Plant growth regulators and their mechanism of action & importance in crop production.

Climatic requirements and cultivation of major fruits and vegetable crops; package of practices and the scientific basis for the same. Pre and post harvest physiology of fruits and vegetables. Principle method of preservation of fruits and vegetables, Processing techniques and equipment. Landscape and Floriculture including raising of ornamental plant. Design and layout of lawns and gardens, Diseases and pests of vegetables, fruits and plantation crops of U.P. and measures to control plant diseases, integrated management of pests and diseases. Pesticides and their formulations, plant protection equipment, their care and maintenance. Storage pest of cereals and pulses, hygiene of storage, godowns, preservation and remedial measures, Food production and consumption trends. In India, National and International food policies, Procurements, distribution, processing and production constraints.

2. ZOOLOGY : PAPER- I

Non Chordata, Chordata, Ecology, Ethology, Biostatistics and Economic Zoology.

Continued....

SECTION A-NON-CHORDATA AND CHORDATA

1. General Survey: Classification and Interrelationship of various Phyla. **2. Protozoa:** Locomotion, Nutrition, Reproduction and Human Parasite. **3. Porifers:** Canal system; Skeleton and Reproduction. **4. Cridaris:** Polymorphism; Coral reels Metagenesis. **5. Helminthiases:** Parasitic adaptation and host-parasite relationships. **6. Annelida:** Adaptive radiation in Polychaeta. **7. Arthopoda:** Larval forma and parasitism in Crustacea. Appendages of prawn: Vision and respiration in Arthopoda, Social life and metamorphosis in insects. **8. Mollusca:** Respiration, Pearl formation. **9. Echinedermata:** General organisation, larval forms and affinities. **10. Chordata:** Origin: Lung fishes; Origin of tetrapods. **11. Amphibis:** Neoteny and parental care. **12. Reptilia:** Skull types (Anapsid; Diapsid; Parapsid and synpaid) Dinosaurs. **13. Aves:** Origin aerial adaptations and migration; Fightless birds. **14. Mammalia:** Prototheria and Metatheria: Skin derivatives of Eutheria.

SECTION- B- Ecology, Ethology, Biostatics and Economic Zoology.

1. Ecology: Abiotic and biotic factors; Inter and intraspecific relations, ecological succession; Different types of biomes; Biogeochemical cycles. Food web; Ozone layer and Biosphere; Pollution of air, water and land. **2. Ethology:** Types of animal behaviour, Role of hormones and phenomones in behaviour; Methods of studying animal behaviour, Biological rhythms. **3. Biostatistics:** Sampling methods, frequency distribution and measures of central rendency, standard deviation, standard error correlation and regression chi-square and t-test. **4. Economic Zoology:** Insect pests of crops (Paddy, Gram and Sugarcane) and stored grains, Agriculture, Sericulture, Lacculture, pisciculture and Oyster culture.

PAPER- II

Cell Biology Genetics, Evolution and Systematics, Bio-Chemistry, Physiology and Development Biology.

SECTION- A

1. Cell Biology: Cell membrane, Active transport and Sodium potassium AT Pase Pump, Mitochondria, Golgibodies; endoplasmic reticulum; ribosomes and lysosomes; cell division mitotic spinal and chromosome movements and meiosis, chromosome mapping Gene concept and function; Watson-Crick model of DNA, Genetic code Protein synthesis, Sex chromosomes and sex determination. **2. Genetics:** Mendelian laws of inheritance, recombination linkage and linkage maps, multiple alleles, mutation (nutural and induced, mutation and evolution, chromosome number and form structural rearrangements, polypoloidy, regulation of gene expression in prokaryotes and eukaryotes; Human cormosomal abnormalities, gene and diseases, Eugenics, Genetic engineering, recombinant DNA technology and gene cloning. **3. Evolution and systematics:** Theories of evaluation; sources and nature of organic variation; natural selection; Hardy Weinberg law; cryptic and cematic colouration; mimicry; isolating mechanisms and their role, insular fauds, concept of species and sub-species; principles of taxonomy; Zological nomenclature and International code; Fossils; Geological Bras; Phylogeny of horse and elephant; origin and evolution of man; principles and theories of continental distribution of animals; Zoogeographical realms of the world.

SECTION - B - Biochemistry, Physiology and Development Biology.

1. Biochemistry: Structure of carbohydrates, lipids (including saturated and unsaturated fatty acids) amino acids, proteins and nuclieic acides, Glycolysis; Kreb's cycle, Oxidation and reduction, oxidative phosphorelation, Energy conservation and release. ATPC-AMP; types of enzymes, mechanism of enzyme action; Immunoghlobulins and immunity; vitamins, **2. Physiology (with special reference to mammals):** Composition of blood, blood group in man, agglutination; oxygen and carbon dioxide transport, haemoglobin, breathing and its regulation Formation of urea and urine, acide-base balance and homeostasis; Thermo-regulation in Man; Nerve impulse conduction and transmission across synpse, neurotransmitters; Vision, hearing and olfaction; Types of muscles; Digestion and absorption of protein, carbohydrate, fat and nucleic acid, control of secretion of digestive juices, balanced diet of man, steroid, protein peptide and aminoacids, drived hormones; role of hypothalamus, pituitary thyroid, parathyroid, pancreas, adernal glands and pineal organ and their relationship, physiology of human reproduction, hormonal control of development in man; Pheromones in mammals. **3. Development Biology:** Gametogenesis, fertilisation, types of eggs, clevage and gastrulation in Brachiotoma frog and chick; fate maps of frog and chick; metamorphosis in frog; formation and fate of extra embryonic membrance in chick; formation of amino allantois and types of placenta in mammals, organiser phenomenon, regeneration genetic control of development organogenesis of brain, eye and heart; aging.

3. CHEMISTRY: PAPER- I

Atomic Structure : Bohr's model and its limitation de Broglie equation, Heisenberg's suncertainty principle, quantum mechanical operators and the Schrodinger wave equation, physical significance of wave function and its characteristics (normalized orthogonal), radial distribution and shapes of s.p.d. and f-orbitals, particle in a one-dimensional box, quantisation of electronic energies (qualitative treatment of hydrogen atom).

Paul's Exclusion principle. Hund's rule of maximum multiplicity, Aufbau principle, Electronic configuration of atoms, Long form of periodic table including translawrencium elements. Periodicity in progerties of the elements such as atomic and ionic radionization potential election affinity, electronegativity and hydration energy.

Nuclear and Radiation Chemistry : Sructure of nucleus (shell model), nuclear forces, nuclear stability-NP ration, nuclear binding energy Kinetics, detection and measurement of radioactivity, Artificial transmutation of elements and nuclear reactions, nuclear fission & fusion, radioactive isotopes and their applications. Radio cartoon dating, Elementary ideas of radiation chemistry, radiolysis of water and aqueous solution, unit of radiation, chemical yield (G-value), Fricke's dosimetry. **Chemical Bonding :** Valence bond theory (Heitier-London and Pauling-Slater theories), hybridization, VSEPR theory and molecular orbital energy lever diagrams, for homo and hetro nuclear diatomic molecules, bond order, bond length and bond strength, signa-and p-bonds, hydrogen bond, characteristics of covalent bond. **Chemistry of s- and p- block elements :** General properties of s-and p-block elements, chemical reactivity of elements and group trends. Chemical behaviour with respect of their hybrids, halidas and oxides. **Chemistry of Transition Elements :** General Characteristics, variable oxidation stases, complex formation, colour, magnetic and catalytic properties. Comparative study of 4d and 5d transition elements with 3d analogues with respect to their ionic radil, oxidation stasis and magnetic properties. **Chemistry of Lanthanides and Actinides :** Lanthanide contraction, oxidation stasis, Principles of separation of lanthanides and actinides. Magnetic and spectral properties of their compounds. **Coordination Chemistry :** Werner's Theory of coordination compounds. IUPAC system of nomenclature, effective atomic number (EAN) Isomerism in coordination compounds. Valence bond theory and its limitations. Crystal held theory, Crystal held splitting of d-orbitals in octahedral, tetrahedral and square planer complexes. Eq and factors affecting its magnitude, calculation of Crystal held stabilisation energies (CFSE) for d1 to d9 week and strong field, octahedral complexes, spectrochemical series. Electronic spectre of d-transition metal complexes, types of electronic transitions, selection rules for electronic transitions, Spectroscopic ground states for d1 to d10 systems. **Bio-Inorganic Chemistry:** Essential and trace elements in biological processes, Metalloporphyrins with special reference to haemoglobin and myoglobin, Biological role of alkali and alkaline earth metal ions with special reference to Ca2+. **Preparation, Properties and Uses of the following Inorganic Compounds :** Heavy water, boric acid, diborane, hydrazine, hydroxylamine, potassium dicromate, potassium permanganate, Ce (IV) sulphate and titanium (III) sulphate, **Polymers :** Molecular weight of polymers by sedimentation light scattering viscosity and osmotic pressure. Number average and weight average molecular weights, elasticity and crystallinity of polymers. **Borazines :** Sillicons and phosphonitrillic halide polymers. **Chemical Thermodynamics :** Thermodynamic functions, Laws of thermodynamics and their applications to various physico-chemical process. Concept of chemical potential. Glibbs Duhem equation, Classius-Clapeyron equation, thermodynamic treatment of colligative properties. **Chemical Kinetics:** Order and molecularity of a reaction Rate laws, methods for determining the order of a reaction. Energy of activation, Colision theory of reaction rate. Steady state approximations. Transition state, theory of reaction rates, consecutive and side reactions. **Phase Equilibria :** Phases, components, degrees of freedom, phase diagram of one and two component systems, Nearest distribution law, Applications of distribution law. **Electrochemistry :** Theory of strong electrolytes. Debye-Hucket theory of activity coefficient laws of electrolytic conduction, transport number determination of transport number (Hittorts and moving boundary method). Applications of conductance for determining the solubility and solubility products, Ionic equilibria, ionic product of water, pH, acid-base indicators, common ion effect, buffer solubility buffer index, buffer capacity solubility product and applications in analysis. **Solid State Chemistry :** Classification of solids, seven crystal systems, elements of symmetry in crystals, space lattice and unit cell, classification of crystals on the basis of bond types ionic solids, metalic solids, covalent solids, and molecular solids. The close packing of spheres, hexagonal close ionic solids, metalic solids, covalent solids, and molecular solids. The close packing of spheres, hexagonal close packing, cubic close packing and body centered cubic packing, coordination number and radius ratio effect. Bargg's law of X-ray diffraction, powder pattern method, crystal structure of NaCl and KCl. **Surface Chemistry:** Stability of and origin of charge on colloids, Electrokinetic potential. Physical and chemical absorption, various types of adsorption isotherms. Hormogenous and heteterogeneous catalysis enzyme catalysis (Michelis-Menton) equation. **Molecular Spectra :** Rotational Spectra Rigid and non-rigid rotator models. Determination of bond distance of diatomic molecules, linear triatomic molecules isotopic substitution. **Vibrational-Rotational Spectra :** Hormonic and anthormonic vibrations, vibrational energies of diatomic molecules, zero point energy, evaluation of force constant. Fundamental frequencies, overtones, trot bands, degrees of freedm of polyatomic molecules. Concept of group frequencies. **Raman Spectra :** Raman effect stokes and antistokes fines and their intensity difference. Rule of mutual exclusion. **Electronic Spectra :** Electronic transitions, Frank condom Principle, Phosphorescene and fluorescence.

PAPER- II

General Organic Chemistry : Electronic displacement inductive, electromeric and mesmoeric effects, Conjugation and hyperconjugation, Resonance and its application to organic compounds, Electrophlies, nuclephlies, carbocations, carbanions and free radical. Organic acids and bases. Effects of structure on the strength of organic acids and bases. Hydrogen bond and its effect on the properties of organic compounds. **Concepts of Organic Reaction Mechanism :** Mechanism of addition, substitution, elimination, reactions and molecular rearranagements, Mechanism of Electrophilic and nucleophilic automatic substitution. Mechanism of the following reactions : Aldol condensation, Claims condensation Beckmann rearrangement, Perkin reaction, Reiner-Tiemann reaction, Cannizaro's reaction, Friedel Craft's reaction, Refonnatisky's reaction and Wagner-Meerwein rearrangement. **Aliphatic Compounds :** Chemistry of simple organic compounds belonging to following classes with special reference to the mechanisms of the reactions involved therein, alkanes, alkenes, alkynes alkyl, halides, alcohol, ethers, thiols aldehydes, ketones, a busnaltruated carbonyl compounds, acids and their derivatives, amines, aminoacids, hydroxy acids, unsaturated acids and diabasic acids, Synthetic uses of malonic easier acetoaceliceasier, Gridnand's reagent, carbene, diazomelhane and phosphoranes. **Carbohydrates :** Classification, configuration and general reaction of simple monosaccharides. Ozone formation, mutarotation, pyranose and furanose structures. Chain lengthening and chain shortening in aidoses and Kethses. Interconversion of glucose and fructose. **Stereochemistry and conformations :** Elements of symmetry, optical and geometical isomerism in simple organic compounds. Absolute configuration (R & S); confugations of geometrical isomers, E & Z notations, Conformation of mono and distributed cyciohexnaes. Boat and chair forme, **Aromatic Compounds :** Modern structure of benzene; Concept of aromaticity. Huckle rule and its simple application to non-benezenoid aromatic compounds. Activating and deactivating effect of subsituent groups, directive influence. Study of the compounds containing following groups attached to the alky and benzene ring halogen, hydroxy, nitro and amino groups. Sulphonic acids, benzaldelyde, salicy dehyde, acetophenone, Benzoic, salicyclic, phithalic, cannamic and mandelic acids. **Naphthalene & Pyridine :** Synthesis, structure and important reations. **Alkaloids :** General methods of structure elucidation of alkaloids, chemistry of nicotine. **Organic Polymers :** Mechanism of polymerization, polymers of industrial importance, synthetic fibers, **Chemistry of Living Cells :** A Brief introduction, chemical constituents, cell membraines, acid base balance, Diffusion and active transport. Donnan membranes equilibria. **Enzymes and Coenzymes :** Nomenclature and characteristics, factors which affect enzyme activity. **NMR Spectroscopy :** Principle of PMR, chemical shift, spin-spin coupling, interpretation of PMR spectra of simple organic molecules, **Evaluation of analytical Data :** Errors, accuracy and precision, Relative and standard deviation rejection of doubtful, observations, t-test, Q-test. **Solvent Extraction :** Distribution law, Craigs concept of counter-current distribution, important solvent extraction systems. **Chromatography :** Classification of Chromatographic techniques, general principles of absorption, partition exchange, paper and thin layer chromatography. **Environmental Chemistry :** Air pollutants and their toxic effects, depletion of ozone layer effects of oxides of nitrogen, flurochlorocarbons and their effect on ozone layer, Greenhouse effect. Acid rain.

4. PHYSICS: PAPER - I: Mechanics, Thermal Physics and Waves & Oscillations

1. Mechanics : Conservation law, collisions, impact paramter, scattering cross-section centre of mass and lab systems with transformation of physical quantities, Rutheford Scattering. Motion of a rocket under constant force field. Rotating frames of reference, Coriolls force. Motion of rigid bodies. Dynamics of rotating bodies. Moment of inertia, Theorem of parallel and perpendicular axis. Moment of inertia of sphere, ring cylinder, disc, Angular momentum. tonque and precession of a top. Gyroscope. Central forces. Motion under inverse square law. Kepler's Laws, Motion of Safellites (including geostationary). Galilean Relativity. Special Theory of Relativity. Michesion-Morley Experiment, Lorentz Transformations-addition theorem of velocities. Variation of mass with velocity. Mass-Energy equivalence. Fluid dynamics. streamlines, Reynold number Viscosity, Poiseulle's formula for the flow of liquid throught narrow tubes, turbulence, Bermoulli's equation with simple applications.

2. Thermal Physics : Laws of thermodynamics, Entropy, Camot's cycle, Isothermal and Adiabatic changes, thermodynamic Potentials, Helmbolz and Gibbs functions. Maxwell's relations. The clausius-clapeyron equation, reversible cell, Joul-Kelvin effect, Stefan Boltzmann Law, Kinetic Theory of Gasses, Maxwell's Distribution Law of velocities, Equipartition of energy, specific heats of gases, mean free patin, Borwnian Motion, Black Body radiation specific heat of solids, Einstein and Debye theories. Wein's Law, Planck's Law, solar constant. Shah's theory of therma ionization and Steliar spectre Production of low temperatures using adiabetic dermagnatization and dilution refrigeration. Concept of negative temparature. **3. Waves of Oscillations :** Oscillations, simple harmonic motion, Examples of simple harmonic motion mass, spring and LC circuits. Statinary and travelling waves, Damped hormonic motion, forced oscillation and Resonance, Sharpness of resonance, Wave equation, Harmonic solutions, Plane and Spherical waves, Superposition of waves. Two prependicular simple harmonic motions. Lissajous figures, Fourier analysis of periodic waves-square and triangular waves. Phase and Group velocities, Beats, Huygen's principle, Division of amplitude and wave front, Fresnel Biprism, Newton's rings, Michelson interferometer, Fabry-Petrot inter ferometer. Diffraction-Fresnel and Frauhoe's. Diffraction as a Fourier Transformation. Fresnel and Fraunholer diffraction by reactungular and circular apertures. Diffraction by straight edge, Single and multiple slits. Resolving power of granting and optical instruments. Rayleigh criterion. Polarization, production and Detection of polarised light (Linear, circular and elliptical) Brewster's law, Huyghen's theory of double refraction, optical rotation, polarimeters. Laser sources (Helium-Neon, Ruby and semi conductor diode). Concept of spatial and temporal coherence Holography, theory and application.

PAPER - II : Electricity and Magnetism, Modern Physics and Electronics

1. Electricity and Magnetism : Coulomb's law, Electric Field Gauss's Law, Electric Potential, Possion and Laplace equations for homogenous dielectric, uncharged conducting sphere in a uniform field, point charge and infinite conducting plane. Current electricity, Kirchoff's laws and its applications; Wheatstone bridge, Kelvin's double bridge, Carey foster's bridge. Bio-Savart law and applications. Ampers's circuital law and its applications, Magnetic induction and field strength, Magnetic shell Magnetic field on the axis of circular coil Helmboltz coil, Electromagnetic Industion, Faraday's and Lenz's law, self and mutual inductances. Alternating currents L.C.R. circuits, series and parallel resonance circuits, quality factor. Maxwell's equations and electromagnetic waves. Transverse nature of electromagnetic waves, Poynting vector Magnetic fields in Matter. Dia, para, Ferro, Antiferro and Ferrimagnetism (Qualitative approach only). Hsteresis.

2. Modern Physics : Bohr's theory of hydrogen atom Electron spin, Optical and X-ray Spectral Stem-Geriach experiment and spatial quantkation, Vector model of the atom spectral terms, fine structure of spectral fines. J-J and L-S coupling Zeeman effect, Pauli's exclusion principle, spectral terms of two equivalent and non-equivalent electrons. Gross and fine structure of electronic band spectra. Raman effect, Photoelectric effect, Compton effect De-Broglie waves. Wave Particle duality, uncertainty principle, postulates of quantum machanics. Schrodinger wave equation with application (i) particle in a box, **(ii)** motion across a step potential, One dimensional harmonic osciffator eigen values and eigen functions. Radioactivity, Alpha, Beta and gamma radiations. Elementary theory of the alpha deca. Nuclear binding energy. Mass spectroscopy, semi empirical mass formula. Nuclear fission and fusion. Elementary Reactor Physice, Elementary particles and their classification, strong and weak Electromagnetic interactions. Particle accelerators, cyclotrol. Linear accelerators. Elementary ideas of superconductivity. **3. Electronics :** Band theory of solids, conductors insulators and semiconductors. Intrinsic and extrinsic semiconductors, P.N junction, Thermistor Zener diodes. Reverse and forward based P.N. Junction, solar cell. Use of diodes and transistors for rectification, amplification oscillation, modulation and detection r.f. waves. Transistor, receiver. Television, Logic Gates and their truth table, some applications.

5. MATHEMATICS: PAPER- I

Linear Algebra : Vector space, bases, dimensions of a finitely generated space, linear transformation: Rank and nullity of a linear transformation. Cayley Hamiliton theorem, Eigenvalues and Eigen vectors. Matrix of linear transformation, Row and column reduction. Echelon form, Equivalence, Congruence and similarty, Reduction to canonical form. Orthogonal, symmetrical, skew-symmetrical, unitary, Hemitian and skew-Hermitian matrices their eigen values, orthogonal and unitary reduction of quadratic and Hermitian form. Positive definite quadratic form. Simultaneous reduction. **Calculus :** Real numbers, limits, continuity, differentiability. Mean value theorems, Taylor's indeterminate forms, Maxima and minima. Curve Tracing Asymptotes. Functions of several variables, partial derivatives, maxima and minima, Jacobian Definite and indefinite integrals. Double and tripple integrals (techniques only), application to Beta and Gamma Functions, Areas, Volumes, Centre of gravity. **Analytical Geometry of two and three dimensions :** First and second degree equations in two dimensions in cartesian and polar coordinates. Plane, sphere, parabofoid, Ellipsoid, hyperboloid of one and two sheets and their elementary properties. Curves in space. Curvature and torsion. Frenet's formulze. **Differential Equations :** Order and Degree of a differential equation, differential equation of first order and first degree, variables separable. Homogeneous, linear, and exact differential equations, differential equation with constant coefficients. The complementary function and the particular integral of e^{ax}, cosax, sinax, x^m, e^{ax}, cosdx, e^{ax}, sinbx. **Vector Analysis :** Vector Algebra, Differentiation of vector function of a scalar variable Gradient, divergence and curl in cartestian, cylindrical and spherical coordinates and their physical interpretation, Higher order derivates. vector identities and vector, equations, Gauss and stokes Theorems. **Tensor Analysis :** Definition of Tensor, Transformation of coordinates, contravariant and contravariant tensors. Addition and multiplication of tensors, contraction of tensors. Inner product, fundamental tensors, Christoffel symbols, contravariant differentiation, Gradiant, curl and divergence in tensor notation. **Statics :** Equilibrium of a system of particles, work and potential energy. Friction. Common catenary. Principle of Virtual work..... Stability of equilibrium. Equilibrium of forces in three dimensions. **Dynamics:** Degree of freedom and constraints. Rectilinear motion Simple harmonic motion in a plane. Projectiles, Constrained motion, work and energy. Motion under impulsive forces, Kepler's laws. Orbits under central forces. Motion of varying mass. Motion under resisting medium. **Hydrostatics :** Pressure of heavy fluids. Equilibrium of fluids under given system of forces. Centre of pressure. Thrust on curved surfaces. Equilibrium of floating bodies, stability of equilibrium and pressure and gases, problems relating to atmosphere.

PAPER - II

Algebra : Groups, subgroups, normal subgroup, homomorphism of groups, quotient groups Baisc isomorphism theorems, sylow theorems. Permutation Groups. Cayley's Theorem. Rings and ideals. Principal ideal domains, unique ractorization domains and Euciiden domains, Field Extensions, Finite fields. **Real Analysis :** Metric spaces, their topology with special reference to 'R' sequence in metric space Cauchy sequence completeness. Completion, continuous functions. Uniform continuity. Properties of continuous function of Compact sets. Riemann Steltjes Integral. Improper integral and their condition's of existence. Differentiation of function of several variables. Implicit function theorem, maxima and minima.

Absolute and conditional Convergence of series of real Complex terms, Rearrangement of series, Uniform-convergence, infinite products. Continuity, differentiability and integrability of series, Multiple integrals.

Complex Analysis : Analytic functions, Cauchy's theorem, Cauchy's integral formula, power series, Taylor's series, Singularities, Cachley's Residue theorem and Contour integration. **Partial Differential Equations :** Formation of partial differential equation. Types of integrals of partial differential equaltions of first order, Charphs method, Partial differential equation with constant coeffcients. **Mechanis :** Generalised constraints, constraints, holonomic and non-holonomic systems, D'Alemberts' Principle and Langrange's equations, Moment of intertia. Motion of rigid bodies in two dimensions. **Hydrodynamics :** Equation of continuity. momentum and energy, inviscid flow theory. Two dimensional motion, streaming motion sources and Sinks. **Numerical Analysis :** Transcendental and ploynomial Equations-Methods of tabulation, bisection, reaula-false secants and Newton-Renhsoand order of its converagence. Interpolation and Numerical differentiation formulae with error terms. **Numercial Integration of Ordinary differential Equations :** Euler's method, mulistepperdictors Corrector methods. Adam's and Milne's method convergence and stability, Runge Kutta Method. **Operational Research :** Mathematical Programming, Definition and some elementary properties of convex sets, simplex methods, rectangular games and their solutions.

6. GEOGRAPHY : PAPER -1- SECTION -A-PHYSICAL GEOGRAPHY

1.Geomophology : Origin and structure of the earth, Earth movements Plate tectomics and Mountain Building: Isostasy; Vulcansim; Weathering and Erosion; Cycle of Erosion, Evolution of landforms; fluvial, glacial, acolion, marine and Karst Rejuvenation and Polycyclic Land form features. **2 Climatology :** Composition and structure of atmoshphere, Insolation and Heat Budget; Atmospheric pressure and winds, Moisture and Precipitation; Airmasses and Fronts; Cyclone; Origin; Movements and associated weather, Classification of world climates; Koopen and Thomthwaite. **3. Oceanography :** Configuration of Ocean floor, Salinity Ocean Currents, Tides; Ocean deposits and coral reefs.

Continued....

4. Soil and Vegetation : Soils -geneisis; classification and world distribution, Soil Vegetation Symbiosis: Biotic Communities and Succession. **5. Ecosystem :** Concept of Ecosystem, structure and fuctioning of Ecosystem. Types of Ecosystem, Major Biomes, Man's impact on the ecosystem and global ecological issues.

SECTION - B- HUMAN GEOGRAPHY

1. Evolution of Geography Thought : Contributions of German,French, British, Soviet and Indian Geographers: Changing Paradigms of Man Environment Relationship impact of Positivism and Quantitative revolution; models and systems in geography, Recent trends in geographic thought with special reference to radical, behavioural phenomenological and ecological paradigms. **2. Human Geography :** Human habitat in major natural regions: Emergence of Man and Races of Mankind; Cultural evolution and stages; Major cultural realsm.Growth and Distribution of population; International migration population. Demorgraphic Transition and contemporary population problems. **3. Settlement Geography :** Concept of Settlement Geography; Rural settlement; Nature; Origin, Types and pattern, conecept of Urban settlement. Patterns, Processes and consequences of Urbanisation; Central place theory; classification of town; Hierarchy of urban centres. Morphology of Town; Rural Urban nexus; Uniand and urban finges. **4. Economic Geography :** Fundamental concepts. Concepts of Resources; Classification, Conservation and Management Nature and Types of Agriculture; Agricultural land use location theories; World agricultrual regions; Major crops: Mineral and Power Resources Occurrence, Reserve, utilization and procduction patterns, World Energy crisis and search for alternatives. Industries-Theories of Industrial location, Major industrial regions; Major Industries- Iron & Steel, Paper, Textiles, Petro-Chemicals, Automobiles, Ship building; their location patterns. International Trade; Trade Blocks, Trade routes. Ports and global trace centres. World Economic Development Patterns. Concepts of and approaches to Sustainable Development. **5. Political Geography :** Concept of Nation and state; Frontiers, Boundaries and Buffer zones; Concepts of Heartland and Rimland Federalism, Contemporary world geopolitical issue.

PAPER - II - GEOGRAPHY OF INDIA

1. Physical Features : Geological systems and structure: Relief and drainage, soils and natural vegetation; soil degradation and deforestation. Origin and mechanism of Indian Monsoon; Climatic regionalisation; Physiographic regionlisation **2. Human Feature :** Distribution and growth of population; structural characteristics of population-temporal-regional variations. Regional rural settlements patterns and village morphaology. Urban Settlement; Classfication of Indian Cities- location, functional, hierarchcality regions Urban morophology, urbanisastion and urban policy. **3. Agriculture :** Infrastructure; irrigation, power, fertilizer use, mechanization; Regional characteristics of agricultural land use, problem of westelands and their reclamation, Cropping patterns and intensity; Agricultural Efficiency and Productivity, Impact of Green revolution; Agricultural regions with special reference to agroecological conditions. Land reforms and agrarian prob lems Crop Combinations and agricultural regionalisation. Modernisation of Agriculture and agricultural planning. **4. Mineral and Power Resources:** Locational patterns, Reserves and Production trends; Complementarily of minerals. Power resources; Coal petroleum, hydro power, Mulitipurpose river valley projects; Energy crisis and search for alternatives. **5. Industries :** Industrial Development, Major industries-non & steel. Textiles, paper Cements, Fertilizers Sugar, Petro-chemicals, industrial Complexes and Regions. **6. Transport and Trade :** Networks of railways and roads; Problems and prospects of Civil aviation and water transport; inter-regional commodity flows; International trace, policy and flow patterns. Major ports and trace centres. **7. Regional Development and Planning :** Problems of regional development and spatial planning strategies: Geographic and Planning regions; Planning for metropolitan, tribal, hilly, drought-prone regions and watershed management. Regional disparities in development and policies in five year Plans: Planning for Eco-Development. **8. Political Economy :** Historical Perspective on Unity and diversity. States reorganisation; Regional consciousness and national integration geographical basis on centre -state relations. International boundaries of India and related geo-political issues.India and the geopolitics of Indian ocean. India and the SAARC.

7. ECONOMICS : PAPER-1- ECONOMIC THEORY (SECTION- A)

1.Consumer Demand and Consumer Sovereignty : Law of Demand, Nature and types of elasticity of demand, indifference curve analysis and consumer's equilibrium. **2. Theory of Production :** Production Function, Laws of Returns, Equilibrium of a Producer, Nature of Cost and Revenue curves, Pricing of factors of prodcution. **3. Price and output determination :** Under different market conditions. Cost plus pricing. **4. Equilbrium :** General and Partial, Stable and Unstable. **5. Concepts of Economic Welfare :** Old and New Welfare economics, Pareto Optimality and compensation principles, Consumer's surplus. Economics welfare and Competition. **6.National Income :** Concept, Components and methods of accounting. Classical and Keynesian Theories of Employment and Income, Pigou effect and Real balance effect; Intersection of Multiplier and Accelerator .Theory of Trade Cycles. (Monetary and Hicksian trade cycles). **7. Theory of Money :** Measurement of changes in price level, Theory of money supply.Money Multiplier, Quantity theory of Money, Theories of Demand for money.Interest determination, IS-LM curve analysis. Theory of Inflation, Measures of inflation control. **8. Monetary and Banking System:** Banks and their roles in the economy. Central Bank and the money market, Techniques of monetary Management.

SECTION - B

(i) Public Finance : Theories of Taxation and Public Expenditure, Incidence of taxation, evasion and shifting of Tax burden, Effects of Taxation, Fiscal Policy and economic development, economic classfication of Budgetary Recepits and Expenditure, Types of budget deficits and their effects on the economy. **(ii) International Economics :**Theories of International Trade, Hecksher-Ohlin theory. Offer Terms of Trade,Trade and Development Balance of Payments, Disequilibrium in Balance of Payments and policies for correcting it. Fixed and fluctuating exchange rates, Free Trade vs. Protection, Foreign Debt and Debt management, International Monetary and Trade Institutions.**(iii) Growth and Development :** Measures of Economic developments. Theories of Economic Growth; Classical, Marxian and Harrod-Domar Model, Surplus Labour and capital formation, stages of growth.Problem of Human Capital formatoin.

PAPER- II - INDIAN ECONOMY

1. Basic Features of Indian Economy : Trends in National Income and per capita income. Changes in comparison of National Income. Population Growth and Economic Development, Characteristics of India's Population. Changes in occupational pattern. Development & Infrastructure for Agriculture and Industry. Source of Energy: Conventional and non-conventional.Energy Crisis, Enviormental pollution and its control. **2.Indian Agriculture :** Importance of agricultrue in Indian economy.Source of growth in agriculture. Institutional reforms in Indian agriculture with special reference to land reforms and credit supply. Agricultural cost and product pricing. **3. Industrial growth and Structure in India :** Public Sector. Private Corporate Sector Joint Sector. Small Scale and Cottage Industry in India; Industrial Policy resolutions; competition and industrial growth. Foreign Capital Technology and growth of Indian Industry; Industrial sickness in India. Labour policy reforms in India. **4. Budgetary Trends and Fiscal Policy in India :** Trends of major sources of public revenue and expenditure of Union Government,and U.P. Government. Non-Plan expenditure of Union Goverment internal and external debt of the Union Goverment, Fiscal and Revenue deficits in Union Budget, Major recommendations of the Tenth Finance Commission. **5. Money and Banking :** The Monetary institutions of India. Commercial Banks, Reserve Bank of India, Special Financial Institutions (Banking and nonbanking). Sources of Reserve money, money mulipliers, objective and techniques of monetary policy in India and their limitations. **6. Foreign Trade and Balance of Payment :** Foreign Trade of India-volume, composition and direction, Trade Policy-import substitution, export promotion and self reliance. Import liberalization and its effect on trade balance, External borrowing and the burden of foreign debt. **Exchange rate of rupee.** Devaluation and its effect on balance of payments-convertiblility of rupee. Integration of Indian economic with the world economy, Indian and the World Trade Orgainisation. **7. Economic Planning in India.** Role of economic planning in India. Objectives of Economic Planning, Problems of unemployment, Economic poverty and regional imblances.A brief review of planning in India since 1951. Strategy of planning in India and recent changes therein. Financial resources for the Plans Objectivies and achievements of the Eighth Five Year plan and the proposed strategy for the Ninth Plan.

8. SOCIOLOGY : PAPER-1 GENERAL SOCIOLOGY (SECTION- A)

1. Fundamentals of Sociology and Study of Social Phenomena : Emergence of Sociology, its nature and scope. Methods of study; Problem of objectivity and issues of measurement in Social Science; Sampling : Research Design: Descriptive, Exploratory and Experimental : Techniques of data collection; Observation, Interview schedule and questionnaire, **2. Theoretical Perspective Functionalism :** Redcliffe Brown, Malinowski and Merton. **Conflict Theory Karl Marx, Raif Dahrendorf and Lewiscoser. Symbolic Interactionism :** C.H.Cooley, G.H.Mead and Herbert Blumer. Structionslism -Levi: Strauss, S.F. Nadel, Parson and Merton. **3. Pioneers In Sociology :** A. Comte-Positivism and Hierarchy of Sciences. H Spencer- Organic analogy and the doctrine of **evolution .** KMarx- Dialectical materiaslism and alienation. **E. Durkheim-**Division of labour. Sociology of religion. Max Weber-Social action and idea type. **4. Social Stratification And Differentiation :** Concept, Theories of Stratification: Marx Weber,Davis and Moore, Types-Caste and Class. Status and Role, Social Mobilty-types: Occupational Mobility -Intra-Generabonal and inter Generational.

SECTION- B

5. Marriage, Family And Kinship : Type and forms of marriage, impact of social legislation. Family; Structure and functions; Changing patterns of family; Family decent and kinship: Mariage and sex roles in modern society. **6. Social Change and Development :** Concept,Theories and Factors of Social Change, Social moment and change. State intervention. Social policy and development, Strategies of rural transformation; Community developement programme.I.R.D.P., TRYSEM and Jawahar Rojgar Yojana. **7. Economic and Political System :** Concept of property. Social dimensions of division of labour. Types of exchange. Industrialisation, Urbanisation and Social Development, Nature of Power. Personal, Community Elite. Class. Modes of political participation-Democratic and Authoritarian. **8. Religion, Science and Technology :** Concept, Role and religious belief in traditional and modern societies. Ethos of science, Social responsibility and control of science; Social consequences of science and technology. **9. Population and Society :** Population size, Trends, Composition, Migration Growth, population Problems in India, Population, education.

PAPER- II- Indian Social System (Section- A)

1. Bases of Indian Society : Traditional Indian Social Organisation : Dharma, Doctrine of Karma. Ashram Vyavastha Purushartha and Samskars; Socio-Cultural Dynamics impact if Buddhism, Islam and the west. Factors responsible for contisnuity and change. **2. Social Stratification :** Caste system:Origin, Structural Cultural views. Changing patterns of caste: Caste and class: Issues of equality and social justice: Class structure in India-Agrarian and industrial: Emergence of middle class. Classes among the tribes; Emergence of Dalits consiousness. **3. Marriage Family and Kinship :** Marriage among different ethic groups. its changing trends and future; Family-its structural and functional aspects Changing pattern, Impact of legislations and socio-economic changes of marriage and family, Regional variations in kinship system and its changing aspect. **4.Economic and Political System :** Jaimani System, Land tenure system. Social consequences of land reforms and liberalisation, Social Determianats of economic development, Green revoluation, Functioning of demorcraitic politicial system. Political parties and their compostion, Structural change and orientation among political elities. Decentrailisation of power and political participation, Politiacal implications to development. **5. Education and Socity :** Dimension of education in traditional and modem socities, Educational equality and change; Education and social mobility. Problems of education among the weaker sections of the society.

SECTION- B

6. Tribal, Rural and Urban Social Organisation : Distinctive features of tribal communities and their distribution; Tribe and caste, Process Acculturation. Assimilation and integration. Problems of tribal's social identity: Socio-cultural dimensions of village community; traditional power structure, Democratisation and leadership. Community development programme leadership. Community development programme and Panchayti Raj, New strategies for rural transformation, community and change of traditional development in urban areas (Kinship, caste, occupation etc.) Class structure and mobility in urban commnuity; Ethinic diversity and community intergration. Urban neighbourhood. Rural urban differences. Demographic and socio-cultural practics. **7. Religion and Society :** Size Growth and Regional distribution of different religoius groups; inter religious interaction and its manifecstaiton- Problems of conversion. Commnity tensions. Secularism, Minority status and religious fundamentalism. **8. Population Dynamics :** Socio-cultrual aspects of sex, Age, Marital status. Feritility and mortality. The problem of population explosion, Socio-psychological,cultural and Economic. Population policy and family welfare programme; Determinants and consequences of population growth. **9. Women and Society :** Demographic profile of women Changes in their status; Special problems-dowry, atrocity, discrimination; welfare programmes for women & children.**10. Dimensions of Change and Development:**Social change and modernisation.Indices, Constrains and respectivity; Source of social change Endogenious and Exgenoius,. Processes of Social Change Sanskritisation, Westernisation and Modernisation, Agents of change. Mass media, Education and communication, problem of modernisation and planned change: Strategy and ideology of planning. Five year plans. Poverty alleviation programme ; Environment, Unemployment and programme for urban development; social reform movement with special refernece to peasant movement. Backward classes movement. women and Dalit movement.

9. PHILOSOPHY : PAPER -1 History and Problems of Philosophy : (SECTION-A)

1.Plato : Theory of ideas. **2. Aristotle :** Form, matter and Causation. **3. Descartes :** Method, soul, God, Mind-Body dualism. **4. Spinoza:**Substance, Attributes and Modes, Pantheism. **5. Leibnitz :** Monads , God. **6. Locke:** Theory of knowledge, Rejection of Innate Ideas, Substance and Qualities. **7. Berkeley :** Refutation of Matter, idealism. **8.Hume :** Theory of knowledge, Scepticism, Self, Casuality. **9. Kant:** Apriori and aposteriori knowledge, analytic and synthetic judgement, possibility of synthic apriori judgement, space, timer categories, ideas of Reason, Criticism of the proofs for the existence God.**10. Hegal :** Dialectical Method, Absoulte ideaism. **11. (a) Moore :** Defence of Common sense, Refutation of idealism. **11. (b) Russell** : Theory of Descriptions, Incomplete Symbols. **12. Logical :** Atomic Facts, Elementary Propositions, Picture Atomism (Wittgenstein) Theory of Meaning, Distinction of saying and showing. **13. Logical Positivism :** Verification Theory. Rejection of Metaphysics, positivism Linguistic Theory of Necessary Propositions. **14. Phenomenology :** Husserl **15. Existentialism:** Kicrkegaard, sartres. **16. Quine :** Radical Translation. **17. Strawson:** Theory of Person.

SECTION- B

1. Charvak : Theory of knowledge, Materialism. **2. Jainism ;** Theory of Reality. Syadvada and Saptabhanginaya, bondage and liberation. **3. Buddhism :** Pratityasamutpada, Ksanikavada, Nairiatmyvada, Schools of Budhism. **4. Sankhya :** Prakriti, Purusa, Theory of Causation, Liberation **5. Nyaya -Vaisesika :** Pramanas, Self, Liberation, Nature of God and proofs for existence of God. Categories, Theory of causation, Atomism. **6. Mimansa :** Theory of knowledge, Prama, Pramanas, svatahpramanyavada. **7. Vedants :** Sankara, Ramauja and Madhva (Brahma, Isvara, Atma Jiva,Jagat, Maya, Avidya, Adhyasa, Moksha).

PAPER-II -Socio Political Pholisophy and Philosophy of Religion.

SECTION- A

1.Political Ideals : Equality, Justice, Liberty **2.** Sovereignty **3.** Individual and State **4. Democracy:** Concept and forms **5.** Socialism and Marxism **6.** Humanism **7.** Secularism **8.** Theories of Punishment **9.** Violence, non-violence, Sarvodaya **10.** Gender -Equality **11.**Scientific Temper and Progress **12.** Philosophy of Ecology

SECTION- B

1.Religion ; Theology and philosophy of Religion **2.** Religion and Morality **3.**Notions of God; Personalistic, impersonalistic, Natuaralistic.**4.** Proofs for the existence of God. **5.** Immoratility of Soul **6.** Liberation **7.** Religious knowledge; Reasons, Revelation and Mysticism **8.** Religion without God **9.** Problem of Evil **10**. Religious tolerance.

10. GEOLOGY : PAPER-1

General Geology, Geology, Geomorphology, Structural Geology, Palaeontology and Stratigraphy.

(i) General Geology : Energy in relation to goedynamic activities, Origin and interor of the Earth. Dating of rock by various methods and age of the earth, Radio-activity and its application to geological problems, Volcanoes -causes and products, volcanic belts. Earthquakes -causes, effects, distribution and its relation to volcanic belts. Geosynclines and their classification, island arcs, deep sea trenches and mid- oceanic ridges,sea-floor spreading and plate tectonics, isostasy. Mountains-types and origin. Origin of continents and oceans.An outline of continental drift.

(ii) Geomorphology : Basic concepts and significance, Geomorphic process as and parameters, Geomorphic cycles and their interpretation, Relief features, topography and its relation to structures and lithology. Major landforms, Drainage system, geomorphic features of Indian subcontinent. **(iii) Structural Geology:** Stress and strain, ellipsoid and rock deformation, Mechanics of folding and faulting linear and planer suructtures and their genetic significance. Petrofobric analysis, its graphic representation and application to geological problems. Tectonic farme work of India, **(iv) Palaeontology :** Micro and macro-fossils. Modes of preservation and utility of fossils. General idea about classification and nomenclature. Organic evolution and the hearing of palaeontological studies on it. Morphology, classification and geological history including evolutionary trends of brachiopods, bivalves, gastropods, ammonoids, trilobites, echinoids and corals.Principal groups of vertebrates and their main morphological characters. Vertebrate life through ages. Dinosaurs.Detailed study of evolution of horses, elephants and man Gondwana flora and its importance. Type of microfossils and their significance with special reference to petroleum exploration. **(v) Stratigraphy :** Principles of stratigraphy, stratigraphic classification, nomenclature standard, stratigraphical scale, Detailed study of various geological system of Indian sub continent during geological past. Paleogeographic reconstructions.

PAPER- II- Crystallography, Mineralogy, Petrology and Economic Geology

(I) Crystallography : Crystalline and non-Crystalline substances, space groups.Lattice symmetry ,Classification of crystals into 32 classes of symmetry.Intentional system of crystallographic notation Use of stereographic projections to represent crystal symmetry.Twinning and twin laws, Crystal irregularities. Applications of X-rays for crystal studies. **(II) Optical Mineralogy :** General principles of optics, intropism and anisotropism,concepts of optical indicatrix,pleochroism, Birefringence and interference colours and extinction. Optical orientation in crystals. Dispersion optical accessories. **(III) Mineralogy :** Elements of crystal chemistry, types of bondings, ionic radii, coordination number, inomorphism, polymorphism and seudoumorphism, structural classification of silicates. Detailed study of rock forming minerals, their physical chemical and optical properties and uses, if any. study of the alteration products of these minerals. **(iv) Petrology :** Magma its generation, natural and composition, simple phase diagrams binary and temary systems and their significance, Bowen's Reaction principle, Magmatic differentiation and assimilation. Texture and structure and their pertogenetic significance. Classification of igneous rocks. Petrography and petrogenesis of important rock types of India, granites, alkaline rocks, chamockites anorthosite and Deccan basalts. Process of formation of sedimentary rock, Diagenesis and lithification. Textures and structures and their petrogenectic, significance. Classification of sedimentary rocks, clastic and non-clastic. Heavy minarals and their significance, Elementary concept of depositional environments, sedimentry, facies and provenance. Petrography of common rock types. Metamorphic processes and types of meyamorphism. Metamorphic grades, zones and facies ACF, AKF and AFM diagrams. Textures, structures and nomenclature of metamorphic rock, Petrography and petrogenesis of important rock types. **(v) Economic Geology:** Ore, mineral and gangue, tenor of ores, Processes of formation of mineral deposits. Common forms and structures of ore deposits. Classification of ore deposits. Control of ore deposition. Metallogenetic epochs. Study of important metalliferous and non metalliferous deposits, oil and natural gas fields, and coal fields of India, Mineral wealth of India. Mineral economics. National mineral pofícy. Conservation and utilisation of minerals. **(v) Applied Geology :** Essentials of prospecting and exploration techniques. Principal methods of mining. Sampling, ore dressing and mineral benefication. Geolgical considerations in Engineering works; Dams, Tunnels, Bridges and roads. Elements of soil and groundwater geology and geochemistry. Use of aerial photographs and satellite imageries in geological investigations.

11. PSYCHOLOGY:PAPER-1 BASIC PSYCHOLOGICAL PROCESSES

1. Psychology: Introduction : • Overview of the subject matter• Theoretical approaches S-R. Cognitive information processing and humanisitic place of psychology in science.• Sources of knowledge. **2. Methods :** Empirical methods.• Methods of data collection observation, Interview, Questionnaires Tests and scales, case study. **3. Biological bases of behaviour :** • Outline of central, peripheral and autonomic nervous systems Localization of functions in the brain, hemispheric specificity nerve impulse and its conduction, receptor system,• Endocrine system, Its role in physical growth, emotional activties and personality make up.**4. Perceptual Processes :** The problem of perceptural threshold classical psychophysics and signal detection theory. Attentional processes, selective attention and sustained attention. Perception of form, colour and depth. Perceptual contancy; the stability-instability paradox • Perceptual sensitivity and defence; The central deferminants. **5. Learning Proceses:** • Conditioning Classical and instrumental, observational learning • Verbal on, discrimination and generalization **6. Memory :** • Encoding; structural, phonological and semantic; dual encoding • Sensory memory, STM, LTM including episodic, semantic and procedural • For getting; interference and stimulus encoding variability • Constructive Memory **7. Problem Solving, Reasoning and Thinking:** • Process and deteminants of problem solving • Inductive, and deductive reasoning hypothesis testing • Language and thought; Whorfian view-point and its critique. **8. Emotions :** • Nature and development •Theories of emotions; physiological, cognitive and opponent-process,• Indicators of emotions, recognition of emotions, **9. Motivation :** • Criteria of motivated Behaviour. Concepts of need, drive, arousal and incentive.• Measurement of motivation.• Extrinsic versus intrinsic motivation.• Learned motivation **10. Origin and development of behaviour :** • Genetic bases. • Environmental factors; child rearing, deprivation, cultural factors, sensory deprivation.• Motor and skill development. **11. Individual differences in psychological functions:** • General mental ability, natural and theoretical approaches- Spearman,• Thurstone Guilford, Jensen and Piaget • Creativity and creative thinking. Heritabilty of intelligence.

PAPER- II

Psychology In the Applied Setting

1. Psychology as an applied Science : Applied versus basic science; fields of psychology, social community, industry school, health and environment. **2. Individual Differences and Measurement :** Nature and sources of individual differ-

Continued....

ences, Psychological scaling, test construction and standardization, Reliability and validity, Norms Cross- Validation, cultural factors in testing. **3. Assessment of personality :** Issues in personality assesment, self-report measures projective techniques, response styles; familiarity with inportant personality measures like TAT. Rochash and MMPI. **4. Psychological Disorders and Mental Health :** Classification of Psychological disorders (DSM-IV); symptoms and etiology of psychoneurotic, psychotic and psychosomatic disorders; coping stress and mental health. **5. Attitude and Social Cognition :** Nature of Attitude; theories of Attitude; attraction and helping . Nature of Social cognition; Social and cultural factors in perception prejudice stereotypes and group conficts. **6 Social Influence :** Influence, control and power, Basis of influence; Social facilitation, Ledership in group; Group factors in performance. **7. Psychology In Industry and Organisation :** Personnel selection job attitudes and job behavior, Motivational patterns in organisations Organisational models, Organistional communication, organistional effectiveness. **8. Psychology In School setting :** School as a social system, School as an agent to socialization; learning; motivational and emotional problems of school children, factors influencing academic achievement; interventions for improving school performance. **9. Psychology In the Clinical setting :** Nature and goals of Psychotherapy, Psychoanalytic client-centered, group and behaviour therapies, community mental health, Ethical issues in therapy. **10. Environmentall Psychology :** Role of environment in behaviour, personal space effect of noise pollution, effect of Human bahaviour on enviroment and crowd.

12. BOTANY: PAPER- I

Microbiology, Pathology, Plant Diversity, Morphogenesis, Microbiology : Microbial diversity elementary idea of microbiology of air, water and soil, a general-account of microbial infection and immunity, application of microbiology with reference to agriculture, industry medicine and environment. **Plant Pathology :** Important plant diseases caused by viruses, bacteria, algae, fungi and nematodes with special reference to root blot of crucifers, tobacco, mosaic leaf curl of papaya, cirtrus. canker, leaf blight of paddy, rust of tea, rust of wheat, smut of barley, late blight of potato red rot of sugarcane and wilt of arhar. **Plant Diversity :** Classification, structure, reproduction, life cycles and economic importance of viruses, bacteria, algae, fungi, bryophytes, pteridophytes and gymnosperms including fossils, morphology of root, stem, leaf flower and seed secondary growth; embryology, microsporogenesis and male gametophyte, megasporogenesis and female gametophyte, fertilization, embryo and endosperm, development principles of taxonomy, modern systems of classification of angiosperms, rules of botanical nomenclature, biosystematics distinguishing features of families-Renunculaccac, Magnoliaceae, Brassicaceae. Malvaceae, Fabaceae, Rosaceae, Apisceae, Cucubiaceae, Solanaceae, Asclepiadaceae, Verbenaceae, Lamiaceae, Asteraceae, Apocyanaceae, Euphorbiceae, Arecaceae, Posceae and Orchidaceae. **Morphogenesis :** Correlation, Polarity, Symmetry, totipotency, differentation and regeneration of tissues and organs; morphogenetic factors, methods and applications of cell tissue, organ and protoplast cultures, somaclonal variations, somatic hybrid and cybrids.

BOTANY: PAPER- II

Cell Biology, Genetices, Physiology and Biochemistry

Ecology and Economic Botany Cell Biology : Cell as structural and functional unit of life, Ultra structure of eucaryotic and procaryotic cells, structure and functions of plasma membrane, endoplasmic reticulum chloroplasts, mitochondria, ribosomes, golgibodies, and nucleous: Cell cycle, mytosis and meosys, Chromosomal morphology and chemistry, numerical and structural changes in chromosomes and their cytological and genetical effects. **Genetics :** Mendal's law of inheritance, interaction of genes, linkage and crossing over genetic recombination in fungi, cyanobacteria, bacteria and viruses , gene mapping, sex linkage, determination of sex, cytoplasmic inheritance of plastids; development of genetics and gene concept, genetic code; molecule genetics-DNA as genetic material. Structure and replication of DNA, role of nucleic acids in protein synthesis (transcription and translation) and regulation of gene expression, mutation and evolution, DNA damage and repair, gene amplification, gene rearrangement, oncogene, genetic engineering-restriction enzyme, cloning vectors (pBR 322, PTi lambda phage), genetransfer, recombinant DNA, genomic libraries, application of genetic engineering in human welfare, **Physiology and Biochemisty :** Water relations of plants absorption, conduction of water and transpiration; mineral nutrition and ion transport, translocation of phyotosynthates, essential micro-and macroelements and their function chemistry and classification of carbohydrates; photosynthesis-mechanism and importance, factors affecting photosynthesis, C3 and C4 carbon fixation cycle, photorespiration; plant respiration and fermentation, Kreb's cycle; enzymes and coenzymes,mechanism of enzyme action: secondary metabolites (alkloids, steroids, terpenses, lipids), nitrogen fixation and nitrogen metabolism, structure of protein and its synthesis: Plant growth-growth movements and senescence, growth hormones and growth regulators their structure, role and importance in agriculture and horticulture; physiology of flowering, sexual incomptibility, seed germination and dormancy. **Ecology :** Scope of ecology, ecological factors, plant communities and plant succession; concept of biosphere; ecosystem-structure and functions, abiotic and biotic components, flow of energy in the ecosystem, applied aspects of ecology natural resourcesand their conservation, endangered, threatened and endemic taxa; pollution and its control. **Economic Botany :** Origin of cultivated plants study of plants as sources of food, fibre timber, drugs, rubber, beverage, spices, resin and gums. dyes, essential oils, pesticides and bioferilizers, ornamental plants energy plantation and petrocrops.

13. LAW: PAPER-1

1. Constitutional Law of India : 1. Nature of Indian Constitution, Salient features, **2.** Nature of Fundamental Rights with special reference to Right to equality, Right to Freedom of Speech and Expression. Right to Life and Personal liberty and Religious, Cultural and Educational Rights. **3.** Directive Principles of State Policy and Fundamental Duties **4.** Constitutional Position of the President and relationship with the Council of Ministers. **5.** Constitutional postion of Governors and their power. **6.**Supreme Court and High Courts, their powers and jurisdiction. **7** Principles of Natural Justice.**8.** Distribution of Legislative powers between the Union and States, Administrative and Financial relations between the Union and States. **9.** Delegated legislation; its constitutionality and judicial and legislative controls. **10.** Freedom of Trade and commerce in India. **11.** Emergency Provisions. **12.** Constitutional safeguards to Civil Servants. **13.** Parliamentary privileges and ammenities. **14.** Amendment of the Constitution.

II. International Law : 1. Nature of International Law. **2. Source:** Treaty, Custom, General principles of law recognised by civilized nations, subsidiary means for the determination of law. **3.** Relationship between international Law and Municipal law. **4.** State Recognition and State Succession. **5. Territory of States:** modes of acquisition and loss of territory. **6. Sea:** Inland waters; Territorial Sea; Contiguous Zone; Continental Shelf; Exclusive Economic Zone and Ocean beyond national jurisdiction. **7. Air space and aerial navigation. 8. Outer space ;** Exploration and use of outer space. **9. Individuals :** Nationality, Statelessness, Human Rights and is enforcement. **10. Jurisdiction of States:** basis of jurisdiction and immunity from jurisdiction.**11. Extradition and Asylum. 12. Diplomatic and Consular Agents. 13. Treaties:** Formation, application and termination. **14.** State Responsibility. **15. United Nations:** Purposes and principles; principal organs and their powers and functions. **16. Peaceful means for settlement of International disputes. 17. Lawful recourse to force :** aggression, self-defence and interventions. **18. Legality of the use of nuclear weapons.**

PAPER- II

1-A-LAW OF CRIMES : (a) Concept of Crimes, Elements, Preparations, and attempt to commit crime. **(b) (1)** Indian Penal Code, 1860 **i. GENERAL** exceptions **ii.** Joint and Constructive liability iii. Abetment **iv.** Criminal conspiracy. **V.** Offences against the state **vi.** Offences against Public Tranquility. **vii.** Offences against Human Body **Viii.** Offences against Property **ix** Offences Relating to Marriage **x.** Defamation.
2. Protection of Civil Rights Act, 1965 **3.** Dowry Prohibition Act, 1961 **4.** Prevention of Food Adulteration Act, 1964.
B. LAW OF TORTS : i. Nature of tortious liability **ii.** Liability based upon fault and strict liability .**iii.** Statutory liability. **iv.** Vicarious liability **v.** Joint fort feasors **vi.** Negligence **vii.** Occupier's liability and liability in respect of structures. **viii.** Detention and conversion. **ix.** Defamation. **x.** Nuisance. **xi.** False imprisonment and malicious prosecution.
2. Law of Contracts and Mercantile Law: i. Formation of contract **ii.** Factors vitiating consent. **iii.** Void, Voidable, illegal and unenforceable contracts. **iv.** Perfomance of contracts.**v.** Dissolution of contractual obligations, frustration of contracts. **vi.** Quasi contracts. **vii.** Remedies for breach of contract. **viii.** Sales of goods Act, 1930. **ix.** Indian Partnership Act, 1932. **x.** Negotiable Instruments Act.

14. ANIMAL HUSBANDARY AND VETERINARY SCIENCE: PAPER-1

SECTION- A

A. Animal Nutrition : 1. Energy nutrition, Energy sources, energy metabolian, Requirements of energy for maintenance and production of milk, meat eggs and work energy evaluation of foods. **2. Protein nutritions :** Sources of protein digestion and metabolism of protein evaluation, Requirement of protein maintenance and production, Energy protein ratio in a ration. **3.Mineral nutrition :** Sources, function, deficiency symptoms, requirments for animals and their relationship with vitamins.**4. Vitamins, hormones and Feed additives :** Sources,function, deficiency,symptoms, requirements and interrelationship with minerals. **5. Applied nutrition :** Evaluation of feeding experiments, digestibility and balance studies. Feeding standards and measures of feed energy. Nutrient requirement for growth maintenance and production, Balanced ration. **6. Ruminant nutrition :** Nutrient and their metabolism with reference to milk production and its composition, Nutrient requirements and feed formulation for calves, heifers, dry and milking cows and buffaloes. **7. Non-ruminant nutrition:** Nutrient and their metabolism. with special reference to meat and egg production. Nutrient requirements and feed formulation for rayer broiler and pig.

B. Animal Physiology : 1. Growth and animal production : Parental and Post natal growth, maturation, growth curves, measures of growth, factors affecting growth, bodycomposition and meat quality. **2 Milk Production:** Hormonal control of mammary development, Milk secretion and milk ejection, composition of milk of cows and buffaloes. **3. Animal Reproduction :** Male and female reproductive organs, their components and functions. **4. Digestive physiology :** Organs of digestion and their function, Digestion of carbohydrates, protein and fat in numinants and non-ruminants.**5. Enviromnent Physiology :** Physiology ralations and their regulation mechanism of adaptation, environmental factors and regulatory mechanism involved in animal bahaviour, Method of controlling climatic stress. **6. Semen quality, preservation and artificial inseminations :** Components of semen, composition of spermatozoa, physical and chemical properties of ejaculated semen, semen preservation, composition, of diluents, sperm, concentration, transport of diluted semen, deep freezing techniques.

SECTION- B

C. LIVESTOCK PRODUCTION AND MANAGEMENT : 1. Commercial Diary Farming : Comparison of dairy farming in India with advanced countries, Dairying under mixed farming and as specialised farming economic dairy farming, starting of dairy farm capital and land requirement , organisation of dairy farms, procurement of goods, opportunities in dairy farming, factors determing the efficiency of dairy animals, herd recording, budgeting, cost of milk production, Pricing policy personnel management. **2. General Management :** Management of lovestock (pregnant and milking cows, newly born calves), livestock records priciples of clean milk production, economics of livestock farming, housing for livestock and poultry, General problems of sheep, goat, pigs and poultry management. **3. Feeding Management :** Developing practical and economic ration for dairy cattle supply of green fodder throughout the year, Land and fodder requirement of dairy farms, Feeding regimes for dry, young stock, bults, heifers and breeding animals. **4. Management of animals under drought condition :** Feeding and management of animals under drought flood and other natural climatics.

D. Milk and Milk products Technology : 1. Milk Technology : Organization of rural milk, procurement, collection and transport of raw milk. Quality, testing, and grading of raw milk, Quality storage grade of whole milk skimmed milk and cream. Processing, Packing, storing, distributing, marketing, defects and their control and nutritive properties of the following milk. Pasteurized, stardardized, toned double toned sterilized, homogenized, reconstituted, recombined and flavoured milk, Culture and their management, Youghurt, Dahi, Lassi, sterilized,homogenized, reconstiuted recombined and flavoured milk, Culture and their management, Youghurt, Dahi, Lassi, Srikhand ,legal standards, sanitation, Requirement for clean and safe milk and for the milk-plant equipments. **2. Milk product Technology :** Selection of raw materials, assembling, production processing, storing, distributing and marketing milk products such as butter, ghee, khoa, chenna, cheese,, condensed, evaporated, dry milk, baby food, icecream and kulfi, Testing grading, judging of milk products. BIS and Agark specification, legal standards, quality control and nutritive propereties, Packing, processing and operational control cost. **3. Milk by-products Technology :** Whey products, butter milk, lactose and casein.

PAPER- II- SECTION- A

A. General and Animal Breeding : 1. Animal Genetics : Mitosis and meiosis, Mendelian inheritance, deviation to Mendelism genetics, Expression of genes. Linkage and crossing over, sex determination, sex influenced and sex limited characters. Blood group and polymorphism, chromosomal aberrations, Gene and its structure, DNA as genetic material, genetic code and protein synthesis, recombinant DNA technology, Mutations, types of mutations, methods for detecting mutations and mutation role. **2. Population Genetics applied to Animal Breeding :** Quantitative vs. Qualitative traits. Hardy weinbery law, populations vs. Individual gene and genotype frequency. Forces changing genen frequency. Random drift and small population. Inbreeding method of estimating inbreeding co-efficient, system of inbreeding. Effective population size, Breeding value estimation of breeding value, dominance and epistatic deviation, partoning of variation, geotype environment correlation and gemotype environment interaction.**3. Breeding System :** Heriablity, repeatability and genetic and phenotypic correlations. their method of estimation and precision of estimates Aids to selection and their relative ments, individual pedigree, family within family selection, progeny testing, methods of selections, basis of selection. Response to selection and its measure, selection differential sirindex selection index, recurrent and reciprocal recurrent selection, establishment of new breed, inbreeding, out breeding, upgrading, hybridization , cross breeding, out crossing. **B. HEALTH AND HYGIENE : 1.** Anatomy of ox and fowl, Histological techniques, freezing paraffin embedding etc. Preparation and staining of blood film. **2.** Common histotlgical stain and embryology of cow. **3.** Physiology of blood and its; circulation, digestion, respiration, excretion: endocrine gland in health and diseases. **4.** General knowledge of parmacology and therapetics of drugs. **5.** Veterinary hygeine with respect of water, air and habitatior. **6.** Milk hygeine.

SECTION- B

c. ANIMAL DISEASES : 1. Immunity and Vaccination : Principles and methods of Immunisation of animals against specific diseases, herd immunity, disease free Zone, zero disease concept, chemprophylaxis. **2. Diseases of cattle, buffalo, sheep and goats :** Etiology, symptorns, diagnosis, prevention and control and disease, treatment of the following: Anthrax, haemorrhagic, septicaemia, Balock quarter, mastitis, tuberculosis, Johnes disease, food and mouth disease, Rinder pest, rabies, Piroplasmosis, Trypanosomiasis, Faciolisis, Milk fever and Tympanitis. Diseases of new born calf. **3. Diseases of poultry :** Etiology symptoms, diagnosis, prevention, control and treatments of Ranikhet disease, Fowlpox, Aviam Leusocis complex, Marek's disease and gumboro disease. **4. Disease of Swine :** Swine fever, Hogcholera. **5. Disease of Dog :** Canine distemper, Parvo disease, Rabies in pets in relation to human health.
D. VETERINARY PUBLIC HEALTH : 1. Zoonoses : Classification definition, role of animals and birds in prevalence and transmission of Zoonotic disease. **2. Veterinary Jurisprudence :** Rule and regulations for improvement of animals quality and prevention of animal diseases, Materials and methods for collection of samples for veterolegal investigation. **3.** Duties and role of vetemian in slaughter houses to provide meat that is produced under ideal hygienic conditions. **4.** By-products from slaughter houses and their economic utilization. **5. Method of collection,** preservation and processing of hormonal glands for medicinal use.
E. EXTENSION : Basic philosophy, objectives, concept and principles of extension,different methods, adopted to educate farmers, under rural conditions, Generation of technology,, its transfer and feed back, Problems and constraints in transfer of technology, Animal husbandry programmes for rural development.

15. STATISTICS : PAPER1- Probability Theory and Statistical Application

GROUP-A- PROBABILITY THEORY : Sample Space and Events, Classical and Axiomatic Definitions of Probability. Properties of Probability Measure, Conditional Probability, Independence of Events, Bayes Theorem and its Applications. Random Variable and its Distribution Function, Elementary Properties of Distribution Function, Discrete and Continuous Random Variables, Vibariate Distribution and Associated Marginal and Conditional Distributions- Expectation, Moments, Moment Generating and Characteristic Functions, Markov and Chebyshev Inequalities, Convergence in probability, Weak Law of Large Numbers and Central Limit Theorem for independently and Identically Distributed Random Variables. Some standard Discrete and Continuous Distributions, viz., Bionomial, Poisson, Hypergeometric, Geometric Negative Bionomial, Multinomial, Uniform, Normal, Exponential, Gamma, Beta and Cauchy. Bivariate Normal Distribution.
GROUP- B-STATISTICAL APPLICATIONS : Linear Regression and Correlation, Product Moment correlation, Rank Correlation, Intra-class Correlation and Correlation Ratio, Multiple and Partial Correlational and Regression for Three Variables. Principles of Experimental Design, One-Way and Two-Way Analysis of Variance with Equal number of Observations per Cell, Completely Randomized Design, Randomized Block Design, Latin Square Design, 2^2 and 2^3 Factorial Experiments, Missing Plot Technique. Sources of Demographic Data, Stable and Stationary Populations, Measures of Fertility and Mortality, Life Tables, Simple Poputations, Measures of Fertility and Mortality, Life Tables, Simple Population Growth Models and Population Projection Techniques. Index Numbers, and their Uses, Index Numbers due to Laspeyre, Paasche, Marshall-Edgeworth and Fisher, Tests for Index Numbers, Construction for Price Index Number and Cost of living Index Number. Times Series and its Components, Determination of Trend and Seasonal Indices, Periodogram and Correlogram Analysis, Variate Difference Method.

PAPER - II - STATISTICAL INFERENCE AND MANAGEMENT

GROUP-A-STATISTICAL INFERENCE : Properties of Estimators, Consistency, Unbiasedness, Efficiency, Sufficiency and Compltences, Cramer-Rao Bound, Minimum Variance Unbased Estimation, Rao-Blackwell Theorem. Estimation Procedures, Method of Moments and Method of Maximum Likelihood, Properties of Estimators, Interval Estimation. Simple and Composite Hypotheses, Two Kinds fo Errors, Critical Region, Level of Significance, Size and Power Function, Unbased Tests, Most- Powerful and Uniformly Most Powerful Tests, Neyman-Pearson Lemma and its Applications, Likefihood Ratio Tests. Tests based on t, x^2, z and F-distributions, Large Sample Tests, Variance Stabilizing Transformations. Distributions of Order Statistics and Range, Non- parametric Tests, Viz...Sign Test, Median Test, Run Test, Wilcoxon-Mann- Whitney Test.
GROUP - B - STATISTICAL MANAGEMENT : Nature of Operations Research Problems, Linear Programming Problem and the Graphical Solution in simple Cases, Simplex Method, Dual of Linear Programming Problem, Allocation and Transportstion Problems. Zero sum two-person game, Pure and Mixed Strategies, Value of a Game, Fundamental Theorem, Solution of 2x2 Games. Nature and Scope of Sample Survey, Sampling vs. Complete Enumeration, Simple Random Sampling from Finite Populations with and Without Replacement, Stratified Sampling and Allocation Principles, Cluster Sampling with Equal Cluster Size. Ratio, Product and Regression Methods of Esitmation and Double Sampling, Two Stage Sampling with Equal First Stage Units, Systematic Sampling. Statistical- Quality Control, Control Charts for Variables and Attributes (R),(-s) p.n.p and C Charts.
Acceptance-Sampling, OC, ASN and ATI Curves, Producers risk and Consumer's risk, Concept of AQL, AOQL and LTPD, Single and Double Sampling Plans. Scaling Procedures, Scaling of Test Items, Test Scores, Qualitative Judgements, Theory of Tests, Parallel Tests, True Score, Reliability and Validity of Tests.

16. DEFENCE STUDIES: PAPER- I Evolution of Strategic thoughts (Section-A)

1. Concpet and theories of Conflict (a) Origin, perceptions, processes, escalation, goal achivement, etc,of conflicts fn human social relation and its relevance to international conflict. **(b) Conflict as War :** State behaviour, causes, correlates, domestic sources, glogal structural sources, commencement and termination, negotiation, ecology of warfare etc. **(c) Concepts of war and Its relation with politics :** Classical thought and trends from Mechiaveli to Nuclear Age. **(2) (a)** Kautilya's philosophy of war and his strategic contribution. (**b**) Suntzu's thoughts on war. **(c)** Thoughts of Jomini and Clausewitz on Strategy, Tactics, Logistics, Principles of War and Nature of War **3.** War and industrial society with reference to the views of Marx Engles. **4.** Concepts and Theories of Revolutionary War and Guerrilla Warfare with reference to the views of Lenin, Mao to tung, Che Guevara, Regis Denbray and Giap. **5. Economic Bases of military power : (a)** Economics of war. **(b)** Linkages between commercial, financial, industrial, economic and politic ; military strengths and weaknesses of a nation-state. **(c)** Arms trace and theory of donor- recipient behaviour. **(d)** Post-war economy and reconstruction. **6. Theories of Land, Sea and Air warfare : (a)** Theories of land warfare with reference to mobile defence, use of tank and machine, warfare and propounded by Liddeli Hast and J.F.C Fuller. **(b)** Views of A.T. Mahan on the elements of sea power and naval strategy. **(c)** Continental doctrine of sea power. (**d**) Heartland theiroes of Halford Mackinder. **(e)** Heartland theories based on National Power.**(f)** Theories of Air power as propounded by G. Douhet, Mitchell and Alexander de Seversky.

SECTION- B

7. German Concept of total war with reference to the views of Luideadroff ; German strategy in the Machine Age. **8.** Military strategy of Allied Powers during the World War II **9.** Soviet military strategy with reference to the views of Lenin Trosky, Stalin and V.D Sokolovsky. **10. Concept and theories of deterrence: (a)** Concepts and theories of conventional deterrence. **(b)** Concept and theories of nuclear deterrence with reference to the views of Liddell Hart, Andre Beaufre,Y. Harkavi and Henry Kissinger. **11.** Concepts of Disarmament. **12.** Concept and theories of Arms Control and Disarmament. **13.** Concept and the theories of 'Peace –keeping' and Peace building. **14.** Theories of Conflict Resolution, Methods of Conflict Resolution, Gandhian teachniques of Conflict Resolution.

PAPER – II (SECTION - A)

1. Conceptuall framework of National Security in the contemporary strategic thinking. **2.** Evolution of National Security thinking and problematics. **3.** Theories of National Power. **(a)** Definitive framework of National Power. **(b)** The impression of Power as a concept. **(c)** Power profile of nation stases. **(d)** Non-Power influence. **(e)** Elements of National Power **(i) Tangible elements :** Geography, Population, Extent of Territory. Natural Resources, Industrial Compacity, Financial Capability, Scientific and Technological Capability, Military Capability. **(ii) Intangible elements :** Leadership. Bureaucratic and Organizational Efficiency. Type of Government, Social and Ethnic cohasiveness, National, Character and Requtation, National, Morale, Public Support. **4.** Concept and models of International Security. **(i)** Conceptual frame work of International Security during the Cold War and Post Cold War Periods. **(ii)** Balance of Power **(iii)** Collective Security **(iv)** Collective Defence **(v)** Non-Alignment. **(5)**. Concept and theories of conventional and nuclear deterrence. **6. (i)** Arms proliferation as constraint to National. Regional and International Security. **(ii)**

Continued....

Prospects for Arms control. **7. International Terrorism :** Concept and dimensions. **8. Insurgency and Counter- Insurgency:** Concepts and dimensions. **9. Co-relation between Foreign,** Defence and Domestic policies. **10.** Historical Legacy, Geo-political and Geo Strategical consideration of India's Security.

SECTION– B

11. NATIONAL SECURITY PROBLEMATICS AND INDIA QUEST FOR SECURITY : (a) India is the world strategic arena; Contemporary trends. **(b)** India's quest for security Vis-avis Pakistan (till-date); Pakistan's conventional nuclear and missile programmes and their impact no India defence, India's options. **(c)** India-China boundary dispute; Positions and Polemics: efforts for the settlement of boundary dispute; framework of Cooperative Security between India and China. **(d)** India's mutuality of strategic and other interests with Bangladesh, Nepal, Bhutan, Mayanmar, Srilanka, Maldives and Afganistan. **(e)** Role of extra- regional power in the Post-Cold War South Asian strategic milieu and India's security considerations. **(f)** Need of Confidence and Security Building Measures' for India and its South Asia neighbours. **12. SCIENCE, TECHNOLOGY AND INDIA'S SECURITY : (a)** India's scientific and technological base for National Defence. **(b)** Need for India's integrated science policy. **(c)** India's defence industrialization and achievements. **(d)** Indian's Research and Development (R&D) **13. INDIA'S NUCLEAR POLICY AND OPTIONS : (a)** India's need for Nuclear power. **(b)** India's Nuclear breakthroughs. **(c)** India's nuclear options in a nuclearised world. **(14) INDIAN OCEAN AND INDIA'S SECURITY CONSIDERATIONS** : **(a)** Strategic milieu in and around the Indian Ocean region **(b)** India's security problems in relation to the Indian Ocean region **(c)** Indian's maritime security and its needs for naval power projections; **15. India's over-all security perspectives and defence preparedness. 16. INTERNATIONAL SECURITY OF INDIA** : **(a)** Harmful internal; threats and challenges-diminution of social and ethnic cohesiveness. communalism, linguistic differences; regionalism: rise of ethno nationalism. poor governability and political instability, corruption in the various walks of National life overpopulations and ethnic migration across the borders rising but frustrated expectations of people at the root of insecurity; ecological imbalances and economic problems. **(b)** Low Intensity Conflicts (LIC) in India with special reference to Jammu & Kashmir and North- East region. **(c)** Identification of the problems of Internal Security and conditions for the use of military; pros and cons. **(d)** imperatives of comprehensive National Security-Strategy.

17. Management

The candidates are expected to be acquainted with various aspects of Management. They should be able to apply theory to practice in the context of world business, in general. and business function in India, in particular. For this, they are expected to be well conversant with the environment, in with business functions in India. They should also be able to display knowledge and application of managerial tools of analysis and decision-making in various functional areas.

Paper –1

1. Management Concepts and Evolution : Concept and significance of Management: Management as science of art as a profession and distinction between management and administration. Roles and responsibilities of management; Principles of management Evoluton of management-classical school, new-classical school, modern management school: contribution of management experts. **2. Planning and Decision Makings :** Planning-nature, type, significance and limitations; objectives of Organization, MBO; Plans objectives; policies: procedures: planning premises and forecasting. Techniques of forecasting. Decision- making- types, process; Rational decision making-its- limitations. **3. Organisation and Organizational Behaviour** : Organisation-concept. Factors affecting, Departmentation and assignment of activities, Span of management: Authority and responsibility. Authority-meaning, types. sources. Acceptance of authority; Delegation of authority meaning principles and obstacles to delegation; Centralisation and decentralisation of authority; Organisatonal behaviour-concept and significance; individual and group behaviour. Oganisational Change. **4. Directing :** Directing meaning principles and techniques: Motivation-Theories: Contribution of Maslow, Herzberg, Mc Gregor, McLeland, and other leading authorities: Leadership meaning functions and types: qualifies of successful leader, Various theories of leadership; Communication-meaning, functions and types: qualities of a successful leader, Various theories of leadership; authroties; Leadership-meaning. Functions and types; qualifies of a successful leader. Various theories of leadership; Communication-meaning, types and techniques: barriers to communication: Measures for effctives communicaton. **5. Controlling and Co-ordinating ;** Controlling-meaning process; pre-requisites for effctives controlling, Methods of controlling. budgetary and non budgetary, Co-ordination, Principles, Techniques and barriers to Co-ordination. **6. Business Environments :** Concept and significance of Business environment, Interplay between business unit and environment, social responsibilities of business, Business ethics; Industrial Policy: Monetary Policy, Fiscal Policy: Foreign capital and foreign collaboraton; Multinationals in India: Causes of concentration of economic power, control of monopoly.

PAPER- II: SECTION - 1 - MARKETING MANAGEMENT

Concept and functions of marketing, Marketing mix; Market segmentation and product differentiation; Product modificaton and product life-cycle. Consumer motivation and behaviour: Demand forecasting. Sales promotion: Advertising: Salesmanship and management of sales force. Role and techniques of marketing research. Marketing audit and coutrol. Decision ideas in International Marketing. Rural Marketing in India.

SECTION- II - PRODUCTION MANAGEMENT

Meaning and nature of production Management. Type of Production systems. Production planning and control, Ranking, loading and scheduling for different types of production system. Plant location and site selecton. Plant layout and material handling. Production design. Value analysis Quality control, Inventory Control: ABC Analysis, Determination of EOQ, Reader point and safety stock Waste Management.

SECTION- III - FINANCIAL MANAGEMENT

Meaning and scope, Estimating the firm's financial requirements; Capital Structure determination; Cost of Capital; the Size of Working Capital; Managerial dimensions of Working Capital, Management of Long-Term Funds; Capital market, insitutional mechanism for funds. Leasing and sub-contracting. Investment decisions, Criteria for investment appraisal; Risk Analysis in Investment decision. Financial Management in Public Enterprises with reference to India.

SECTION - IV - HUMAN RESOURCE MANAGEMENT

Nature scope and significance of Human Resources Recruitment and Training Development; Promotion and Transfer; Performance appraisal; Job evaluation and Merit rating. Wage and salary administration. Employee moral and Motivation. Industrial Democracy and workers participation in Management, Collective Bargaining. Descipline and Grievance handling. Conciliation and adjudication, Trade Unionism in India.

18. POLITICAL SCIENCE AND INTERNATIONAL RELATIONS : PAPER-1 SECTION - A

1. Political Theory : (1) Nature and scope of political Science. Different approaches to the study of Political Science. Traditional and contemporary- Behavioural, systemes and Marxist. **(2)** Nature of Moderm State, Theories of Sovereignty, Power, Authority and Legitimacy. **(3)** Theories of Rights, Liberty, Equality and Justice. **(4)** Theories of Democracy. **(5)** Liberalism, Socialism and Marxism. **(6)** Political Philolsophy: Kautilya and Manu; Plato and Aristotle; St. Thomas Acquinas and Marsiglio of Padua; Machiavelli, Hobbes, Locke and Rousseau; Montesquieu, Bentham and J.S. Mill, Hegal, T.H. Green, Herold, J. laski; Marx, Lenin and Mao Tse Tung.

SECTION- B

1. Government and Politics with Special Reference of India : (1) Forms of Government : Unitary and Federal, Parliamentary and Presidential. **(2) Political Institutions :** Legislature Executive and Judiciary, Political Parties and Pressure Groups; Electroal System; Bureaucray's Role in Modern Government. **(3) Political Process:** Political Culture and Political Socialization, Modernization and political development. **4.INDIAN POLITICAL SYSTEM (a) Rise of Indian Nationalism :** Social and Political Ideas of Gokhale, Tilak, Mahatma Gandhi, Jawahar Lal Nehru, Jinna and B.R. Ambedkar **(b) Indian Constitution :** Basic features, Fundamental Rights and Directive Principles: The Union Government; President, Prime-Minister and Council of Ministers, Parliament and Supreme Court; State Government, Powers and position of the Governor, Centre- State Relations, Local Government with special reference of Panchayati Raj. **(c)** Indian Politics Process : Caste in Politics, Regionalism, Linguism and Communalism, Political Parties and Pressure Groups, Violence in Indian politiecs, National integration.

PAPER- II (SECTION- A)

1. International Relations and International Politics ; Definition, Nature and Scope. **2. Theories of International Politics :** The Realist, Systems, and Decision making theories. **3.** Factors determinings foreign policy; National Interest, ideology, Elements of National Power. **4.** Nationalism and imperialism; Decolonization; Rise of New-Colonialism. **5. Balance of power** as foreign policy choice, its relevance in present tunes. **6.** TheCold War: Détente; New Cola War and Current World Order. **7.** The new International Economic Order and its significance & Role of International Law in International Relations. **9.** Role of Diplomacy in International Politics. **10.** International Organizations the U.N. and its agencies; International Court of Justice, Role of U.N. international Relations. **11. Regional Organizations ;** OAS, OAU, The Arableague, SAARC, The ASEAN, The EEC and their role in International Relations. **12. Arms race :** Efforts at conventional and nuclear disarmament and arms control. Impact of Nuclear Power on international Politics. 13. Nonalignment: Origin, role and its current relevance in international relation.

SECTION - B

1. Foreign Policies of U.S.A., Russia and China. **2.** India's Foreign Policy and its relations with U.S.A. Russia and China. **3.** India and its neighbours. **4.** Zones of Regional conflict and cooperation; West Asia, South Asia and South East Asia. **5.** Third World and its role international relations, North-South Dialogue, South-South Cooperation. **6.** Indian Ocean: Problems and Prospects.

19. HISTORY: PAPER - I (SECTION - A)

1. Sources and approaches to study of early Indian History. **2.** Early pastoral and agricultural communities. The archaeological evidence. **3.** The Indus Civilization: its origins, nature and decline. **4.** Patterns of settlement, economy, social organization and religion in India (**c.** 2000 to 500 B.C.): archaeological perspectives. **5.** Evolutions of North Indian society and culture: evidence of Vedic Texts (Samhitas of Sutras). **6.** Teachings of Mahavira And Buddha. Contemporary Society. Early phase of state formation and urbanization. **7.** Rise of Magadha: the Mauryan Empire. Ashoka's inscriptions; his dharma. Nature of the Mauryan State. 8-9 Post-Mauryan period in Northern and Peninsular India: Political and Adminsrative History. Social, Economy, Culture and religion. Tamilaham and its Society: and Sangam Texts. 10-11. India changes in the Gupta and post- Gupta period (to c. 750): political history of northern and peninsular India; Samanta System and changes in political structure; economy; Social Structure; culture; religion. **12.** Themes in early Indian cultural history; languages and texts; major stages in the evolution of art and architecture; major philosophical thinkers and schools; ideas in science and mathmatics.

SECTION- B

13. India, 750-1200 : Polity Society and economy, Major dynasties and political Structures In North India. Agrarian structures "Indian Feudalism". Rise of Rajputs. The Imperial Cholas and their contemporaries in Peninsular India. Village communites in the South. Conditions for women. Commerce mercantile groups and guilds; town. Problem of coinage. Arabs conquest of Sind; the Ghanavide Empire. **14** India, 750-1200; Culture, Literature, Kalhana, historian. Styles of temple architecture; sculpture. Religious thought and institution Sankaracharya's vedanta. Ramanuja. Growth of Bhakti, Islam and its arrival in India. Sufism. Indian. Science, Alberuni and his study of Indian science and civilization. **15.** The 13th century: The Ghorian invasions. Factors behind Gorian success. Economic, Social and cultural consequences, Foundation of the Suitanate. The "slave" Dyansty, Iltutmish: Balban. "The Khaliji Revolution" Early Sultanate architecture. **16 The 14th century :** Alauddin Khaliji's conquests, agrarian and economic measures. Muhammad Tuglaq's major "project"s Flruz Tughluq's concessions and public works. Decline of the Sultanate. Foregin Contacts: Ibn Battuta. **17.** Economy society and culture and the 13th and 14th Centuries. Cast and slavery under Sultanate. Technological Changes. Sultanate architecture. Persion literature. Amir Khushrau, Historiography, ziya Barani. evolution of composite culture. Sufism in North India. Lingayats. Bhakti Schools in the south. **18. The 15th and early 16th Century (Political History). Rise of Provincial Dynasties :** Bengal, Kashmir (Zainul Abedin), Gujarat, Malwa, Bahmanids. The Vijayanagra Empire. Lodis. Mughal Empire, First Phase: Babur, Humayan. The sure Empire: Sher Shah's administration. The Protuguese colonial enterprise. **19.** The 15th and early 16th Century (society, economy and culture). Regional cultures and liteatures. Provincial architectural styles. Society, Culture, Literature and the arts in Vijayanagra Empire. Monotheistic movements: Kabir and Guru Nanak Bhakti Movements: Chaitanya, Sufism in its Pantheistic phase. **20. Akbar :** His conquests and consolidation of empire. Establishment of Jagir and Mansab systems. His Rajput Policy. Evolution of religious and social outlook. Theory of Suth-i-kul and religious policy. Abdul Fazl, thinker and historian. Court patronage of art and thchnology. **21. Mughal empire in the 17th Century**. Manjor policies (administrative and religious) of Jahangir, Shajahan and Aurangzeb. The Empire and the Zamindars. Nature of the Mughal state. Late 17 th Century crisis: Revolts. The Ahon kingdom, Shivaji and the early maratha Kingdom. **22. Economy and Society,** 16th and 17 th Centuries. Population. Agricultural and craft production. Towns, commerce with Europe through Dutch, English and French companies-a "trade revolution". Indian mercantile classes. Banking, insurance and credit systems. Conditions of peasants, Famines. Condition of Women. **23. Culture during Mughal Empire.** Persian literature (including historical works). Hindi and religious literatures. Mughal architecture. Mughal painting. Provincial schools of architecture and painting. Classical music. Science and technology Sawai Jai Sing, astronomer. Mystic electism: Dara Shikoh, Vaishnav Bhakti, Maharastra Dharma. Evolution of the Sikh community (Khalsa). **24. First half of 18th Century.** Factors behind decline of the Mughal Empire. The regional principalities (Nizam's Deccan, Bengal, Awadh) Rise of Maratha ascendancy under the Peshwas. The Maratha fiscal and financial system. Emergency of Afghan Power. Panipat, 1761. Internal weakness. Political cultural and economic, on eve of the British conquest.

Paper – II Section-A

1. Establishment of British rule In India : Factors behind British success against Indian powers-Mysore, Maratha confederacy and the Punjab as major powers in resistance; Policy of subsidiary Alliance and Doctrine of Lapse. **2. Colonial Economy :** Tributes System. Drain of wealth and "deindustrialisation''. Fiscal pressures and revenue settlements (Zamindari, Ryotwari and Mahalwari settlements), Structure of the British Raj up to 1857; (including the Acts of 1773 and 1784 and administrative organisation). **3. Resistance to colonial rule:** Early uprisings; Causes, nature and inpact of the Revolt of 1857 Reorganisation of the Raj, 1858 and after. **4. Socio- cultureal impact of colonial rule :** Official social reform measures (1828-1857); Orientalist-Anglicist Controversy; coming of English education and the press. Christian missionary activities; Bengal Renaissance; Social and religious reform movements in Bengal and other areas: Women as focus of social reform. **5. Economy 1858-1914 : Railway**: Commercialization of Indian agriculture. Growth of landless labourers; and rural indebtedness; Femines; India as market for British Industry; constoms removal, exchange and contrervailing excise; Limited grow the of modern industry. **6. Early Indian nationalism :** Social background; Formation of national associations Peasent and tribal uprising during the early nationalist era; Fundation of the Indian National Congress. The moderate phase of the congress; Growth of Extremism; The Indian council Act of 1909; Home Rule Movement, the Goverrmment of India Act of 1919. **7. Inter-War economy of India :** Industries and problem of Protection; Agricultural distress. The Great Depression; Ottawa agreements and Discriminatory Protection; the growth of trade unions; The Kisan Movement; The economic programme of the Congress Karachi Resolution, 1931. **8.** Nationalism under Gandhi's leadership: Gandhi's career though and methods of mass mobilization, Rowlatt Satyagraha, Khailafat Non Cooperation Movement, Civil Disobedience Movement, 1940 Satyagraha and Quit India movement, State people's Movement. **9. Other stands of the National Movement: (a)** Revolutionary movements since 1905; **(b)** Constitutional politics; Swarajists, Liberals, Responsive Co-operation; **(c)** Ideas of Jawahalal Nehru, **(d)** The Left (Socialists and Communists); **(e)** Subhash Chandra Bose and the Indian National Army. **(f)** Communal strands: Muslim League and Hindu Mahasabha; (g) Women and National Movement. **10.** Literary and cultural movement: Tagore. Premchand, Subramanayam Bharti, Iqbal as examples only; New trends in art ; Film Industry, Writers Organisations and. Theater Association. **11. Towards freedom:** The Act of 1935; Congress Ministries, 1937-1939, The Pakistan movement Post-1945 upsurge (Rim Mutiny, Telangana uprising etc.); Constitutional negotiations and the Transfer of power, 15 August 1947. **12. First phase of Independence (1947- 64)** Facing the consequences of partition; Gandhiji's murder, economic dislocatan; Integration of State; The democratic constitution, 1950; Agrarian reforms. Building and Industrial Welfare state; planning and industrialisation; Foregin Policy of Non-alignment: Relations with neighbours.

SECTION- B

13. Enlightenment and Modern Ideas - 1. Renaissance Background. **2.** Mojor ideas of Enlightenment: Kant, Rousseau. **3.** Spread of Enlightenment outside Europe. **4.** Rise of Socialist ideas (to marx).
14. origins of Modern Politics – **1.** European States System. **2.** Americal Revolution and the Constitution. **3.** Frence revoluton and after math, 1789-1815. **4.** British Democratic Politics. 1815-1850, Parliamentry Reformers: Free Trades Charitists.
15. Industrialization : 1. English Industrial Revolution: Causes and Impect on Society. **2.** Industrialization in other countries: USA, Germany, Russia, Japan. **3.** Socialist industrialization: Soviet and Chiness.
16. Nation-State System - 1 Rise of Nationalism in 19th Century **2.** Nationalsm: State-building in Germany and Italy. **3.** Disintegration of Empires though the emergency of nationalities.
17. Imperialism and Colonialism - 1. Colonial System (Exploitation of New world. Tran-atlantic Slave Trade, Tribute from Asian Conquests. **2.** Types of Empire: of settlement and non-settlement: Lain America, South Africa, Indonesia, Australia. **3.** Imperialism and Free Trade. The New imperialism.
18. Revolutions and Counter- Revolution - 1. 19th Century European revolutions. **2.** The Russian Revolution of 1917-1921. **3.** Fascist Counter-Revolution, Italy and Germany. **4.** The Chinese Revolution of 1949.
19. World Wars - 1. 1st and 2nd World Wars as Total Wars: Societal Implications. **2.** World war- **1:** Cause and Consequences. **3.** World War-II : Political consequence.
20. Cold War - 1 Emergence of two Blocs. **2.** Intergration of west Europe and Us Stragegy; Communist East Europe. **3.** Emergenc of Third World and Non-Alignment. **4.** UN and Dispute Resolution.
21. Colonial Liberation - 1. Latin America- Bolivar. **2.** Arab World - Egypt. **3.** Africa- Apartheid of Democracy. **4.** South-East Asia-Vietnam.
22. Decolonization and underdevelopment - Decolonization: Break up colonical empires: British, Frenceh, Dutch. **2.** Foctors Constraining Development: Latin America, Africa.
23. Unification of Europe- **1.** Post War foundations: NATO and Eurpean Community. **2.** Consolidation and expansion of European Community European Union.
24. Soviet Disintegration and the Unipolar World - 1. Factors in the collapes of soviet communism and the Soviet Union. 1985-1991. **2.** Political Changes in East Europe 1989-1992. **3.** End of the Cold War and US Ascendancy in the world. **4.** Globalizaton.

20. SOCIAL WORK : Paper- I - Social work: Philosophy and Methods.

Social work: Meaning, Objectives, Scope, Assumptions & Values; History of Social work in U.K. U.S.A. and India, philosophy of Social Work. Democratic (Equality, Justice Liberty & Fraternity) and Humanitarian (Human Rights) Matrix. Social works as a profession.

Methods of Social work

Social Case work : Meaning, Scope Principles, Processes (Psychosocial study, Assessments, treatment-goal formulation and techniques), Evaluation, Follow-up and Rehabilitation. Social Groups work: Meaning, Objective, Principles, Skills, Processes (Study, Diagnosis, treatment and evaluation), Programme, Planning and Development, Role of Social group worker, Leadership Development.
Community organization : Meaning, Objective, Principles, Approaches, Roles of Community Organization Worker.

Continued....

Social Welfare Administration : Meaning Scope, Auspices-Private and Public, Principles, Basic Administrative Processes and Practicedecision making communication, planning. organisation, budgeting and finacial control, reporting. **Social work Research** : Meaning objectives, types, scope, scientific method, Selection and formulation of the problem Research Design Sampling, Sources and Methods of Data Collection, Processing of Data, analysing and interpretation, Report writing. Social Action: Meaning, Scope, approaches (Sarvodays, Antyodaya etc.) and Strategies.

Paper- II

Social Problems and Fields of Social work in India Problem pertaining to Marriage, Family and caste: Dowry- child Marriage, Divorce, Families with working couples, Disorganised Families, Families with Emigrant Heads of the Households, Gender Inequality, Authoritarian Family structure, Major Changes in Caste systems and problem of casteism. Problems Pertaining of Weaker Sections. Problems of Children, Women Aged. Handicapped and Backward Classes (SCs, STs, and other Backward Classes). **Problems of Deviance:** Truancy Vagrancy and Juvenile Delinquency, Crime, White Colla Crime, Organized Crime, Collective Violence, Terrorism, Prostitution and Sex Related Crimes. Social Vices: Alcohilism. Drug Addiction, Beggary, Corruption and communalism. **Problems of Social Structure :** Poverty, Unemployment, Bonded Labour, Child Labour. **Fields of Socialwork India :** Child Development, Development of Youth, Women's Empowerment, Welfare of aged, Welfare of Physically. Mentally and Social Handicapped, Welfare of backward Classes (Scs, STs and Other Backward Classes) Rural Development Urban Community Development, Medical And Psychiatric Social work, Industrial Social work, Social Security offender Reforms.

21. Anthropology - Paper -1

1.1 Meaning and scope anthropology **1.2** Relationship with other discipline: History, Economics, Sociology, Psychology, Political Science, Life Science, Medical Science. **1.3** Main branches of Anthropology, The scope and relevance (a) Social-cultural anthropology (b) Physical and biological Anthropology. **(c)** Archaelogical Anthropology. **1.4** Human Evolution and emergence of Man. **Organic Evolution-** The ories of evoluton in historical perspective, Per-Darwinian, Darwinian and Post-Darwinian Period. Modern Synthetic Theory of evolution brief outline of terms and concepts of evolutionary biology (Doll's rule, Cope's rule, Gause's rule, Parallelism, covergence, adaptive radiation, mosaic evolution); Principal of systematic and taxonomy major primate taxa, tertiary and quaternary fossil primates, Systematics of Hominoidea and Hominidae, Origin and evolutions of Man-"Homo erectus and Homo sapiens". **1.5** Phylogentic status, Characteristies and distribution of the following **(a)** Preplestocence fossil primates-Oreopithecus. **(b)** South and East African Hominids-Pleasianthropus/Australopithecus Africaus, Paranthropus, Australopithecus.**(c)** Paranthropus-homo erectus-Homo erectusjavanicus, Homo erectus Pekinesis. **(d)** Homo Heidelbergensis. **(e)** Neanderthal Man-La-Chapelle-aue-Saints (Classical type) Mr. Carmelites types (Progressive type) .**(f)** Rhodesian man. **(g)** Homo sapiens- Cromognon, Grimaldi, Chancelede. Recent advances in understanding the evolution, distribution and multidisciplinary approach to understand a fossil type in relation of others. **1.6** Evolutionary trend and classification of the order primates, Relationship with other mammals, molecular evolution of Primates, Comparative anatomy of man and apes,, Primate locomotion terrestrial and arboreal adaptation, skeletal Changes due to errect posture and its implications. **1.7** Cultural Evolution-broad outlines of prehistoric culture **(a)** Paleolithic **(b)** Mesolithic **(c)** Neolithic (d) Chalcotithic **(e)** Copper-Bronze age **(f)** Iron age.

2.1 Family- Definition and typology family household and domestic groups. Basic structure and functions: Stability and changes in family. Typological and processual approaches to the study of family. Inpact of urbanizaton, Industrializaton, education and feminist movements. Universality of family- critique. **2.2** Concept of kinship: Definition of kin, incest prohibition and exogamy and endogamy Principles of descent-types and functions. Political and jural aspect of kinship. Unilineal, bilateral and double descent. Descent, filiation and complementary filiation. Kinship terminology typology and approaches to the study to terminology Alliance and descent. **2.3** Marriage- Definition, types and variation of marriage systems. Debates on the Universal definition of Marriage. Regulation of Marriage preferential, prescriptive, Prescriptive and open system. Types and form of marriage Dowry, brode-price, pestation and marriage stability. **3.1** Study of culture, patterns and processes, concept of culture, patterns of culture, relationships relationship between culture and civilization and society. **3.2** Concept of Social Change and cultural change 3.3 Social structure and social organization, Role-analysis and social network, institutions, groups community, Social Stratification: principles and form, status, class and power, gender, nature and types of mobility. **3.4** Concept of society **3.5** Approaches to the study of culture and society-classical evolutionism-neo-evolutionism culture ecology, historical particularism and diffusionism, structural- functionalism, culture and personality, transaction-alism, symobolism cognative 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 function and functionaries: Priest, saman, medicine men and sorcerers. Symbolism in religion and rituals. Ethnomedicine. Myths and rituals: definitions and approaches to their study- structural, functonal and processual relation with economic and political structures. **5.1** Meaning, scope and relevance, principles governing producton, distribution and consumption in communities subsisting on hunting-gathering, fishing, pastoralism, horticulture and other economic pursuits. Formalist and subtantivlst date-Daltan, Kart-polyanny and marx approach and. News Economic Anthropology, Exchange. Gifts, barter, trade, ceremonial exchange and market economy. **5.2** Theoretical foundations. Types of political organisatonband, tribe, chiefdom, State, concept of power, authority and legitimacy, Social Control, Law and Justice in tribal and peasant Societies. **6.1** Concepts of development Anthropological perspective. Models of development. Critiques of classical developmental theories. Concepts of planning and planned development. Concept of participatory development. Culture ecology and sustainable development. Displacement and rehabilitation. **7.1** Concepts of research in anthropology, subjectivety and reflexivity in terms of gender class ideology and ethics. Distinction between methodology, methods and techniques. Nature and explanation in anthropological research, positivistic and non-positivistic approaches. Comparative methods: nature purpose and methods of comparison in social and cultural anthropology. Basic techniques of data collection. Interview, participant and other forms of observaton, schedules, questionnaire, case-study methods, extended case study methods, life histories and secondary sources. Oral history, generalogical method, participatory, learning and assessment (PLA). Participatory rapid assessment (PRA). Analysis, interpreatation and presentation of data. **8.1** Concept, Scope and major branches of human genetics. Its relationship with other branches of science and medicine. **8.2** Method for study of genetic principles in man-family study (pedegree analysis twin study foster child, co-twin methods, cytogentic method, chromosomal and karyotype analysis), biochemical method, immunological methods, D.N.A. technology and recombinant technologies. **8.3** Twin study method-zygosity, herritability estimates, present status of the twin study method and its applications. **8.4.** Mendelian genetics in man-family study, single factor, multifactor, lethal, sub-lethal, and polygenic inheritance in man. **8.5** Concept of genetic polymorphism and selection, Mendilian populaton, Hardy-Weinberg law. causes and changes with bring down frequency-mutation, isolation, migration selection, inbreeding and genetic drift. Consanguineous and non-consanguineous mating. Genetic load, genetic effect of consanguineous and cousln marriages (statistical and probability methods for study of human genetics). **8.6** Chromosomes and chromosomal aberrations inman methodology **(a)** Numerical and structural aberrations (dis-orders) **(b)** Sex chromosomal aberrations- Kinefelter (XXY), Turner (XO) super female (XXX) Intersex and other syndomic disorders. **(c)** Autosomal aberrations- Bown Syndrom, patau Edward and cri-du-chat syndromes. **(d)** Genetic imprints in human disease, genetic screening, genetic counselling, human DNA profiling gene mapping and genome study. **8.7** Concept of race in histrological and biological perspective. Race and recism, biological base of morphological variation of non-metric race in histrological and biological perspective. Race and racism, biological basis of morphological variation of non-metric and metric characters. Racial criteria, racial traits in relation to heredity and environment: biological basis of recial classification, recial differenctial and reac- corossing in man 8.8 Ethinic group of mankind-charcteristes and distribution in world, recial classification of human groups. Principal living peoples of world. Their distribution and characteristics. **8.9** Age, Sex and population veriation in genitc marker- ABO, RH blood groups, HLA, HP transferrin, Gm, blood enzymes-physiological characteristics- Hb level, body fat, pulse rate, respiratory functions and sensory perceptions in different cultural and socio-economic group. Impact or smoking air pollutions, alcoholism, drug and occupational hazards on health.**9.1** Concepts and Methods of Ecological Anthoropology Adaptation social and cultural Deteministics theories a critique. Resources-biological, non biofogical and sustainable development. Biological adaptation- climatic, environmental, nutritional and genetic.

10.1 Relevance in understading of contemporary society-Dynamics of ethincitiy at rural, tribal, urban and international levels. Ethric confilicts and political developments. Concepts of ethnic boundaries. Ethnicity and concept of nation state. **11.1** Concept of human growth of development-stages of growth-prenatal, natal, intant, childhood adolescence, maturity, senescence, Factors affecting growth and development genetic, environmental, biochemical nutiritiona, cultural and socio-economic ageing and sensescence. Theories and observations-biological and chronological longevity. Human physique and somatotypes. Methodologies for growth studies. **12.1** Reproductivity biology, demography and population study, Reproductive physiology of male and female, Biological aspects of human fertilitiy, Relevance of menarche, meno-pause and other bioevents to fertility. Fertily patterns and differentials. **12.2** Demographic theories biological, social and cultural. **12.3** Demographic methods-census, registration system, sample methods, duel reporting system. **12.4** Populations structures and population dynamics. **12.5** Domographic rates and ratios, life table-structure and utility **12.6** Biological and socio-ecological factors influence fecundity, fertility natality and morality. **12.7** Methods of studying population growth. **12.8** Biological consequences of population control and family welfare. **13.1** Anthropology of sports **13.2** Nutritional Anthropology. **13.3** Anthropology in designing of defence and other equipments. **13.4** Forensic anthropology. **13.5** Methods and principles of personal identification and reconstruction. **13.6** Applied human genetics, -paternity diagnosis genetic counselling and eugenics. **13.7** DNA techonlgy-prevention and cure of diseses. **13.8** Antropo-genetics in medicine. **13.9** Seronetics and cytogenetics in reproductive biology **13.10** Application of Satistical principles in human genetics and Physical Anthropology.

Paper- II

1. Evolution of the India Culture and Civilization-Prohistoric (Paleolithic, Mesolithic and Neolithic,) Protohistoric (Indus Civilization). Vedic and post-vedic beginnings. Contributions of the tribal cultures. **2.** Demographic profiles of India- Ethinic and lingustic elements in the Indian population and their distribution. Indian population, factors influencing its structure and growth. **3.** The basic structure and nature of traditional India social System-a critique. Vamasharam, Purushartha, Karama, Rina and Rebirth. Theories on the orgin of caste system, Jajmani system. Structrual basis inequality in traditional Indian Society. Impact of Buddhism, Jainism, Islam and Christianity of Indian Society. **4.** Emergence, growth and development of antroprology in India-contributions of the 19th Century and early 20th Century scholar-ad-ministrators Contributions of Indian anthropologists to tribal and caste studies. Contemporary nature of anthropological studies in India. **5.** Approaches to the study of India society and culture-traditional and contemporary. **5.1** Aspect of Indian village- Social organization of agriculture, impact of market economy of Indian villages. **5.2** Linguistic and religiousminorities-Social, political and economic status. **6.** Tribal situation of India-biogenetic variability, lingustic and socio-economic characterstiecs of the tribal populations and their distribution. Problems of the tribal communities and alienation, proverty indebtedness, low litracy, poor educational facilities, unemployment, under employment, health and and nutrition. Developmental projects-tribal displacement and problems of rehabilitation. Development of forest policy and tribals. Impact of urbanization and industrialization on tribal and rural populations. **7.** Problems of exploitation and deprivation of Scheduled Castes/ Scheduled Tribles and other Backward Classes. Constitutional safeguards for Scheduled Tribes and Scheduled Castes. Social change and contemporary tribal societies: Impact of modern democratic institutions, development progarmmes and welfare measures on tribals and weaker sections. Emergence of ethnicity, tribal movements and quest for identity. Pseudo- tribalism. **8.** Social change among the tribes during colonial and post-independent India. **8.1** impact of Hinduism, Christianity, Islam and other religious on tribal societies. **8.2** Tribe and nation state- a comparative study of tribal communities in India and other countries. **9.** History of administration of tribal areas; tribal policies, plans programmes of tribal development and their implemention. Role of N.G.Os. **9.1** Role of anthropology in tribal and rural development. **9.2** Contributions of anthropology to the understanding or regionalism copmmunalism and ethnic and political movements.

22. CIVIL ENGINEERING : PAPER –I PART-'A'

(a) Theory of Structures : Principles of superposition: receprocal theorem; unsymmetrical bending: Determinate and indeterminate Strcture; simple and space frames: degree of freedom: virtual work; energy the orem; deflection off trusses; indeterminate beams & frames three months: equation; siope deflection and moment; distribution methods; column analcgy. Enegy menthods; appoximate and numerical methods Moving Loads shearing force and bending moment diagrams, influence fines for simple and continuous beams. Analysis of determinate and ideterminate arches. Matrix methods of analysis, stiffness and and flexibility matrice **(b)** Steel Design: Factors of safety and load factors; Design tension; compression and flexural members; built up beams and plategirders semi-rigid connection Design of Stanchions, slabs and gusseted bases; gentry girders; roof trusses; industrial and multistoreyed buildings, plastic design of frames and portais **(c) R.C. Design:** Working strees and limit State methods of design: Design of slabs, Simple and continuos beams rectangle T& L sections, columns. Footing-single and combinate raft foundations, Elevated water tanks, encased beams and columns, Methods and systems of prestressing: anchorages, losses in prestress.

Part- B

(a) Fluid Mechanics : Dynamic of fluid flow - Equations of continuity. engery and momentum. Bemoulli's theorem; caviation. Velocity potential and steam function, rotational and irrotational flow. free and forced vertices flow nit Dimenslonal analysis and its; application to practical problems. Viscous flow-flow between static and moving parallel plates-flow through circular tubes; film lubrication. Velocity disribution in laminer and turbulent flow: critical velocity; Losses, Stampton diagram Hydraulic and energy grade fines, siphons; pipe network- Forces on pipe bends. Compressible flow, Adiabatic and isentropic flow, subsonic and supersonic velocity; Mach number shock wave, water hammer. **(b) Hydraulic Engineering :** Open channel flow- uniform and non-unfirms flow, beat hydraulic cross-section; Specific energy and critical depth, gradually varied flow; classification of surface profiles; control section; standing wave flume; Surges and waves. Hydraulic pump. **Design of canals :** Unlined channel in ailuvium, the critical tractive stress, principles of sediment transport, regime theories lined charnels; hydraulic design and coms analysis; drainage behind lining. **Canal structure:** Designs of regulations work; cross drainage lalls, apeducts, metering flumes etc. Canal outlets. **Diver Headworks:** Principle of design of different part on impermeable and permeable foundations; Khosla's theory; Energy dissipation. Sediment exclusion. **Dams :** Design of rigid dams, earth dams, forces acting on dams stability analysis, spillways-different types and their suitability. Design of spillways. **(c) Wells and Tube wells:** Soil Mechanics and foundations Engineering. Soil Mechanics. Origin and classification of soils: Atterburg limit, void ratio; moisture contents; permeability; laboratory and field tests, seepage and flow nets, flow under hydraulic structures. Uplift and quik sand condition, unconfined and direct shear tests; triaxial test; earth pressure thories, stability of slopes. Theories of soil consolidation; rate of settlement Total and effect stress analysis, pressure distribution in soils; Boussinsque and westerguard theories. Soil stabization in foundation Engineering, Bearing capacity of Footing; pills and wells, design of retaining walls; sheet piles and caissons, Machine foundations.

PAPER- II (PART- A)

(a) Building Construction : Building Materials and construction- fimber, stone, brick, cement, steel sand, mortar, concrete, paints and varnishes, plastics, water proofing and damp proofing materials, Detailing of walls, floors, roofs, staircases doors and windows. Finishing of building plastering. pointing. painting, etc. Use of building codes. Ventilation, air conditioning, Building estimates and specifications. Construction scheduling PERT AND CPM methods, base chars. **(b) Railways and Highways Engineering : Railways –** Permanent way ballast, sleeper, chair and fastenings; point and crossings, different types of turn outs, cross-over setting out of points. Maintenances of track super elevation, creep of rails, ruling gradients, track resistance reactive effort curve resistance, Station yards and machines, station buildings; platform sidings, turn tables. Signals and interlocking; level crossings.

Road and Runways : Classification of roads planning geometric design. Design of flexible and rigid pavements; subbase and weathering surfaces. Tram engineering and traffic survey, intersections roads signs, signals and markings.

(c) Surveying : Plan table Surveying Equipment & methods, solution of 3 & 2 point problems. Errors and precautions. Triangulation. Grades Baseline and its measurement. Statelite station, intervisibility of stations; Great Trigonometrical Survey of India. Errors and least squares method general methods, of least quares method with interdisciplinary approach. Adjustment of level nets and triangular nets. Matrix notation solution. Layout of curves; Simple, compound, reverse transition and vertical curves. Projects surveys and layout of Civil Engineering works such as buildings, bridges, tunnels and hydroelectric project. Introduction to photogrammetry and Remote sensing.

PART- B

(a) Water Resources Engineering : Hydrology-Hydrologic cycle: precipitation; evaporation- transpiration and infiltration hydrographs; units hydrograph; units hydrograph: Flood estimation and frequency. Planning for water Resources Ground and surface water resources; surface flows. Single and multipurpose projects storage capacity, reservoir losses; reservoir silting flood routing. Benefit cost ratio, General Principles of optimization. Elements of water Resources management. Water requirements for crops-quality of irrigation water, consumptive use of water, water depth and frequency of irrigation; duty of water; irrigation methods and efficiencies. Distribution system for canal irrigations determination of required channel capacity channel losses. Alignment of main and distributary channels. Waterlogging its causes and control, design of drainage system; soil salinity. River training principles and methods storage worktypes of Dams (including earth dams) and their charcterisitics, principles of design, criteria for stability. Foundation treatment; joints and galleries. control of seepage. **(b) Sanitation and water supply :** Sanitation-site and orientation of Buildings, ventilation and damp-proof course house drainage; conservancy and water-borne system of waste disposal sanitary appliances, latrines & urinals. **(c) Environmental Engineering :** Elemetary principles of echology and eco systems and their inter-action with environment. Engineering activitiy and environment pollution. Environment and its effect on human health and activity. Air environment: major pollutants and their adverse effects, types of are cleaning devices. Water quality; parameters, advers effects, monitoring, salt purification of streams. Solid wastes; collecting system and disposal methods, their selection and operation. Typical feature of water distribution systems; Demand, available need network analysis, storage, corrosllon. **Typical features of sewerage systems:** Permissible velocities. Partial flow in circuler servers, non-circuler section, corropsion in servers, construction and maintenance sewer appurtenances. Pumping of sewage, pumbing standards and systems, environmental management.

23. MECHANICAL ENGINEERING: PAPER-1 (PART- A)

1. Theory of Machines : Kinematics and dynamic analysis of planer mechanism. Belt and chain drives, Gears and gear trains. Cams. Flywheel. Govermors. Balancing of rotations and reciprocating masses. single and multi cylinder engines. Free, forced and damped vibrations (single degree of freedom) Critical speeds and whirling of shafts. Automatic controls.

2. Machanics of Solids : Stress strain relationship and analysis (in two dimensions). Strain energy concepts. Theories of failure. Principal stresses sand strains. Mohr's construction. Uniaxial loading. Thermal stresses. Beams bending mement shear force, ending stresses deflection. Shear stress distribution. Torsion of shafts. Helical springs. Thin and thick walled pressure vessels . Shrink fafs Columns. Rotating discs. **3. Engineering Materials :** Structure of solids-basic concepts. Crystalline materials imperfections. Alloys and binary phase diagram-Structures and properties of common engineering materials and applications. Heat treatment of steels. Polymers. Ceramics. Composed materials.

Continued....

PART- B

4. Manufacturing Science : Manufacturing process basis concepts mechanics of Metal cuffing. Merchant's force analysis. Toyjor's tool life equation. Machaniability. Economics of machining. Aldomadion. NC and CNC. Recend machining method-EDM, ECM, EMB, LMB, PAM and USM. Analysis of forming proceses. High energy rate forming. Jigsand fudures.Cutting tools Gauges, Inspection of lengths angles and surface finish. **5. Manufacturing Management :** Product development. Value analysis. Braeak even analysis. Fore-casting techniques Operations Scheduling. Capacity planning. Assembly Fine balancing. CPM and PERT Inventory control. ABC analysis, EOQ model, Material requirement. Planning Job design, Job standards. Method study and work measurement. Quality management. Qulaity analysis, Control chart. Acceptance sampling. Total quality management. Operations research. linear programming. Graphical and simplex method. Transportaion and assignment models. Sinigle serve quencing model. **6. elements of Computation :** Computer organization. Flow charting features of common computer languages. Fortran. Dbase, Lotus, 1-2-4, c. Elementary programming.

PAPER – II (PART- A)

1. Thermodynamics : Basic concepts First law and its application. Second law its corollaries and applications. Maxwell and T-ds equation. Clapeyron equation. Availabiltiy and irrevensibility. **2. Heat Transfer :** Laws of heat transfers One and two dimensional steady stase heat conduction. Heat transfer from extended surfaces. One dimensional unsteady stase heat conduction. Free and forces convective heat transfers Dimensional analysis. Heat exchanges. Radiation laws. Shape factors. Heat exchanges between black and non-black surfaces. Network analysis. **3. Referigeration and Air conditioning.** Vapour compression, absorbtion, steam jet and air refrigeration system. properties of refrigerants, compressors. condensers. Expansion value and evaporators. Psychrometric processes. Comport zones. Cooling load calculations. All the year round air conddioning systems.

PART – B

4. Internal Combustion Engines : SI and CI engines. Four stroke and two stroke engines. Valve timing diagrams. Combustion phenomena in SI and CI. engines. Detonation and knocking. Choice of engine fuels, Octane and cetane ratings. Combustion of fuels. Engines emission and controls Engine trial. **5. Turbonachines:** Classification of turbonachines continuity. momentum and energy equation. Adiabatic and isentropic flow. Flow analysis in axial flow compressors and turbines. Flow analysis in centrifugal pumps and compressors. Demensional analysis and modeling. Performance of pumps, compressors and turbines. **6. Power plants :** Selection of site for steam, hydro, nuclear and gas power plants. Modern steam generators. Draft and dust removal equipments. Fuel and cooling water system. Thermodynamic analysis of steam power plants.

Governing of turbines : Thermodynamic analysis of gas turbines power plants. Non-conventional power plants sloar thermal and wind generator. Economic power generation.

24. ELECTRICAL ENGINEERING: PAPER-1

(i) E.M. Theory. Analysis of Electrostatic and magetostatic Fields, Lapaice Poisson & Maxwell's equation. Electromagnatic wave and wave equations. Poynting's Thorem. Waves on transmission fines. Wave guides. Microwave resonators **(ii) Networks & Systems,** Systems and signals, Network Theorems and their application. Transient and steady stase analysis of systems. Transform techniques and circuit analysis, Couppled circuits. Resonant circuits Balanced three phase circuits. Network functions. Two part network. Network parameters. Elements of network synthesis. Elementary active networks **(iii) Electrical & Electronic Measurement &Instrumentation** : Basic methods of Measurement. Error anlysis, Electrical Standards. Measurment of voltage, Current, power energy, power factor, resistance, inductance, capacitance, frequency and loss angles. Indicating instruments. DC and AC Bridges, Electronic measuring instruments. Mulitimeter, digital voltmeter, frequency counter, Q-meter, oscilloscope Techniques special purpose CROs. Transducers and their classification. Temp Displacement, strain pressure, velocity transducers, Thermmo-couple, thermistor, LVDT, strain gauges. piezo-electric crystal etc, transduers. Applications of tranducers in the measurement of non-electrical quantities like pressure, temperature, displacement, velocity. acceleration, flow-rate etc. Data-acquisition systems. (iv) Analog & Degital Electronics: semiconductors and semiconductor diodes & zener-diode/ Bi- polar junction transistor and their parameters. Transistor biasing, analysis of all types of amplifiers including feedback and d.c. amplifiers. Operational amplifiers and their application, Analog computers. Feedback oscillators-colpitts and Hartley types, waveform generators. Multivibrators. Boolean algebra. Logic gates. Combinational and sequential digital circuits. Semiconductor memories. A/D & D/A comverters. Microprocessor. Number system and codes, elements of miceroprocessors & their important applications. **(v) Electrical Machines :** D.C. Machines; commutation and armature reaction, characteristics and performance of motors and generators. Applications, starting and speed control. Sychronous generators: Armature reaction, voltage regulation parallel operation. Single and threephase inducticon motors. Principle of operation, performance characteristics, staring and speed control. Syanchronous Motors. Principle of operation performance analysis, Hunting. Synchronous condensera. **Transformers :** Construction phase of diagram, equivalent circuit, voltage regulation. Perfomance, Auto transformers, in instrument transformers. Three phases transformers. **(V) Material Scienc:** Theory of Semiconductors. Conductors and insulators. Superconductivity. Various insulators used for Electrical and Electronic applications. Different magnetic materials, properties and applications. Hail effect.

Paper- II (Section A)

1. Control Engineering : Mathematical Modelling of physical dynamic systems. Block diagram and single flow graph. Transfer function. Time response and frequency response of linear systems. Error evalution Blode- Plot, Polar Plot and Nichol's chars, gain Margin and phase Margin Stability of linear feedback control systems. Routh-Hurwitz and Nayquist criteria. Route focus technique. Design of compensators. State-variable methods in system modelling, analysis and design. Controllability and observability and their testing methods. Polo placement design using state variables feedback. Control system components (Potentiometers, Tachometers, Synchors & Servomotors). **2. Industrial Electronics :** Various power semiconductor devices. Thyristor & its protection and series- parallel operation. Single phase and polyphase rectifiers. Smoothing filters, D.C. regulated power supplies. Controlled converters and inventors, choppers. Cyclo-converters A.C. voltage regulators. Application to variables speed, drives induction and dielectric heating. Timers and welding circuits.

SECTION - B (HEAVY CURRENT)

(3) Electrical Machines : 1. Fundamentals of electromechanical energy conversion. Analysis of electromagnetic torque and induced voltages. The general torque equation. 2-3- Phase induction motors: Concept of revolving field. Induction motor as a transformer. Phase or diagram and equivalent circuit. Performance evaluation. Correlation of induction motor operation with basic torque relations. Torque-speed characteristics. Circle diagram starting and speed control methods. **3. Synchronuos Machines :** Generation of e.m.f. Linear and non-liner and analysis. Equivalent circuit. Experimental determimation of leakage and synchronous reactances. Theory of salient pole machines. Power equation. Parallel Operation. Transient and subtransient reactences and time constants. Synchronous motor. Phasor diagram and equivalent circuit. Performance, V-curves. Power factor control, hunting. **4. Special machines :** Tow phases a.c. servomotors. Equivalent circuit and performance stepper motors. Methods of operation, Drive amplifiers. Half stepping. Reluctance type steppor motor, Principles and working of universal motor. Single phase a.c. compersated series motor. Principle and working of charge motor.

(4) Electric Drives : Fundamentals of electric drive Rating estimation. Electric braking. Electromechanical transients during staring and braking & time and energy calculations. Load equalization. Solid State control of d.c. three phase induction and synchronous motors. Applications of electric motors. **(5) Electric Traction :** Various Systems of track electrification and their comparison. Mechanies of train movement. Estimation of tractive effort and energy requirement. Electification and their comparison, Mechanics of train movement Estimations of tractive effect and energy requirement Traction motors and their characteristics. **(6) Power Systems and Protection : 1. Types of Power Station :** Selection of site. General layout of thermal hydro and nuclear stations. Economics of different types. Base load and peak load stations. Pumped strorage plants. **2. Tranamision and Distribution :** A.C. and D.C. Transmission systems. Transmission fine parameters and calculations. Performance of short. Medium and long transmission fine A.B.C.D. parameters. Insulators. Mechanical design of overhead tramsmission fines and Sag calculation, corona and its effects, Radia interference. EHV AC and HVDC transmission fines undeground cables. Per unit representation of power system. Symmetrical and unsymmetrical fault analysis. Symmetrical components and their applicaton to fault analysis. Load flow analysis using gauss-seidal and Newton-Raphson methods. Fast de-coupled load flow. Steady state and transient stability. Equal area criterion Economic operation and power system incremental fuel costs and fuel rate. Penalty factors. ALFC and AVR control for real time operation of inter connected power system. **3. Protection :** Principal of arc extinction, Classificaltion of circuit bravke. Restriking phenomenon. Calculation of restriking and recovery voltages. Interruption of small inductive and capacity Ne currents. Testing of Circuh Breakers. **4. Relaying Principles :** Primary and back-Up relaying over current, differential impedance and direction relaying principles. Constructional details. Protection schemes for transmisson fine transformerj generator and bus protection. Current and potentiel transformer and their applications in relaying traveling waves. Protection against surges, Surge impedance.

(Or)

SECTION - C (Light Current)

(7) Communication Systems : Amplitude. Frequency and phase modulation and their comparison. Generation and detection of amplitude frequency, phase and pulse modulated signals using oscillators. Modulators and demodulators. Noise problems Channel efficiency. Sampling theorem. Sound and vision broadcast transmitting and receiving systems. Antennas and feeders. Transmission fines at audio, radio and ultrahigh frequencies. Fiber optics and optical communication systems. Digital communications pulse code modulation. Data communication state-lide communication. Computer communication system-LANISDN ect. Electronic Exchanges. **(a) Microwaves :** Electromagetic waves unguided media wave guides. Cavity resonators and Microwave tubes, Magnetrons, Klystrons and TWT. Solid State microave devices. Microwave amplifiers. Microwave receivers Microwave filters and measurements. Microwave antennas.

25. English Literature : Paper –1

Detail study of literary age (19th century): the paper will cover the study of English Literature from 1798 to 1900 with special reference to the works of Willian Word worth, Coleridge, Shelly, Keats, Lamb, Hazlitt, Thackeray. Dickens. Tennyson, Robert Browning, A.C. Swinehurne, D.G. Rossetti, Carlyl and Ruskin. The candidates will be required to evince first hand reading. The paper will be designed to test candidates through understanding of the main literary trends during the period with reference to the authors prescribed. Questions on the social and cultural background to the period will be also set.

Paper – II

The paper will be designed to test candidates first hand reading of the text alomgwith their ability to examine literacy problems critically. **1. William Shakespeare :** Twelth Night Henry IV Pt. J. Hamlet, The Tempest. **2. John Milton :** Paradise Lost Book-1 & II 3. Jane Austen: Pride and Prejudice. **4. W. Wordsworth :** "Immortality Ode" "Tintern Abbey" **5. Dickens :** Great Expectations. **6. Graham Green :** The power and the Glory. **7. William Golding :** Lord of the Flies. **8. W.B. Yeats :** "The Second Coming" "Bizanlium", "Sailing to Bizanlium", "A Prayer for my Daughter". "Leda and the Swan". **9. T.S. Eliot :** The Wasteland. **10. D.H. Lawrence**. Sons and Lovers.

26. URDU PAPER-1 : PART- A

(1) Development of Urdu Language, (a) Western Hindi and its dialects mainly Khari Boli, Braj Bhasha and Haryanvi. **(b)** Persio-Arabic elements in Urdu. **(c)** Urdu Language from 1200 AD to 1700 AD **(d)** Different theories of the origin of Urdu language. **(2) (a)** Development of Urdu Literature in Deccan **(b)** Two Classicial Schools of Urdu poetry- Delhi & Lucknow, **(c)** Development of Urdu prose upto Ghalib **(3) (a)** Aligarh movement. Romantic trends of progressive movement and their impact on Urdu Literatue.**(b)** Urdu literature after independence.

Part - B

(1) Important genesis of poetry- Ghazal, Qasida, Marsiya, Masnavi Rubai. Quata Naam. Blank Verse. Free Verse **(2)** Importance of prose – Destan, Novel Short Story. Darma. Literacy Criticism. Biography, Essay. **(3)** Role of Urdu literature in freedom movement.

PAPER - II

This paper will require first hand reading of the texts prescribed and will be designed to test the candidates critical ability.

PART - A (PROSE)

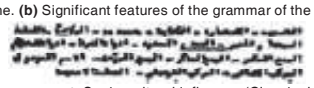
(1) Meer (Amman) : Bagh-o-Bahar. **(2) Ghalib:** Intakhab-e-Ghalib. Ed: Dr. Khaliq Anjum. **(3) Hali :** Muqaddam-e-sher-o-Shairi. **(4) Ruswa :** Umrao Jan Ada **(5) Prem Chand :** Prem Chand ke Numainda Afsaney, Ed. Prof. Qamar Rais. **(6) Abul Kalam Azad :** Ghubar-e-Khatir. **(7) Imtiaz Ali Taj :** Anarkali. **(8) Quratul Ain Hyder :** Akhir-e-Shab ke Hamsufar.

PART- B (POETRY)

(9) Meer : Intakhab-Kalam-e-Meer, Ed: Abdul Haq. **(10) Sauda :** Qasaid-e-Sauda (including Hajuriyat) **(11) Ghalib :** Diewan-e-Ghalib. **(12) Iqbal :** Kulliyat-e-iqbal (Bal-e-Gibrail only) **(13) Josh Malihabadi :** Safi-o-Nagma **(14)**, Firaq Gorakhpuri: Gul-e-Naghma. **(15) Faiz :** Nuskhaha-e-Wafa (Naqsh-e-Fariadi, Dast-e-Saba, Zuridamm Nama only). **(16) Akhtar-ul-Imam :** Sar-o-Saman (Treek Salyara ke Bar, Bint-e-Lamhat only)

27. ARABIC : PAPER –1

1. (a) Origin and development of the language in outline. **(b)** Significant features of the grammar of the language and Rhetorich **The following topics.**



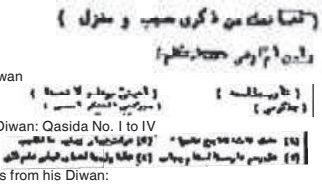
2. Literary History and Literary Criticism : Literary movement. Socio-cultural influence (Classical Background) and modern trends. Origin & Development of modern literary generous including novel, short story, drama & essay.

PAPER – II

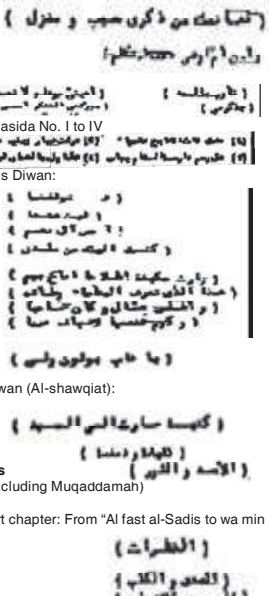
This paper will require first-hand reading of the text prescribed and will be designed to test the candidate critical ability.

SECTION A: Poets

1. Imraul Qasis : His Mullaqah: (Complete)
"Qifa Nabki min Zakra Habibbin was Manzili"
2. Zuhair bin Abi Sulma : His Mullaqah (complete)
"A min Ummi Aufa Diminatum lam takallami"
3. Al- Khansa : The following two elegies from her Diwan
i) Ta' azzara Bial-majd (Complete)
ii) Uzakkiruni (Complete)
4. Hasan bin Thabit : The following Qasaid from his Diwan: Qasida No. I to IV



5. Umar bin Abi Rabiyah : The following four Ghazals from his Diwan:
i) Fa jamma Tawaqafana (Complete)
ii) Lalita Hindan (complete)
iii) Aman Aal Niam (complete)
iv) Kitab (complete)
6. Al-Farazdaq : The following 4 Qasaid from his diwani
i) In praise of Umar bin Abd al-Aziz (complete)
ii) In praise of Zain al-Abidin Ali bin Hasan (complete)
(iii) Wa Atlasa Assalin Wa Kana Sahiba (Complete)
iv) WA Kumin Tanamuha li Adhyal Ainan (Complete)
7. Abu Tammam : The following two from his Diwan:
i) Yarudahu Aba-hasan (complete)
ii) Al wa'z wa al Zuhd (Complete)
8. Ahamad al Shawqi : The following four Qasaid from his Diwan (Al-shawqiat):
i) Masjid Aya Sufiyah (Vol. II) (complete)
ii) Ghaba Bulunia (vol.II) (Complete)
iii) Salamun Min Saba (Vol. II) (complete)
iv) Al- Hamziah al- Nabawiyah (Vol.I) (complete)



SECTION B: Authors

1. Iban a Maqaffa : "Kalila wa Dimna" Chapter (Complete) (excluding Muqaddamah)
"Al-Asad Wa Al-Thaur"
2. Ibu Khaaldum : Muqadamah, 39 Pages, part Six from the firt chapter: From "Al fast al-Sadis to wa min Faruihi aljabr- wa - al Muqabilah".
3. Al-manfaluti : Al- Nazarat Vol 1 Egypt 1950
The following stories:
i) Al-sidq wa al - kizb
ii) Al-Bauz wa allnsan
iii) Fi sabit Al - Ihsan
iv) Al-ghani wa al - Faqir
4. Ahamd Amin : Hayati (Autobiography complete)
5. Taufiq al - Hakim : Drama: "Shahr Zad (complete)

Section - C

Translation from Urdu to Arabic.

Note: Candidates will be required to answer some questions carrying not less than 10 per cent marks in Arabic also.

28.हिन्दी साहित्य: प्रथम प्रश्न-पत्र (भाग-1)

हिन्दी भाषा तथा नागरीलिपि का इतिहास

1.पाली, प्राकृत एवं अपभ्रंश तथा पुरानी हिन्दी का संक्षिप्त अध्ययन। 2.मध्य काल में ब्रज और अवधी का साहित्यिक भाषा के रुप में विकास। 3.खड़ी बोली गद्य भाषा का विकास। 4.राजभाषा, सम्पर्क भाषा, राष्ट्रभाषा एवं मानक भाषा के रुप में हिन्दी। 5.वैज्ञानिक और तकनीकी क्षेत्र में हिन्दी भाषा की स्थिति। 6.हिन्दी भाषा का क्षेत्र और अवधी, ब्रज, खड़ी बोली, भोजपुरी, कुमांउनी का सामान्य परिचय 7.मानक हिन्दी का व्याकरणिक स्वरुप। 8.नागरीलिपि उद्भव और विकास, देवनागरीलिपि की समस्यायें और समाधान। 9.हिन्दी शब्द-सम्पदा।

भाग-2 हिन्दी साहित्य का इतिहास

1.हिन्दी साहित्य के इतिहास लेखन की परम्परा। 2.हिन्दी साहित्य के इतिहास में काल विभाजन तथा नामकरण। 3.आदिकाल: भक्तिकाल, रीतिकाल, आधुनिक काल की प्रमुख प्रवृत्तियां। 4.आधुनिक काल: पुर्नजागरण और भारतेन्दु काल, द्विवेदी युग, छायावाद, प्रगतिवाद, प्रयोगवाद नयी कविता एवं परवर्तीकाव्य धारायें: **(क) हिन्दी उपन्यास, हिन्दी कहानी, हिन्दी नाटक:** उद्भव विकास एवं इनकी आधुनातन प्रवृत्तियां।**(ख)** हिन्दी निबन्ध तथा अन्य गद्य विधायें: रेखाचित्र, सस्मरण, यात्रा वृतांन्त। **(ग)** हिन्दी आलोचना का प्रारंभ और विकास: प्रमुख आलोचक: रामचन्द्र शुक्ल, नन्ददुलारे वाजपेयी, हजारी प्रसाद द्विवेदी, नागेन्द्र, मुक्तिबोध, रामविलास शर्मा, नामवर सिंह।

हिन्दी साहित्य : द्वितीय प्रश्न-पत्र भाग- प्रथम

इस प्रश्न-पत्र में निर्धारित रचनाओं में से व्याख्या एवं उन पर आलोचनात्मक प्रश्न पूछे जायेंगे।कबीर ग्रन्थावली, सम्पादक-श्याम सुन्दर दास, साखी संख्या 1 से 100 तक और पद संख्या 1 से 20 तक।

सूरदास (भ्रमर गीत सार) सम्पादक-रामचन्द्र शुक्ल, प्रारम्भ से एक सौ पद तक, तुलसीदास- रामचरित मानस उत्तरकान्ड। जायसी (पदमावत), सम्पादक-रामचन्द्र शुक्ल (सिंहलदीप खण्ड और नागमती वियोग खण्ड) बिहारी संग्रह (प्रारम्भ से 100 दोहे तक) हिन्दी परिषद प्रकाशन, इलाहाबाद।

जयशंकर प्रसाद: कामायनी: (चिन्ता और श्रद्धा सर्ग) सुमित्रानन्दन पन्त-नौका विहार, परिवर्तन, निराला-राम की शक्ति पूजा, अज्ञेय-असाध्यवीणा, मुक्तिबोध-ब्रह्मराक्षस, नागार्जुन-बादल को घिरते देखा है, अकाल के बाद।

भाग द्वितीय

भारतेन्दु हरिश्चन्द्र-भारत दुर्दशा, जयशंकर 'प्रसाद'-स्कन्द गुप्त, रामचन्द्र शुक्ल, चिन्तामणि भाग-एक (कविता क्या है, श्रद्धा और भक्ति)। प्रेमचन्द्र-गोदान, प्रेमचन्द्र

की सर्वश्रेष्ठ कहानियां, सम्पादक अमृतराय, यशपाल-दिव्या, फणीश्वर नाथ 'रेणु' मैला आँचल।

29. PERSIAN : PAPER - 1

Unit - 1-1. Short essay in Persian (Compulsory.)

Unit - II - 2. (a) Origin and development of the language. (Old Persian, Pahlavi, Modern Persian). (b) Applied Grammar. **(c)** Rhetorics. **(d)** Prosody (Bahr-i-Hazaj Kamil, Bahr-i-Motaqarib Mahzuf/Maqsur, Bahr-i-Rajaz Kamil). Asbab, Autad, Fawasil, Haruf-i-Qafia.

Unit - III - 3. Literary History, Criticism, Movements; Socio-cultural influences, Modern Trends. **(a) Samanid Period:** (Important Poets and Writers) **(b) Ghazanavid Period :** (Firdaus) Runi, Masud Sad-i-Salman, Tarikh-i-Baihaqi). **(c) Saljuquid Period :** (Anwari Attar, Khayyam, Kimya-i-Saadat, Chahar Maqala, Siyasat Nama). **(d) Ilkhanid Period :** (Sa'di, Rumi, 'Jame'-ut- Tawarikh, Tarikh-i-Jahan Kusha). **(e) Timurid Period :** (Hafiz, Salman Saoji, Khaju-i-Kirmani, Zafar Nama-i-Sharfuddin Yazid, Tazkira-Daulat Shah Samarqandi, Jami) **(f) Indo-Persian Literature :** (Aufi, Khusrau, Faizi, Urfi, Naziri, Abul Fazl, Tarikh-i-Firuz Shahi of Barani, Chahar Chaman of Brahman, Ghalib, Iqbal). **(g) Safavid to Modern Period :** (Mohtashim Kashi, Qaani, Malik-ushshu'ara Bahar, Nimayushi, Parwin-i-E'tesami, Simin Behbahani' Sadiq- i-Hedayat, Jamalzada, Hejazi,Sabk- i - Khurasani, Sabk-i-Eraqi, Sabk-i-Hindi, Islamic Revolution of Iran).

Unit - IV - 4 Translation of ten out of fifteen simple sentences of Urdu into Persian (Compulsory).

PAPER - II

The paper will require first hand reading of the texts prescribed and will be designed to test the candidates critical ability.

Unit - I - Prose - 1. Translation from the following texts : (a) Nizami Aruzi Samarqandi, Chahar Maqala (Dabire and Sha'iri). **(b)** i-i Shirazi Gulistan (Der Sirat-i-Padshahan and Dar Akhlaq-i- Derwishan) **(c)** Ziauddin Berani, Tarikh-i- Firuz Shahi (Wasaya- i- Sultan Balban be Ferzand-o-Wali Ahd- i- Khud). **(d)** Sadiq -i- Hidayat Dash Akul, Talab-i-Amorzish, Girdab).

Unit - II - 2. Critical and biographical questions about the prescribed authors and their works (4 questions).

Unit - III - Poetry - 3. Explanation from the following texts : (a) Firdausi. Shahnam (Dastan- i- Rustam- o- Sohrab and Dastan - i - Bizan- o - Maniza). **(b)** Umar- i- Khayyam. Ruba' yat (Radif Alif) **(c)** Maulana Rum, Mathnavi (Hikayat-i-Shaban- o- Musa, Hikayat-Hekayat - i - Hazrat Umar-- o- Qasid -i- Rum and Hikayat-i-Baqqalo-Tuti). **(d)**. Amir Khusrau. Ghaziliyat (Radif Alif). **(e)** Hafiz-i-Shirazi. Ghaziliyat (Radif Alif). **(f)** Urfi- i- Shirazi. Qasidas(Dar tausif - i - Kashmir and Madh-i-Shahzada Salim). **(g)** Bahar- a - Mashhadi Diwan-i-Bahar (Jughd-i-Jang, Shabahang, Damawandiya, Wataniya).

Unit - iv - 4 . Critical and Biographical questions regarding the poets and their work prescribed (4 questions)

Unit - v - 5 Translation of an unseen Passage from English into Persian.

30. SANSKRIT LITERATURE : PAPER-1 खण्ड-क-भाषा विज्ञान (Linguistics)

भाषा का उद्भव और विकास, भाषाओं की वर्गीकरण, भारतीय एवं मध्यकालीन भारतीय आर्यभाषाएं, अर्थपरिवर्तन की दिशाएं तथा कारण, ध्वनिनियम, ध्वनिपरिवर्तन के कारण, संस्कृत ध्वनियों के विशेष संदर्भ में मानवीय वाग्यन्त्र एवं लौकिक संस्कृत की तुलना।

Origin and development of language, Classification of languages. Indo-European and Middle Indo-European and Middle Languages, Semantics, Phonology, Phonetic changes, Human वाग्यन्त्र with special reference to Sanskrit phonology, comparision of Vedic and Classical Sanskrit languages.

खण्ड-ख संस्कृत व्याकरण (Sanskrit Grammer)

सन्धि, समास, कृदन्त, तद्धति एवं कारक from the Laghusiddhanta- Kaumudi

खण्ड-ग भारतीय दर्शन (Indian Philosophy)

निम्नलिखित पाठ्यग्रन्थों के आधार पर भारतीय दर्शन का सामान्य अध्ययन: General study of Indian Philosophy based on the following texts. केशव मिश्र का तर्कभाषा (अनुमानपर्यन्त) ईश्वरकृष्ण का सांख्यकारिका, सदानन्द का वेदान्तसार, कठोपनिषद-प्रथम अध्याय द्वितीय वल्ली मात्र। श्रीमद्भागवतगीता-द्वितीय अध्याय मात्र)

खण्ड - घ - काव्यशास्त्र

(क) आनन्दवर्धन कृत ध्वन्यालोक प्रथम उद्योत के आधार पर ध्वनि और उसके भेदों का सामान्य अध्ययन ध्वन्यालोक (प्रथम उद्योत) आनन्दवर्धन

(ख) मम्मट के काव्यप्रकाश से निम्नलिखित विषय: The following topic from the काव्य प्रकाश आफ मम्मट: काव्यप्रयोजन, काव्यलक्षण, काव्यभेद, शब्दशक्ति, रस, गुण तथा अनुप्रास, श्लेष, उपमा, रूपक, प्रत्क्षा, अपह्नुति, व्यतिरेक, अर्थान्तरन्यास, विभावना, विशेषोक्ति, स्वभाववोक्ति, समासेक्ति,दीपक, काव्यलिंग, एवं परिसंख्या अलंकार।

खण्ड - ड - संस्कृत में निबन्ध (Essay in Sanskrit)

संस्कृत में निबन्ध (250 शब्दों से कम का नहीं होना चाहिये) The Essay in sanskrit should not be less than 250 words.

PAPER- II खण्ड - क गद्य एवं पद्य (Prose & Poetry)

First hand reading of the following texts. निम्नलिखित पाठ्य ग्रन्थों का अध्ययन: 1. कादम्बरी-शुकनासोपदेश मात्र **2.** शिवराजविजयम-प्रथम निःश्वास मात्र **3.** नलचम्पू-प्रथम उच्छ्वास, आर्यावर्तवर्णन (28 श्लोकपर्यन्त) **4.** मेघदूत- (पूर्वमेघ) **5.** किरातर्जुनीयम् (प्रथम सर्ग) **6.** नीतिशतकम् चौखम्बा (संस्करण पद्य 1 से 30 तक)। 25 अंकों के एक प्रश्न का उत्तर संस्कृत में लिखना होगा।

खण्ड - ख संस्कृत नाट्य साहित्य (Sanskrit Drama)

निम्नलिखित रचनाओं की पाठ्यसामग्री का अध्ययन: Textual study of the following works: 1. अभिज्ञानशाकुन्तलम् (चतुर्थ अंक), **2.** उत्तररामचरितम् (तृतीय अंक), **3.**प्रतिमानाटकम् (प्रथम अंक), **4.** मृच्छकटिकम् (प्रथम अंक)।

खण्ड - ग- पारिभाषिक पद Technical Terms

संस्कृत के निम्नलिखित पारिभाषिक शब्दों का ज्ञान: Knowledge of the following Sanskrit technical terms: महाकाव्य, खण्डकाव्य, कथा, आख्यायिका, चम्पू, प्रस्तावना, विष्कम्भक, प्रवेशक, सूत्रधार, वस्तुभेद, नायक भेद, विदूषक, गेष्टमर्द, विट चेट, पताकास्थानक, अर्थप्रकृति, कार्यावस्था, पंचसन्धि, नियत श्राव्य, स्वागत, जनान्तिक, आकाशभाषित, रूपभेद, नेपथ्य, प्रेक्षागृह, मत्तवारणी।

खण्ड - घ - संस्कृत साहित्य का इतिहास (History of Classical Sanskrit)

Literature. निम्नलिखित साहित्यिक विद्याओं का उद्भव, विकास और उनकी विशेषताएं: (Origin, Development and characteristics of the following Literary genesis) आर्षमहाकाव्य, महाकाव्य (ऐतिहासिक महाकाव्य सहित) गद्य, नाटक, चम्पू एवं गीतिकाव्य। **टिप्पणी:** इस खण्ड में 25 अंकों का एक प्रश्न विशिष्ट रचना रचनाकार के विषय में टिप्पणी के रूप में प्रष्टव्य होगा। **Note:** In this section one question carrying 25 marks will be asked in the form of short note on particular work/author.

खण्ड-ङ- हिन्दी से संस्कृत में अनुवाद Section - E - Translation from Hindi into Sanskrit

31. COMMERCE & ACCOUNTANCY : Paper - 1 Accounting and Finance

Part - 1 : Accounting, Auditing and Taxation : Accounting as a financial information system, impact of behavioural science, Methods of accounting of changing price levels. Current purchasing power (CPP) and current cost accounting. Advanced problems of company accounts; Amalgamation, Absorption and reconstruction of companies. Accounting of holding companies. Valuation of Shares and goodwill. Controllership functions- Property control legal and management control. Important provisions of the Income Tax Act., 1961 Definition, Incidence & Tax liability. Charge of Income tax. Exemptions. Depreciation allowance. Simple problems of computation of income under the various heads and determination of assessable income of Individuels and firms, Income tax authorities.

Nature and functions of cost accounting. Cost Classification. Techniques of segregating semivariable costs into fixed and variable components. Job costing Methods of Pricing of issue of Materials. Reconciliation of cost and financial accounts. Marginal Costing, Cost volume-profd relationship-Algebric formulae and graphical representation, Shut- down point. Techniques of cost control and cost reduction, Budgetary control, Flexible budgets, Standard costing and variance analysis. Responsibility accounting. Bases of charging overheads and their inherent fallacy, costing for pricing decision.

Significance of the attext-function-programming the audit work valuation and verification of assets, fixed wasting and current assets verification of liabilities. Audit of limited companies. Appointment status, powers duties and liabilities of the auditor, Auditor's report. Audit fo share capital and transfer of shares. Special points in the audit of banking and insurance companies.

Part - II : Business Finance and Financial Institututions : Concept and scope of Financial Management-Financial goals of corporations, capital Budgetting Rules of the thumb and discounted cash flow approaches, incorporating uncertainity in investment decisions. Designing an optimal capital structure. Weighted average cost of capital and the controversy surrounding the Modigliani and Miller Model. Source of raising short term, intermediate and long term finance, Role of Public Deposits and convertible debentures. Norms and guidelines regarding debtequity ratios- Determinants of an optimal dividend policy, optimising models of James E Walter and John Lintner Forms of divident payment. Structure of working capital and the variables affecting the level of difference of componets cash flow approach of forecasting working capital needs. Profiles of working capital in indian industries. Credit management and cerdit-policy. Consideration of tax in relation to financial planning and cash flow statements.

Organisation and deficiencies of Indian Money Market. Structure of assets and liablities of commercial banks. Achievments and failures of nationalisation. Regional rural banks, Recommendations of the P.L. Tandon study Groups on following of Bank Credit, 1976 and their revisiorby the Chore Committee, 1979. Assessment of the monetary and credit policies of the Reserve Bank of India. Constitutons of the indian capital Market. Functions and working of all India term financial institution (IDBI, IFCI, ICIC, and IRBI). Investment Polices of the Life Insurance Corporaton of India and the Unit Trust of India. Present stage of stock exchanges and their regulation.

Provisons of the Negotiable Instruments Act. 1881 relating to crossing and endorsements with particular reference to statutor, protection to the paying and collecting bankers. Salient provision and the banking Regulaton Act, 1949 with regard to charting, supervison and regulation of banks.

Paper- II : Organisation Theory and industrial Relations : PART- I : ORGANISATION THEORY

Nature and concepts of organisaton, Organisaton goals; primary and secondary goals, single and multiple goals, endsmeans chain. Displacement, succession, expansion and multiplication of goals. Formal organisaton: type structure: fine and staff, Functional matrix and project, informal organisaton: functions and limitations. Evolution of organisation theory,; classical, Neo-clssical and system approach, Bureaucracy Nature and basis of power, source of power, power structue and politics, Morale and productivity, leadership. Theories and styles management of conflicts in organisaton, transactlonal analysis, significance of culture to organisation. Limits of rationality. Organisational change, adaptations, growth and development, organisational control and effectiveness. Public accountabilty of organisations.

PART - II : INDUSTRIAL RELATIONS

Industiral labour in India and its commitment, Absentism and labour Turnover in Indian Industries. Nature and scope of Industrial Relations. Workers educaton, Workers participation in Management: philoshophy, Rational, Present day stase of affaires, and its future prospects, Industrial Relations in Pubilc Enterpreses. Role of Personnel Department in an organisaton, Executive development personnel polices) Personnel audit and personel research, Wage and wage differentials, Wage policy in India, Legislative measures for wage administration in India, wages in Indian Industry and agriculture.

Theories of Unionism, Trade Union Movement in India: Growth and Structure. Role of outside leadership. Collective bargaining; Approaches, Conditions limitations and its effectiveness in India. International Labour organisation and India. Prevention and settlement of industrial disputes in India. Settlement machinery, preventive measures and other measures in practice.

32. PUBLIC ADMINISTRATION : Paper-1 Administrative Theory

I. Basic Permises : Meaning, Scope and significance of Public Administation: Evolution of Public Administration as discipline, Private and Public Administration: Public Administrations as an art and a science: its role in developed and developing societies; Ecology of administration- Social political, economic and culture New Public Administration. **II. Theories of Organisation :** Scientific management (Taylor and tris associates): Bureaucreatic theory (Max Weber); Classical theory (Henri Fayol, Luther Gulick and others); Human Relations theory (Ettor Mayo and tris colleagues); Systems approach (Chester Bamard). **III. Principles of Organisation :** Hierarch; Unity of Command; Power Authority and Responsibility. Coordination; Span of Control; Supervision Centralisation and Decentralisation, Delegation. **IV. Administrative Behaviour :** Decision Making with special reference to the contribution of Herbert Simon, Theories of Communication, Morale, Motivation (Maslow and Herzberg), and Leadership. **V. Structure of Organisation :** Chief Executive and his/her functions Line Staff and auxiliary agencies. Departments Corporation companies, Boards and Commissions, Headquarters and held relationship. **VI. Personnel Administration :** Bureaucracy and Civil Services, Classification. Recruitment Training. Career development; Performance appraisal, Promotion; Pay structuring; Service conditions; Integrity and Discipline, Employer-employee realations; Retirement benefits; Generalists and Specialists; Neutrality and Anoymity. **VII. Financial Administration :** Concepts of Budget: Preparation and execution of the Budget; performance Budgeting; Legislative control; Accounts and Audit, **VIII. Accountability and Control :** Concepts of Accountability and Control; Accounts and Audit. **IX. Administrative Reforms :** Concepts and processes of Administrative Reforms; O & M; Work study and its techniques; Problems and prospects. **X. Administrative Law :** Concepts and significance of Administrative Law, Delegation; Meaning, type advantage, limitations and safeguards Administrative Tribunals. **XI. Comparative and Development Administration :** Meaning, nature and scope of Comparative Public Administration; Contribution of Fred Riggs with special reference to the Prismatic-Sala model; Concepts scope andsignificance of Development Administration, Political, Economic and socio- cultural context of Development Administration; Concepts of Administrative Development. **XII. Public policy :** Concept and significance of Policy and policy-making in public Administration Processes of formulation and implementation.

PAPER - II : INDIAN ADMINISTRATION

I. Evolution of Indian Administration : Kautilya's views, Major landmarks of Mughal and British periods. **II. Constitutional Setting : Parliamentary democracy :** Federalism; Planning Socialism. **III. Poitical Executive at the Union Level :** President, Prime Minister, Council of Ministers; Cabinet Committees. **IV. Structure of Control Administration :** Secretariat; Cabinet Secretariat Ministries and Departments Boards and Commissions, Field organisations. **V. Central- State Relations :** Legislative Administrative Planning and Financial. **VI. Public Service :** All India Central and State Services. Union and State Public Service Commissions: Training of Civil Servants. **VII. Machinary for Planning :** Plan formulation at the national level; National Develpment Council. Planning Commission. Planning Machinery at the State and District levels. **VIII. Public Sector Undertakings :** Forms, Top- level Managment. Control and problems. **IX. Control of Public Expenditure :** Parliamentary control; Role of the Finance Ministry. Controller and Auditor General. **X. Adminstration of Law and Order:** Role of Central and State agencies in Maintenance of law and Order. **XI. State Adminstration :** Governor Chief Minister, Council of Ministers, Chief Secretary: Secretariat; Directorates. **XII. District Administration:** Role and importance. District Magistate/ Collector, Land Revenue. Law and Order and Developmental functions, District Rural Develpment Angency, Special Programmes of Rural Areas. **XIII. Local Adminstration :** Panchayti Raj and Urban Local Goverment. Features, forms and problems Autonomy of local bodies. **XIV. Adminstration of Welfare:** Administration for the welfare of weaker sections with particular reference to Scheduled Castes. Scheduled Tribes; Programmes for the welfare of Women. **XV. Issue Areas in Indian Administration.** Relationship between political and permanent executives. Generalists and specialists in Administration Integriy in Administration . People's Participation in Administration, Redressal of Citizen's Grievances; Lok Pal and Lok Ayuktas; Administrative Reforms in India.

33. AGRICULTURAL ENGINEERING : PAPER -1

(a) Fluid Machanics : Fluid properties, units and dimensions, mass, momentum and energy conservation principles: special cases of Navier-stoke equation, vorticity. flow of fluids in pipes and channels, frictions factors: turbulence; instruments and measurement systems. **(b) Heat and Mass Transfer:** Thermal properties of materials units and dimensions steady state and transient heat conduction natural and forced convection; boiling, condensation, thermal radiation exchange; heat exchangers, heat- mass transfer analogy: fick's laws, psychrometrics; analysis of heat and mass transfer processes: instruments and measurments systems. **(c) Surveying, Levelling and land Development :** Linear measurements; different surveying devices and methods land grading and levelling; controuring and terracing earth work estimation, land and development budgeting earthmoving machinery **(d) Pumps:** Design, construction, performance characterization. selection, installation, Servicing and maintenance of reciprocating, centrifugal, gear, turbine, submersible, propeller, jet and lift pumps and hydraulic ram; renewable and non renewable power sources for pumps. **(e) Process and food Engineering:** Unit operation in post-harvest processing (cleaning, grading, drying, size reduction, evaporation, pasteurization, distillation): processing of food grains, animal feed, seeds, frutis & vegetables, flowers, spices, dairy products, eggs and meat, design of processing equipment and systems. **(f) Storage and Handling Engineering :** Changes in stored products during storage: storage of food grains & their products, feed fruits and vegetables, flowers, spices, dairy products,eggs and meat, air right ventilated, refrigerated, modified atmosphere and controlleed atmosphere storage systems; packaging, conveyors; design and management of storage and handling systems. **(g) Rural Engineering :** Buliding materials and their properties. design of beams, slabs, columns and foundations: fencing: planning and design of rural houses, farm roads, **village drainage** systems waste disposal and sanitary structures, material and cost estimation in **construction;** integrated rural energy planning and development: rural electrification.

PAPER - II

(a) Thermodynamic and Heat Engines : Concept of energy temperature and heat Equation of State Laws of thermodynamics; pure substances and properties; entropy. boilers; boiler efficiency steam, engine and turbines; rankine, air standed otto, diesel and joule cycles, indicator diagrams; I.C. Engines **(b) Farm Power :** Sources of power on farm; farm power and agricultural productivity relationship; comparison of tractor/ engine power with animal power, operation and constructional features of I.C. engines. various systems present in I.C. engines viz. carburation, ignition cooling lubrication. Starting and electrical system, valves and valve timings; special features of diesel engines. tractors; their classification,,power transmission, clutch, drawbar, three- point hitch. p.t.o belt and pulley: tractor controls; tractor chassis, stability, trouble shooting, repair and maintenance of tractors, tractor testing economics of tractor utilization, small tractors and power tillers: their economics and suitability **(c) Farm Machinery :** Design, construction, operation, repair and maintenance of primary and secondary tillage tools: implements and machines viz. m.b. plough, disc plough, hoe, harrow and cultivator; seeding, planting and transplanting machines, weeders ; sprayers and dusters; forage harvesters and movers: harvesters, threshers, winnowers and combines, crop and soil factors affecting machine performance and energy requirements, economics of tractorization, combining and other machanized operations; selection of farm machines. **(d) Irrigation Engineering :** Water resources of India; soil water plant relationship permeability infiltration; percolation; evaporation; water requirements of crops and irrigation scheduling, direct and indirect mothdos of soil mositure measurements; measurements of irrigation water, weirs and notches, orific, parshall flumes. H- flumes, etc water conveyance and control; design of fields channels and canals; lacey and kennedy's theories most economical challel cross section; selection of underground pipe line structures and their design; irrigation methods- their hydraulics and design viz., border furrow, flood drip & sprinkler methods; concepts in i irrigation efficiencies.

(e) Drainage Engineering : Benefits of drainage; hydraulic conductivity, drainable porosity, drainage coeffecient; surface drainage: drainage of flat and sloping lands; design of open ditches, their alignment and construction; design and layouts of sub surface drains: depth and spacing of drains and drainage outlets. installation of drains and drainage wells. drainage of salt affected areas **(f) Soil and Water Conservation Engineering :** Forms of precipitation: hydrologic cycle; point rainfall analysis, frequency analysis, watershed definition and concept agricultural watersheds. prediction of peak runoff; factors attecting run- off hydrograph, concept of unit and instantaneous hydrogaphs erosion control meaasures on various classes of lead viz controur cultivation, strip cropping, terracing afforestation, pastures, etc. a critical analysis of the role of vegetation in soil and water conservation; grassed waterway and its design; design of gully control measures including permanent structures, viz., chute spill way, drop spillway, drop inlet spillway; retards and steam bank erosion; flood routing; flood amelioration through soil and water management in upstream zone mechanics of wind and water erosion, wind erosion control.

Secretary