JAMMU AND KASHMIR PUBLIC SERVICE COMMISSION

J&K COMBINED COMPETITIVE EXAMINATION, 2016

OFFICE

SOLINA, SRINAGAR/RESHAM GHAR COLONY,
BAKSHI NAGAR, JAMMU

Government of Jammu and Kashmir
General Administration Department
(Services) Civil Secretariat,
Jammu

Notification

Jammu, 1st December, 2008

SRO- 387. In exercise of the powers conferred by the proviso to section 124 of the Constitution of Jammu and Kashmir, the Governor hereby makes the following rules for the conduct of combined competitive examinations by the Public Service Commission, namely:-

1. Short title and application.- (1) These rules may be called the Jammu and Kashmir Combined Competitive Examination Rules, 2008.

(2) These rules shall apply to the conduct of combined competitive examination by Public Service Commission for direct recruitment to the following services:-

(i) Junior Scale of J&K Administrative Service.

(ii) J&K Police (Gazetted) Service.

(iii) J&K Accounts (Gazetted) Service.

2. Definitions.– In these rules unless the context otherwise requires:

(a) "available vacancies" mean the vacancies available in the direct recruitment quota of the services mentioned in rule 1 to be filled on the basis of combined competitive examination;

(b) "Commission" means the Jammu and Kashmir Public Service Commission;

(c) "Examination" means the combined competitive examination for recruitment to the direct recruitment posts of the services specified in rule 1;

(d) "Fee" means the fee which may be charged by the Commission from a candidate for the Preliminary/ Main Examination;

(e) "Government" means Government of Jammu and Kashmir;

(f) "list" means the list of candidates prepared on the basis of merit in the examination for the various services and posts.

Explanation:- Candidates shall be allotted to various services and posts keeping in view their merit in the examination and the preferences expressed by them for various services and posts;

(g) "Preference" means preference, for being selected for a service or posts for which examination is being held under these rules, in the order in which these

are mentioned by the candidate in the application form prescribed by the Commission;

(h) "rules" means the Jammu and Kashmir Combined Competitive Examination Rules, 2008;

(i) "State" means the Jammu and Kashmir State.

3. Duration of examinations.- The examination shall be held at such intervals as the Government may in consultation with the Commission from time to time determine, but at least once in a calendar year unless there are good and sufficient reasons for not doing so.

4. Conduct of Examination.- The examination shall be conducted by the Commission in accordance with the provisions of Jammu and Kashmir Public Service Commission (Conduct of Examination) Rules, 2005.

5. Conditions of eligibility:- In order to be eligible to compete in the examination, a candidate must satisfy the following conditions, namely;-

(i) that he is a permanent resident of the State;

*(ii) that he has attained the age of 21 years but has not crossed the age of 30 years on 1st January of the year in which notification inviting applications is issued by the Commission:

Provided that the upper age limit shall be 32 years, in case of the following:-

a) Candidates belonging to Scheduled Castes/ Scheduled Tribes/ Socially and Educationally Backward Classes;

b) Candidates holding a civil post in the State in a substantive capacity:

Provided that the upper age limit for physically challenged candidates shall be 33 years irrespective of the category to which such a candidate belongs.

Provided further that a candidate who has completed two years service in substantive capacity to be certified by his Head of the Department, shall alone, be eligible to claim the benefit of upper age limit under clause (b) above.

Provided also that for good and sufficient reasons, to be recorded in writing, the Government may prescribe for any particular

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Amended vide SRO No. 154 of 2011 dated 19-05-2011

examination any other upper age limit for open category and reserved category candidates".

(iii) that he holds, notwithstanding anything to the contrary contained in the recruitment rules of various services and posts mentioned in rule (1), a Bachelor's degree of a recognized University in India or of a foreign University declared by Government in consultation with the Commission to be equivalent to the degree of a recognized Indian University:

*Provided that the candidates who have appeared fully in any examination on or before the last date for receipt of application forms for Preliminary Examination for such degree from any such University the passing of which would render them eligible to appear in the examination but the result of their examination has not been declared, shall be allowed to appear in the preliminary examination. All such candidates who are declared qualified by the Commission for taking the Combined Competitive (Main) Examination shall have to produce proof of passing such examination with their applications for the Main Examination failing which such candidates shall not be admitted to the Main Examination;

*Provided further that in respect of candidates for J&K Police (Gazetted) Service, the candidate should possess the following standards also, namely:-

I. ForMales:
(a) Height: 165 cm
(b) Chest girth Min. 84 cm. Expansion 5 cm

II. ForFemales:
(a) Height: 150 cm
(b) Chest girth Min. 79 cm. Expansion 5 cm

III. Forcandidates fromLeh/Kargil

a. ForMales:
(i) Height: 160 cm
(ii) Chest girth: Min. 79 cm. Expansion 5 cm

b. ForFemales:
(i) Height: 145 cm
(ii) Chest girth: Min. 79 cm. Expansion 5 cm"

Amended vide SRO No. 154 of 2011 dated 19-05-2011

Provided also the candidate(s) already holding a civil post in the State shall submit their application through Head of Office with an advance copy of the application directly to Commission and in case the Commission receives an intimation withholding permission from the employer in respect of a candidate who has applied for, or is appearing in the Combined Competitive Examination, his/her application shall be rejected and candidature cancelled. Such a candidate may, however, be allowed to appear in the examination as fresh candidate subject to the condition that the said candidate is otherwise eligible under rules.

*Explanation:- :- The expression "Civil post in the State" mentioned above means a post in any departmental service under the State and includes the posts in the High Court of J&K and the J&K State Legislature".

*6. Documents to be furnished by the candidates for the Combined Competitive (Preliminary) Examination:.- A candidate shall not be required to submit any certificate relating to his/her age, educational qualification, certificate of belonging to reserved category and holding of a civil post in the State, at the time of filling his/her application (OMR) form for the Combined Competitive (Preliminary) Examination. The admission to the preliminary examination shall be purely provisional and if on verification at any stage, it is found that the candidate has claimed eligibility for such examination by misrepresentation, concealment of any material fact(s) or impersonation or fraud, his or her candidature shall be cancelled and he/she will be liable to prosecution/ disciplinary action by the Commission".

*7. Documents to be furnished by the candidates for the Combined Competitive (Main) Examination:- Besides furnishing the documents that may be required by the Commission, the applications for the Combined Competitive (Main) Examination shall be accompanied by the attested copies of the following certificates:-

(a) Academic qualification;
(b) Age;
(c) Character;
(d) Permanent residence of the State;
(e) Category Certificate, in case of candidates belonging to any reserved category.

Note:-

(i) No certificate except the Matriculation certificate or equivalent thereof shall be admitted in proof of age.

(ii) Character certificate shall mean a certificate issued by the Head of the Education Institute or by the University last attended by the candidate or by any gazetted officer of the State. In case of a candidate already in Government Service, the character

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Amended vide SRO No. 154 of 2011 dated 19-05-2011

certificate shall mean a certificate issued by his Controlling Officer:

Provided that the application forms submitted either for the Combined Competitive (Preliminary) or Main Examination, incomplete in any manner shall be rejected without any notice to the candidate(s). However, the Commission shall notify the list of such candidates whose candidature is rejected on account of incomplete forms".

8. Examination- (1) The examination shall consist of two successive stages:-

(a) *Combined Competitive (Preliminary) Examination (Objective Type) for the selection of candidates for the main examination; and

(b) *Combined Competitive (Main) Examination (written and interview) for the selection of candidates for the various services and posts.

*(2) The preliminary examination will consist of two papers of objective type (multiple choice questions) and carry 450 marks in the subjects set out in Appendix-I. This examination is meant to serve as a screening test only. The marks obtained in the preliminary examination shall count only for short-listing of the candidates for the Main Examination.

Subject to the minimum qualifying marks as may be fixed by the Commission at its discretion, the number of candidates to be admitted to the Main Examination shall be, as far as practicable, 1/3rd of the total number of candidates who appeared in the preliminary examination or twenty five times the total number of vacancies to be filled in the various services and posts, whichever be lower".

(3) The Main Examination shall consist of a written test and an interview. The written test shall consist of question papers of descriptive type, out of which one paper shall be of qualifying nature only, from the subjects set out in Appendix-I as per the detailed syllabus in Appendix-II:

*Provided that the Commission may revise or update the syllabi for the Combined Competitive (Preliminary/Main) examination from time to time.

(4) Candidates who obtain such minimum qualifying marks in written part of the Main Examination as may be fixed by the Commission in any or all the papers at their discretion shall be summoned by them for interview.

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Note:- The interview test is intended to judge the mental caliber of a candidate. In broad terms, this is really an assessment of not only his intellectual qualities but also social traits and his interest in current affairs. Some of the qualities to be judged are mental alertness, critical powers of assimilation, clear and logical expositions, balance of judgement, variety and depth of interest, ability for social cohesion and leadership, intellectual and moral integrity.

(5) A candidate who fails to secure such minimum number of marks as are fixed by the Commission in their discretion in more than one subject shall not be eligible to be called for interview.

(6) A Candidate must write the papers in his own hand. In no circumstances, will anybody be allowed the help of a scribe to write the answer for him.

(7) If a candidate's handwriting is not easily legible a deduction will be made on this account from the total marks otherwise accruing to him.

(8) Marks will not be allotted for mere superficial knowledge.

(9) Credit will be given for orderly, effective and exact expression combined with due economy of words in all subjects of the examination.

(10) A candidate shall specify in his application form the optional paper/papers in which he wants to appear. The option once made shall be final. Failure to specify any or all the optional papers shall render the form liable to be rejected.

*(11) A candidate shall have to write the compulsory papers and optional papers (except language paper in English).

*9. (1).The number of candidates to be summoned for interview will not be more than thrice the number of vacancies to be filled. The interview will carry a maximum of 250 marks (with no minimum qualifying marks). Failure to appear in the interview shall render a candidate ineligible for being recommended for appointment notwithstanding the marks obtained by him in the written examination.

(2). The candidates shall be short-listed for interview on the basis of overall merit obtained by them in the Main Examination irrespective of the category(ies) to which he/she/they belong:

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Provided that if the number of candidates belonging to any reserved category, who qualify for the interview on the basis of the above short-listing criteria, falls short of upto three times the number of vacancies reserved for such a category, the Commission shall call the candidates belonging to such category over and above the number short-listed for interview".

*10. Merit List.-Marks thus obtained by the candidates in the Main Examination (written part as well as interview) would determine the final order of merit. Candidates shall be allotted to the various services keeping in view their inter-se merit in the examination and the preferences expressed by them for the various services and posts.

"The allotment of candidates to various services shall be made by the Commission".

Provided that a candidate belonging to a reserved category, though not qualifying by the standard prescribed by the Commission may be declared suitable for appointment thereto by reduced standards with due regard to the maintenance of efficiency in administration, and recommended for appointment to vacancies reserved for members of such class in that service;

Provided that physically challenged candidates shall be considered for selection in the services and against the posts identified for their respective categories in terms of Jammu and Kashmir Persons with Disabilities (Equal Opportunities, Protection of Rights and Full Participation) Rules, 2003 and in accordance with their merit-cum-preference, if otherwise found suitable for selection.

*11. A candidate must be in good mental and bodily health and free from any physical defect likely to interfere with the discharge of his duties as an officer of the service. A candidate who after such Medical Examination as the government may prescribe is found not to satisfy these requirements will not be recommended by the Commission for appointment. The Medical Examination shall be conducted by the Commission before forwarding the select list to the government in accordance with the rules:

Provided that Medical Board shall intimate the nature and degree of disability of physically challenged candidates in terms of the Jammu and Kashmir Persons with Disabilities (Equal Opportunities, Protection of Rights and Full Participation) Rules, 2003 with specific recommendation, if any, in respect of each of such candidate(s) for appointment to various posts through the Combined Competitive Examination.

Explanation: Instructions to appear before the Medical Board shall not be deemed to mean that a candidate for direct recruitment if found fit is necessarily given an appointment. The medical examination will be conducted by a Medical Board to be arranged by the Commission in accordance with Appendix-III for the candidates for J&K

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Police (Gazetted) Service and Appendix-IV for other candidates. The candidates will have to pay a fee as prescribed from time to time to the Medical Board".

12. Determination of order of merit in the event of a tie.- In the event of a tie, the order of merit shall be determined in accordance with the highest marks secured in the viva-voce. Should the marks in the viva-voce of the candidates be also equal, the order of merit shall be decided in accordance with the highest marks obtained by such candidates in the aggregate of the compulsory papers. However, in case the marks obtained in compulsory papers are also equal, the order of merit shall be determined in accordance with the marks obtained in General Studies Paper. Similarly, if the marks obtained in General Studies be also equal, then the order of merit shall be determined in descending order of the date of birth of the candidates.

13. Success in the examination confers no right to appointment unless Government is satisfied after such enquiry as may be considered necessary that the candidate is suitable in all respects for appointment to the service.

14. Repeal and savings.- (1) All rules corresponding to these rules including Notification SRO 161 dated 17th of July, 1995 shall, in so far they are inconsistent with these rules, stand repealed.

(2) Notwithstanding such repeal, Appendix-I, II, III and IV appended to the repealed SRO 161 and the Syllabi notified vide the said repealed notification read with notification SRO 41 dated 22nd February, 2007 shall continue to be in force and shall form the part of these rules.

By order of the Government of Jammu and Kashmir.

Sd/
Commissioner/Secretary to Government
General Administration Department.

No: GAD(Ser)Genl/87/2008 Dated:01.12.2008

Government of Jammu and Kashmir
General Administration Department
(Services) Civil Secretariat,
Srinagar

Notification
Srinagar, the 17th of June, 2016

SRO- 190. In exercise of the powers conferred by proviso third to clause (ii) of sub rule (i) of rule 5 of the Jammu and Kashmir Combined Competitive Examination Rules, 2008, the Government hereby prescribe the upper age limit for Combined Competitive Examination, 2016 as under: -

i.	Open merit candidates	=	35 years;
ii.	Reserved category candidates and in-service candidates	=	37 years
iii.	Physically Challenged candidates	=	38 years

By order of the Government of Jammu & Kashmir.

Sd/-
(Gazzanfer Hussain)
Commissioner/Secretary to Government

No: GAD(Ser)Genl/87/2014 Dated:17.06.2016

APPENDIX I

SCHEME AND SUBJECTS FOR THE PRELIMINARY AND MAIN EXAMINATION.

A. PRELIMINARYEXAMINATION.

The examination will consist of two papers.

Paper I - General Studies	150 marks
Paper II – One subject to be selected from the list of optional subjects indicated below.	300 marks.
Total	450marks

2. List of optional subjects:

Agriculture:

Animal Husbandry and Veterinary Science:

Botany:

Chemistry:

Civil Engineering:

Commerce:

Economics:

Electrical Engineering:

Geography:

Geology:

Indian History:

Law:

Mathematics:

Mechanical Engineering:

Philosophy:

Physics:

Political Science:

Psychology:

Public Administration:

Sociology:

Statistics:

Zoology:

Note: (i) Both the question papers will be of objective type (multiple choice question).

(ii) The question papers will be set in English.

(iii) The course content of the syllabi for the optional subjects will be of the degree level.

(iv) Each paper will be of two hours duration.

B. MAINEXAMINATION

The written examination shall consist of the following papers:-

Paper I	General English	300 marks
Paper II	Essay in English	150 marks
Paper III & IV	General Studies	300 marks (for each paper)
Papers V, VI, VII&VIII	Any two subjects to be selected from the list of the optional subjects indicated below.	-do-

Note: - (i) Paper I on English will be of matriculation standard and will be of qualifying nature only. The marks obtained in this paper shall not count for ranking.

(ii) Interview test will carry 250 marks.

2. List of Optional Subjects:-

Agriculture:

Animal Husbandry and Veterinary Science:

Anthropology:

Botany:

Chemistry:

Civil Engineering:

Commerce and Accountancy:

Economics:

Electrical Engineering:

Geography:

Geology;

History:

Law;

Management;

Mathematics;

Mechanical Engineering;

Philosophy:

Physics;

Political Science & International Relations;

Psychology;

Public Administration:

Sociology;

Statistics;

Zoology.

Literature of one of the following languages:
Arabic, Dogri, English, Hindi, Kashmiri, Persian, Punjabi, Sanskrit, Urdu.

Note:- (i) For the language papers, the scripts to be used by the candidates will be as under :-

Language	Script
Dogri	Devanagari
Hindi	Devanagari
Kashmiri	Persian
Punjabi	Gurmukhi
Urdu	Persian

(ii) Candidates will not be allowed to offer the following combination of the subjects:-

(a) Political Science & International Relations and Public Administration.
(b) Commerce and Accountancy and Management.
(c) Anthropology and Sociology
(d) Mathematics and Statistics.
(e) Agriculture and Animal Husbandry and Veterinary Science.
(f) Management and Public Administration.
(g) Philosophy and Psychology.
(h) of the Engineering subject viz. Civil Engineering. Electrical Engineering and Mechanical Engineering not more than one subject.

(iii) The question papers for the examination will be of descriptive type.

(iv) Each paper will be of three hours duration.

(v) The question papers other than language papers will be set in English.

(vi) The details of the syllabi are set out in Appendix II to these rules.

GENERAL.

(i) Candidates must write the papers in their own hand. In no Circumstances, they will be allowed the help of a scribe to write the answers for them.

(ii) The Commission have discretion to fix qualifying marks in any or all the subjects of the examination.

(iii) If a candidate's handwriting is not easily legible, a deduction will be made on this account from the total marks otherwise accruing to him.

(iv) Marks will not be allotted for mere superficial knowledge.

(v) Credit will be given for orderly, effective and exact expression combined with due economy of words in all subjects of the examination.

APPENDIX II

SYLLABI FOR THE EXAMINATION PART

A—PRELIMINARY EXAMINATION

COMPULSORY SUBJECT

GENERAL STUDIES

The paper on General Studies will include questions covering the following fields of knowledge :

General Science

Current events of national and international importance, History of India.

World Geography.

Indian Polity and Economy.

Indian National Movement and also questions on General Mental Ability.

Questions on General Science will cover general appreciation and understanding of science, including matters of everyday observation and experience, as may be expected of a well educated person who has not made a special study of any scientific discipline. In History, emphasis will be on broad general understanding of the subject in its social, economic and political aspects. In Geography, emphasis will be on Geography of India. Questions on the Geography of India will relate to physical, social and economic Geography of the country, including the main features of Indian agricultural and natural resources. Questions on Indian Polity and Economy will test knowledge on the country's political system, panchayati raj, community development and planning in India. Questions on the Indian National Movement will relate to the nature and character of the nineteenth century resurgence, growth of nationalism and attainment of Independence.

OPTIONAL SUBJECTS

Agriculture

Agriculture, its importance in national economy; factors determining agro-ecological zone and geographic distribution of crop plants.

Important crops of India, cultural practices for cereal, pulses, oil-seed, fibre, sugar and tuber crops and the scientific basis for these crop rotation; multiple and relay cropping, inter-cropping and mixed cropping.

Soil as a medium of plant growth and its composition, mineral and organic constituents of the soil and their role in crop production; chemical, physical and microbiological properties of the soils. Essential plant nutrients, their functions, occurrence of cycling in soils principles of soil fertility and its evaluation for judicious

fertilizer use. Organic manures and bio-fertilizers, straight, complex and mixed fertilizers manufactured and marketed in India.

Principles of plant physiology with reference to plant nutrition, absorption, translocation and metabolism of nutrients. Diagnosis of nutrient deficiencies and their amelioration photosynthesis and respiration, growth and development, auxins and hormones in plant growth.

Elements of Genetics and Plant breeding as applied to improvement of crops; development of plant hybrids and composites, important varieties, hybrids and composites of major crops.

Important fruit and vegetable crops of India, the package of practices and their scientific basis, crop rotations, intercropping and companion crops, role of fruits and vegetables in human nutrition ; post harvest handling and processing of fruits and vegetables.

Serious pests and diseases affecting major crops. Principles of pest control, integrated control of pests and diseases; proper use and maintenance of plant protection equipments.

Principles of economics as applied to agriculture.

Farm planning and resource management for optimal production. Farming systems and their role in regional economies.

Philosophy, objectives and Principles of extension. Extension organisation at the State, District and Block levels their structure, functions and responsibilities. Methods of Communication, Role of farm organisations in extension service.

ANIMAL HUSBANDRY AND VETERINARY SCIENCE

Animal Husbandry :

1. General : Importance of livestock in Agriculture, Relationship between Plant and Animal Husbandry, Mixed farming Livestock and milk production statistics.

2. Genetics: Elements of genetics and breeding as applied to improvement of animals. Breeds of indigenous and exotic cattle, buffaloes, goats, sheeps, pigs and poultry and their potential of milk, eggs, meat and wool production.

3. Nutrition: Classification of feeds, feeding standards, computation of ration and mixing of rations, conservation of feeds and fodder.

4. Management: Management of livestock (Pregnant and milking cows, young stock), livestock records, principles of clean milk production, economies of livestock farming Livestock housing.

Veterinary Science

1. Major contagious diseases affecting cattle and drought animals, poultry and pigs.
2. Artificial insemination, fertility and sterility.
3. Veterinary hygiene with reference to water, air and habitation.
4. Principles of immunization and vaccination.
5. Description, symptoms, diagnosis and treatment of the following diseases of :

(a) Cattle: Anthrax, Foot and mouth disease, Haemorrhagic, Septicaemia, Rinderpest, Black quarter, Tympanitis, Diarrhoea, Pneumonia, Tuberculosis, Johnes disease and diseases of new born calf.

(b) Poultry : Coccidiosis, Ranikhet, Fowl Pox, Avian leukosis, Marks Disease.

(c) Swine: Swine fever.

6. (a) Poisons used for killing animals.

(b) Drugs used for doping of race horses and the techniques of detection.

(c) Drugs used to tranquilize wild animals as well as animals in captivity.

(d) Quarantine measures prevalent in India and abroad and improvements therein.

Dairy Science

1. Study of milk composition, physical properties and food value.
2. Quality control of milk, common tests, legal standards.
3. Utensils and equipment and their cleaning.
4. Organization of Dairy, processing of milk and distribution.
5. Manufacture of Indian indigenous milk products.
6. Simple dairy operations.
7. Micro-organisms found in milk and dairy products.
8. Diseases transmitted through milk to man.

BOTANY

1. Origin of Life—Basic ideas on origin of earth and origin of life.

2. Biological Evolution General account of biochemical and biological aspects of evolution, Speciation.

3. Cell biology—Cell structure, function of organelles. Mitosis, meiosis, significance of meiosis. Differentiation, senescence and death of cells.

4. Tissue Systems—Origin, development, structure and function of primary and secondary tissues.

5. Genetics—Laws of inheritance, concept of gene and genetic code. Linkage, crossing over, gene mapping. Mutation and polyploidy. Hybrid vigour. Sex determination, Genetics and plant improvement.

6. Plant Diversity—Structure and function of plant form from evolutionary aspect (viruses to angiosperms, including lichens and fossils).

7. Plant Systematics—Principles of nomenclature, classification and identification. Modern approaches in plant taxonomy.

8. Plant Growth and Development—Dynamics of growth. Growth movements. Growth substances. Factors of morphogenesis. Mineral nutrition. Water relations. Elementary knowledge of photosynthesis. Respiratory metabolism, Nitrogen metabolism, nucleic acids and protein synthesis. Enzymes. Secondary metabolites. Isotopes in biological studies.

9. Methods of Reproduction and Seed Biology—Vegetative, asexual and sexual methods of reproduction, Physiology of flowering. Pollination and fertilization. Sexual incompatibility. Development, Structure, dormancy and germination of seed.

10. Plant Pathology—Knowledge of diseases of rice, wheat, sugarcane, potato, mustard, groundnut and cotton crops. Principles of biological control. Crown gall.

11. Plant and Environment—Biotic components. Ecological adaptation. Types of vegetational zones and forests of India. Deforestation, afforestation, social forestry. Soil erosion, wasteland reclamation. Environmental pollution, bioindicators. Plant introduction.

12. Botany—A HUMAN CONCERN - Importance of conservation. Germplasm resources, endangered, threatened & endemic taxa. Cell, tissue, organ and protoplast cultures in propagation and enrichment of genetic diversity. Plants as sources of food, fodder, forage, fibers, fatty oils drugs, wood and timber, paper, rubber, beverages, spices, essential oils and resins, gums, dyes, insecticides, pesticides and ornamentation. Biomass as a source of energy. Bio-fertilizers. Biotechnology in agri-horticulture, medicine and industry.

CHEMISTRY

SECTION A

Atomic number, Electronic Configuration of elements, Aufbau principle, Hund's Multiplicity Rule, Pauli's Exclusion Principle, long form of the Periodic Classification of elements; salient characteristics of 's', 'p', 'd' and 'f block elements.

Atomic and ionic radii, ionisation potential, electron affinity and electronegativity; their variation with the position of the element in the periodic table.

Natural and artificial radioactivity theory of nuclear disintegration; disintegration and displacement laws; radioactive series; nuclear bindings energy, nuclear reaction, fission and fusion, radioactive isotopes and their uses.

Electronic Theory of Valency. Elementary ideas about sigma and pi-bonds, hybridization and directional nature of covalent bonds. Shapes of simple molecules, bond order and bond length.

Oxidation states and oxidation number. Common redox reactions; ionic equation.

Bronsted and Lewis theories of acids and bases.

Chemistry of common elements and their compounds, treated from the point of view of periodic classification.

Principles of extraction of metals, as illustrated by sodium, copper, aluminium, iron and nickel.

Werner's theories of coordination compounds and types of isomerism in 6- and 4- coordinate complexes. Role of coordination compounds in nature, common metallurgical and analytical operations.

Structures of Diborane, aluminium chloride, ferrocene alkyl magnesium halides, dichlorodiamine platinum and xenon chloride.

Common ion effect, solubility product and their applications in qualitative inorganic analysis.

SECTION B

Electron displacements-inductive, mesomeric and hyper-conjugative effects - effects of structure on dissociation constants of acids and bases - bond formation and bond fission of covalent bonds-reaction intermediates-carbonations, carbanions, free radicals and carbenes nucleophiles and electrophiles.

Alkanes, alkenes and alkynes-petroleum as a source of organic compounds-simple derivatives of aliphatic compounds; halides, alcohols, aldehydes, ketones, acids, esters, acid chlorides, amides, anhydrides, ethers, amines and nitro compounds monohydroxy, ketonic and amino acids-Grignard reagents-active methylene group - malonic and acetoacetic esters and their synthetic uses - unsaturated acids.

Stereochemistry: elements of symmetry, chirality, optical isomerism of lactic and tartaric acids, D, L,-notation, R,S,-notation of compounds containing chiral centres, concept of conformation -Tischer sawhors and Newman projections of butane 2,3 - diolgeometrical isomerism of maleic and fumaric acids, E and Z notation of geometrical isomers.

Carbohydrates classification and general reactions, structures of glucose, fructose and sucrose, general idea on the chemistry of starch and cellulose. Benzene and common monofunctional benzenoid compounds, concept of aromaticity as applied to benzene naphthalene and pyrole-orientation influence in aromatic substitution chemistry and uses of diazonium salts.

Elementary idea of the chemistry of oils, fats, proteins and vitamins-their role in nutrition and industry.

Basic principles underlying spectral techniques (UV-visible, IR, Raman and NMR).

SECTION C

Kinetic theory of gases and gas laws. Maxwell's law of distribution of velocities. Van der Vaals equation, Law of corresponding states. Specific heat of gases, ratio Cp/Cv.

Thermodynamics: The first law of thermodynamics, isothermal and adiabatic expansions. Enthalpy, heat capacities and thermochemistry. Heats of reaction. Calculation of bond energies. Kirchoffs equation. Criteria for spontaneous changes. Second law of thermodynamics. Entropy, Free energy, Criteria for chemical equilibrium.

Solutions: Osmotic pressure, Lowering of vapour pressure, depression of freezing point and elevation of boiling point. Determination of molecular weight in solution. Association and dissociation of solutes.

Chemical equilibria: Law of mass action and its application to homogeneous and heterogeneous equilibrium; Le Chaterliere principle and its application to chemical equilibria.

Chemical Kinetics: Molecularity and order of a reaction, First order and second order reactions, Temperature coefficient and energy of activation. Collision theory of reaction rates qualitative treatment of theory of activated complex.

Electrochemistry—Faraday's laws of electrolysis, conductivity of an electrolyte, Equivalent conductivity and its variation with dilution. Solubility of sparingly soluble salts. Electrolytic dissociation. Ostwald's dilution law, anomaly of strong electrolytes, Solubility product. Strength-of acids and bases, Hydrolysis of salts. Hydrogen ion concentration. Buffer action. Theory of indicators.

Reversible cells—Standard hydrogen and calomal electrodes. Redox potentials, concentration cells. Ionic product of water. Potentiometric titrations.

Phase rule—Explanation of terms involved. Application to one and two component systems. Distribution law.

Colloids—General nature of colloidal solutions and their classification. Coagulation. Protective action and Gold number.

Absorption

Catalysis—Homogenous and heterogeneous catalysis. Promoters and Poisons.

CIVIL ENGINEERING

Engineering Mechanics: Statics; units and dimensions SI units, vectors, coplanar and noncoplanar force systems, equations of equilibrium, free body diagrams, static friction, virtual. work, distributed force systems, first and second moments of area, mass moment of Inertia.

Kinematics and Dynamics: Velocity and acceleration in Cartesian and curvilinear coordinate systems, equations of motion and their integration, principles of conservation of energy and momentum, collision of elastic bodies, rotation of rigid bodies about fixed axis, simple harmonic motion.

Strength of Materials: elastic, isotropic and homogeneous materials, stress and strain, elastic constants, relation among elastic constants, axially loaded determinate and indeterminated members, shear force and bending moment diagrams, theory of simple bending, shear stress distribution, stitched beams.

Deflection of Beams: Macaulay method, Mohr theorems, Conjugate beam method, torsion, torsion of circular shafts, combined bending, torsion and axial thrust, close coiled helical springs Strain Energy, strain energy in direct stress, shear stress, bending and torsion.

Thin and thick cylinders, columns and struts, Euler and Rankine loads, principal stresses and strains in two dimensions- Mohr circle-theories of elastic failure. Structural Analysis; indeterminate beams, propped, fixed and continuous beams, shear force and bending moment diagrams, deflections, three hinged and two hinged arches, rib shortening, temperature effects, influence lines.

Trusses: Method of joints and method of sections, deflections of plane pin jointed trusses.

Rigid Frames: analysis of rigid frames and continuous beams by theorem of three moments, moment distribution method, slope deflection method, Kani method and column analogy method, matrix analysis; Rolling loads and influence lines for beams and pin-jointed girders.

Soil Mechanics : Classification and identification of soils, phase relationships; surface tension and apillary phenomena in soils, laboratory and field determination of co-efficient of permeability; seepage forces, flow nets, critical hydraulic gradient, permeability of stratified deposits; Theory of compaction, compaction control, total and effective stresses, pore pressure coefficient, shear strength parameters in terms of total and effective stress, Mohr-Coulomb theory; total and effective stress analysis of soil slopes ; active and passive pressures, Rankine and Coulomb theories of earth pressure, pressure, distribution on trench sheeting, retaining walls, sheet pile walls: soil consolidation, Terzaghione-dimensional theory of consolidation, primary and secondary settlement.

Foundation Engineering: Exploratory program for sub-surface investigations, common types of boring and sampling, field test and their interpretation, water level observations;. Stress distribution beneath loaded areas by Boussinesq and Steinbrenner methods, use of influence charts, contact pressure distribution determination of ultimate bearing capacity by Terzaghi, Skempton and Hansen's methods; allowable bearing pressure beneath footings and rafts; settlement criteria, design aspects of footings and rafts; bearing capactiy of piles and pile groups, pile load tests, underreamed piles for swelling soil; Well foundations, conditions of statical equilibrium, vibration analysis of single degree freedom system, general considerations for design of machine foundations; earthquake effects on soil foundation systems, liquefaction.

Fluid Mechanics—Fluid properties, fluid statics, forces on plane and curved surfaces. Stability of floating and submerged bodies

Kinematics—Velocity streamlines, continuity equation, accelerations, irrotational and rotational flow, velocity potential and stream functions, flow net, separation and stagnation.

Dynamics—Euler's equation along stream line, energy and momentum equations, Bernoulli's theorem, applications to pipe flow and free surface flows, free and forced vortices.

Dimensional Analysis and similitude Buckingham's Pi theorem, dimensionless parameters, similarities, undistorted and distorted models.

Boundary layer on a flat plate, drag and lift on bodies.

Laminar and Turbulent flows: Laminar flow through pipe and between parallel plates, transition to turbulent flow, turbulent flow through pipes, friction factor variation, energy loss in expansions, contraction and other non-uniformities, energy grade line and hydraulic grade line, pipe networks, water hammer.

Compressible flow: Isothermal and isentropic flows, velocity of propogation of pressure wave, Mach number, subsonic and supersonic flows, shock waves.

Open channel flow: Uniform and non-uniform flows, specific energy and specific force, critical depth, flow in contracting transitions, free overall, wires, hydraulic jump, surges, gradually varied flow equation and its integration, surface profiles.

Surveying: General principles; sign conventions, chain surveying, principles of plane table surveying, two point problem, three point problem, compass surveying, traversing ; bearings local, attraction, traverse computations, corrections.

Levelling: Temporary and permanent adjustments; fly- levels, reciprocal levelling, contour levelling; volume computations, refraction and curvature corrections.

Theodolite: Adjustments traversing, heights and distances, tacheometric surveying.

Curve setting by chain and by theodolite; horizontal and vertical curves.Triangulation and base-line measurements; Satellite stations, trigonometric levelling, astronomical surveying , celestial co-ordinates, solution of spherical triangles, determination of azimuth, latitude, longitude and time.

Principles of aerial photogrammetry, hydrographic surveying.

COMMERCE

Part-I Accounting

Accounting equation-concepts and conventions, Generally accepted accounting principles-capital and revenue expenditures and receipts- preparation of the financial

statements including statements of sources and application of funds-Partnership accounts including dissolution and piece meal distribution among the partners. Accounts of non profit organisations-Preparation of accounts from incomplete records- Company Accounts-Issue and redemption of shares and debentures-Capitalisation of profits and issue of bonus shares- Accounting for depreciation-including accelerated methods of providing depreciation-Inventory valuation and control.

Ratio analysis and interpretation-Ratios relating to short term liquidity, long term solvency and profitability-importance of the rate of return on investment (ROI) in evaluating the overall performance of a business entity.

Nature and objects of auditing- Balance Sheet and continuous audit-Statutory management and operational audits-Auditors, working papers-internal control and internal audit-Audit of proprietary and partnership firms-Broad outlines of the Company audit.

Part II: Business organisation and Secretarial Practice

Distinctive features of different forms of business organisation. Formalities and documents in floating a Joint Stock Company-Doctrine of indoor management and principle of constructive notice-Type of securities and methods of their issue-Economic functions of the new issues market and stock exchange- Business combinations-Control of monopoly houses- Problems of modernisation of industrial enterprises. Procedure and financing of export and import trade- Incentives for export promotion Role of the EXIM Bank- Principles of insurance, life, fire-and marine.

Management functions: Planning, Organising, Staffing, Directing, Coordination and Control.

Organisation Structure: Centralisation and decentralisation, delegation of authority, span of control, management by objective (M.B.O) and Management by exception.

Office Management: Scope and principles-Systems and routines-Handling of records- Office equipment and machines-Impact of Organisation and methods (O&M).

Company Secretary: Functions and scope-Appointment, qualifications and disqualifications-Right, duties and liabilities of company secretary-Drafting of agenda and minutes.

ECONOMICS

PART-I

1. National Economic Accounting: National Income Analysis, Generation and Distribution of Income and related aggregates: Gross National Product, Net National Product, Gross Domestic Product and Net Domestic Product (at market prices and factor costs) : at constant and current prices.

2. Price Theory: Law of demand; Utility analysis and Indifference curve techniques, consumer equilibrium; cost curves and their relationships; equilibrium of a firm under different market structures: pricing of factors of Production.

3. Money & Banking: Definitions and functions of money (Ml, M2, M3); Credit creation; Credit sources, costs and availability, theories of the Demand for money.

4. International trade: The theory of comparative costs; Ricardian and Hocksher Ohlin ; the balance of payments and the adjustment mechanism. Trade theory and economic growth and development.

Part II

Economic growth and development: Meaning and measurement; characteristics of underdevelopment; rate and pattern. Modern Economic Growth; Sources of growth distribution and growth; problems of growth of developing economies.

Part III

Indian Economy: India's economy since independence; trends in population growth since 1951; Population and poverty; general trends in National Income and related aggregates; Planning in India; Objectives, strategy and rate and pattern of growth; problems of industrialisation strategy; Agricultural growth since Independence with special reference to foodgrains; unemployment; nature of the problem and possible solutions; Public Finance and Economic Policy.

ELECTRICAL ENGINEERING

Primary and secondary cells, Dry accumulators, Solar Cells, Steady state analysis of d.c. and a.c. network, network theorems; network functions, Laplace techniques, transient response; frequency response; three- phase networks; inductively coupled circuits.

Mathematical modelling of dynamic linear systems, transfer functions, block diagrams; stability of control systems.

Electrostatic and magnetostatic field analysis; Maxwell's equations. Wave equations and electromagnetic waves.

Basic methods of measurements, standards, error analysis; indicating instruments, cathode-ray oscilloscope, measurement of voltage; current; power resistance, inductance, capacitance, frequency, time and flux, electronic meters.

Vaccum based and Semi-conductor devices and analysis of electronic Circuits; single and multi-stage audio and radio, small signal and large signal amplifiers; oscillators and feed back amplifiers; wave shaping circuits and time base generators ; multi-vibrators and digital circuits; modulation and demodulation circuits. Transmission line at audio, radio and U.H. Frequencies; Wire and Radio communication.

Generation of e.m.f. and torque in rotation machine; motor and generator characteristics of d.c. synchronous and induction machines, equivalent circuits; commutation starters ; phaser diagram, losses, regulation, power transformers.

Modelling of transmission lines, steady, state and transient stability, surge phenomena and insulation coordination; protective devices and schemes for power system equipment.

Conversion of a.c. to d.c. and d.c. to a.c. controlled and uncontrolled power, speed control techniques for drives.

GEOGRAPHY

Section A: General principles :

(i) Physical geography.
(ii) Human Geography.
(iii) Economic Geography.
(iv) Cartography.
(v) Development of Geographical thought.

Section B: Geography of the World :

(i) World land forms, climates, soils and vegetation.
(ii) Natural regions of the World.
(iii) World population, distribution and growth; races of mankind and international migrations; cultural realms of the World.
(iv) World agriculture, fishing and forestry minerals and energy resources; World industries.
(v) Regional study of Africa, South-East Asia, S.W. Asia, Anglo-America, U.S.S.R and China.

Section C : Geography of India :

(i) Physiography, climate, soils and vegetation.
(ii) Irrigation and agriculture; forestry and fisheries.
(iii) Minerals and energy resources.
(iv) Industries and industrial development.
(v) Population and settlements.

GEOLOGY

Part-I

(a) Physical Geology; Solar system and the Earth Origin, age and internal constitution of Earth, Weathering , Geological work of river, lake, glacier, wind, sea and groundwater. Volcanoes-types distribution, geological effects and products; Earthquakes-distribution causes and effects. Elementary ideas about geosynclines, isostasy and mountain building, continental drift, seafloor spreading and plate tectonics.

(b) Geomorphology: Basic concepts of geomorphology. Normal cycle of erosion, drainage patterns. Landforms formed by ice, wind and water.

(c) Structural and Field geology: Clinometer compass and its use. Primary and secondary structures. Representation of altitude; Slope; strike and dip. Effects of topography on outcrop. Folds, Fault, unconformities and joint-their description,

classification, recognition in the field and their effects on outcrops. Criteria for the determination of the order of super- position in the field. Nappes and Geological windows. Elementary ideas of geological survey and mapping.

Part-II

(a) Crystallography: Crystalline and amorphous substances. Crystal, its definition and morphological characteristics; elements of crystal structure. Laws of Crystallography. Symmetry elements of crystal belonging to normal class of seven Crystal Systems. Crystal habits and twinning.

(b) Mineralogy: Principles of optics. Behaviour of light through isotropic and anisotropic substances. Petrological microscope; construction and working of Nicol Prism. Birefringence; Pleochroism; extinction. Physical, chemical and optical properties of more common rock forming minerals of following groups; quartz, feldspar, mica, amphibole, pyroxene, olivine, garnet, chlorite and carbonate.

(c) Economic Geology: Ore, ore mineral and gangue. Outline of the processes of formation and classification of ore deposits. Brief study of mode of occurrence, origin, distribution (in India) and economic uses of the following; gold, ores of iron, manganese, chromium, copper, aluminium, lead and zinc; mica, gypsum magnesite and kyanite; diamond; coal and petroleum.

PETROLOGY

Part-III

(a) Igneous Petrology: Magma- Its composition and nature, Crystallization of Magma Differentiation and assimilation. Bowen's reaction principle Texture and structure of igneous rocks. Mode of occurrence and mineralogy of igneous rocks. Classification and varieties of igneous rocks.

(b) Sedimentary Petrology: Sedimentary process and products. An outline classification of sedimentary rocks . Important primary sedimentary structures (bedding, cross bedding, graded bedding , ripple marks, sole structures, parting lineation). Residual deposit, their mode of formation, characteristics and important types. Clastic deposits, their classification, mineral, composition and texture. Elementary knowledge of the origin and characteristics of quartz arenites, arkoses and greywackes. Siliceous and calcoreous deposits of chemical and organic origin.

(c) Metamorphic Petrology: Definition, agents and types of metamorphism. Distinguishing characters of metamorphic rocks. Zones, grades of metamorphic rocks. Texture and structure of metamorphic rocks. Basis of classification of metamorphic rocks. Brief petrographic description of quartizite, slate, schist, gneiss, marble and homfels.

Part-IV

(a) Palaeontology : Fossils, conditions for entombent, types of preservation and uses. Broad morphological features and geological distribution of brachiopods, bivalves (lamelli-branches), gastropodes, cephalopods, trilobites, echinoids and corals. A brief study of Gondwana flora and Siwalik mammals.

(b) Stratigraphy: Fundamental laws of stratigraphy: Classification of the stratified rocks into groups, systems and series etc. and classification of geologic time into eras, periods and epochs. An outline Geology of India and a brief study of the following systems with respect to their distribution, lithology, fossil interest and economic importance, if any; Dharwar, Windhyan, Gondwana and Siwalik.

INDIAN HISTORY

Section A

1. Foundations of Indian Culture and civilisation :
   Indus Civilisation
   Vedic Culture
   Sangam Age

2. Religious Movements :
   Buddhism
   Jainism
   Bhagavatism and Brahmanism

3. The Maurya Empire.
4. Trade and Commerce in the pre Gupta and Gupta period.
5. Agrarian structure in the post-Gupta period.
6. Changes in the social structure of ancient India.

Section B

1. Political and Social conditions, 800-1200. The Cholas.
2. The Delhi Sultanate : Administration Agrarian Conditions.
3. The Provincial Dynasties, Vijayanagar Empire Society and Administration.
4. The Indo-Islamic culture, Religious movements, 15th and 16th centuries.
5. The Mughal Empire (1526-1707) Mughal polity; agrarian relations; art, architecture and culture under the Mughals.
6. Beginning of European Commerce.
7. The Maratha Kingdom and Confederacy.

SECTION C

1. The decline of the Mughal Empire; the autonomous state with special reference to Bengal, Mysore and Punjab.
2. The East India Company and the Bengal Nawabs.
3. British Economic Impact in India.
4. The Revolt of 1857 and other popular movements against British rule in the 19th century.
5. Social and cultural awakening; the lower caste, trade union and the peasant movements.
6. The Freedom struggle.

LAW

I. Jurisprudence

1. Schools of Jurisprudence; Analytical, historical, philosophical and sociological.
2. Sources of law: custom, precedent and legislation.
3. Rights and duties.
4. Legal Personality.
5. Ownership and possession.

II. Constitutional Law of India

1. Salient features of the Indian Constitution;
2. Preamble;
3. Fundamental Rights, Directive Principles and Fundamental Duties.
4. Constitutional position of the President and Governors and their powers.
5. Supreme Court and High Courts: their powers and jurisdiction.
6. Union Public Service Commission and State Public Service Commissions :Their Powers and Functions.
7. Distribution of Legislative powers between the Union and the States.
8. Emergency provisions.
9. Amendment of the Constitution.

III. International Law

1. Nature of International Law.
2. Sources: Treaty, Custom, General Principles of law recognized by civilized nations and subsidiary means for the determination of law.
3. State Recognition and State Succession.
4. The United Nations: its objectives and Principal Organs; the constitution, role and jurisdiction of the International Court of Justice.

IV. Torts

1. Nature and definition of tort;
2. Liability based on fault and strict liability;
3. Vicarious liability;
4. Joint tort-feasors;
5. Negligence;
6. Defamation;
7. Conspiracy;
8. Nuisance;
9. False imprisonment and malicious prosecution.

V. Criminal Law

1. General principles of criminal liability;
2. Mens rea;

3. General exceptions;
4. Abetment and conspiracy;
5. Joint and constructive liability;
6. Criminal attempts;
7. Murder and Culpable homicide;
8. Sedition;
9. Theft; extortion, robbery and dacoity;
10. Misappropriation and Criminal breach of trust;

VI. Law of Contract

1. Basic elements of contract: offer, acceptance, consideration, contractual capacity.
2. Factors vitiating consent.
3. Void, viodable, illegal and unenforceable agreements.
4. Performance of contracts.
5. Dissolution of contractual obligations, frustration of contracts.
6. Quassi-contracts.
7. Remedies for breach of contract.

MATHEMATICS

Algebra : Sets, relations equivalence relations, Natural numbers, Integers, Rational numbers, Real and Complex numbers, division algorithm, greatest common divisor polynomials, division algorithm, derivations, Integral, rational real and complex roots of a polynomial, Relation between roots and coefficients, repeated roots, elementary symmetric functions, Groups, rings, fields and their elementary properties.

Matrices: Addition and multiplication, elementary row and column operation, rank determinants, inverse, solutions of systems of linear equations.

Calculus: Real numbers, order completeness property, standard functions, limits, continuity, properties of continuous functions in closed intervals, differentiability, Mean value Theorem, Taylors Theorem, Maxima and Minima, Application to curves-tangent normal properties, Curvature, asymptotes, double points, points of inflexion and tracing.

Definition of a definite integral of continuous function as the limit of a sum, fundamental theorem of integral Calculus, methods of integration, rectification quadrature, volume and surfaces of solids of revolution.

Partial differentiation and its application.

Simple test of convergence of series of positive terms alternating series and absolute convergence.

Differential Equations: First order differential equations, Singular solutions, geometrical interpretations, linear differential equations with constant coefficients.

Geometry: Analytic Geometry of straight lines and conics referred to Cartesian and polar Coordinates; three dimensional geometry for planes, straight lines, sphere, Cone and Cylinder.

Mechanics: Concept of particle, lamina, rigid body, displacement, force, mass, weight, concept of scalar and vector quantities, Vector Algebra, Combination and equilibrium of Coplanar forces, Newton's Laws of motion, motion of a particle in a straight line; Simple Harmonic motion, projectile, circular motion, motion under central forces (inverse square law), escape velocity.

MECHANICAL ENGINEERING

Statics: Simple applications of equilibrium equations.

Dynamics: Simple applications of equations of motion, simple harmonic motion, work energy, power.

Theory of Machines: Simple examples of links and mechanism. Classification of gears, standard gear tooth profiles, Classification of bearing. Function of fly wheel. Types of governors. Statics and dynamic balancing. Simple examples of vibration of bars. Whirling of shafts.

Mechanics of solids : Stress, strain, Hook's Law, elastic modulii, Bending moments and shearing force diagrams for beams. Simple bending and torsion of beams springs, thin walled cylinders Mechanical properties and material testing.

Manufacturing Science: Mechanics of metal cutting, tool life, economics of machining, cutting tool materials. Basic machining processes, types of machine tools, transfer lines, shearing, drawing, spinning, rolling, forging, extrusion. Different types of casting and welding methods.

Production Management: Method and time study, motion economy and work space design, operation and flow process charts. Product design and cost selection of manufacturing process. Break even analysis, Site selection, plant layout, Materials handling, selection of equipment for job, shop and mass production, Scheduling, despatching routing.

Thermodynamics: Heat, work and temperature, First and second laws of thermodynamics, Carnot, Rankine, Otto and Diesel Cycles.

Fluid Mechanics: Hydrostatics Continuity equation. Bernoulli’s theorem. Flow through pipes. Discharge measurement. Laminar and Turbulent flow, concept of boundary layer.

Heat Transfer: Heat transfer by Conduction, Convection and Radiation. One dimensional steady state conduction through walls and cylinders. Fins, Concept of thermal boundary layer. Heat transfer, coefficient, Combined heat transfer, coefficient, Heat exchangers.

Energy Conversion: Compression and spark ignition engines, Compressors, fans and blowers. Hydraulic pumps and turbines Thermal turbo machines.

Boiler Flow of steam through nozzles layout of power plants.

Environmental Control Refrigeration cycles, refrigeration equipment—its operation and maintenance, important refrigerants, Psychometrics comfort, cooling and dehumidification.

PHILOSOPHY

(i) Logic : Symbolic Logic Syllogism and fallacies, Mathematical Logic, Truth Functional logic ;

(ii) History of Indian Ethics: Source, Types, Meaning of Dharma, Ethics and Metaphysics; and Karma and Freewill ; Karma and Gyana ;

(iii) History of Western Ethics: Moral standards Judgement, Order and progress; Ethics and Emotivism; Determinism and Freewill; Crime and Punishment, Individual and Society.

(iv) History of Philosophy : Western, Indian Orthodox. Indian Heterodox.

PHYSICS

1. Mechanics : Units and dimensions, S.l. units, Motion in one and two dimensions, Newton's laws of motion with applications. Variable mass systems, Frictional forces, work, power and Energy. Conservative and non-conservative systems, Collisions, Conservation of energy. Linear and angular momenta. Rotational Kinematics, Rotational dynamics. Equilibrium of rigid bodies. Gravitation, Planetary motion, Artificial Satellites.. Surface tension and Viscosity. Fluid dynamics, streamline and turbulent motion. Bernoulli's equation with applications. Stoke's law and its application, Special theory of relativity, Lorentz Transformation, Mass Energy equivalence.

2. Waves and Oscillations : Simple harmonic motion, Travelling & Stationary waves, Superposition of waves, Beats. Forced oscillations, Damped oscillations, Resonance, Sound waves, Vibrations of air columns, strings and rods. Ultrasonic waves and their application. Doppler effect.

3. Optics : Matrix method in paraxial optics. Thin lens formulae, Nodal planes, Systems of two thin lenses, Chromatic and Spherical aberration, Optical instruments, Eyepieces, Nature and propagation of light, Interference, Division of wavefront, Division of amplitude, Simple interferometers. Diffraction-Fraunhefer and Fresnel, Gratings. Resolving power of optical instruments, Rayleigh criterion, Polarization, Production and Detection of Polarized light. Rayleigh Scattering. Raman Scattering, Lasers and their applications.

4. Thermal Physics : Thermometry, Laws of thermodynamics, Heat engines, Entropy, Thermodynamic potentials and Maxwell's relations. Vander Waals equation of

State, Critical constants. Joule-Thomson effect, Phase transition, Transport phenomenon, heat conduction and specific heat in solids, Kinetic Theory of Gases, Ideal Gas equation, Maxwell's velocity distribution, Equipartition of Energy, Mean free path, Brownian Motion Black- body radiation, Planck's Law.

5. Electricity and Magnetism: Electric charge, Fields and Potentials, Coulomb's Law, Gauss Law, Capacitance, Dielectrics, Ohm's Law, Kirchoffs laws, Magnetic field, Ampere's Law, Faraday's Law of electromagnetic induction, Lenz's Law. Alternating Currents, LCR Circuits, Series & Parallel resonance, Q-factor, Thermoelectric effects and their applications, Electromagnetic Waves. Motion of charged particles in electric and magnetic fields. Particle accelerators, Ven de Graaff generator, Cyclotron, Betatron, Mass spectrometer, Hall effect, Dia, Para and ferro magnetism.

6. Modern Physics : Bohr's Theory of Hydrogen atom, Optical and X-ray spectra, Photoelectric effect. Compton effect, Wave nature of matter and Wave-Particle duality, Natural and artificial radio-activity, alpha, beta and gamma radiation, chain decay, Nuclear fission and fusion, Elementary particles and their classification.

7. Electronics: Vacuum tubes diode and triode p- and n-type materials p-n diodes and transistors. Circuits for rectification, amplification and oscillations. Logic gates.

POLITICAL SCIENCE

Section A (Theory)

1. (a) The State - Sovereignty; Theories of Sovereignty.

   (b) Theories of the Origin of the States (Social contract Historical—Evolutionary and Marxist).

   (c) Theories of the functions of the State (Liberal Welfare and Socialist).

2. (a) Concepts—Rights, Property, Liberty, Equality, Justice.

   (b)Democracy—Electoral process; Theories of Representations; Public opinion, freedom of speech, the role of the Press; Parties and Pressure Groups.

   (c) Political Theories—Liberalism ; Early Socialism, Marxian Socialism, Fascism.

   (d) Theories of Development and Under-Development Liberal and Marxist.

Section B (Government)

1. Government: Constitution and Constitutional Government, Parliamentary and Presidential Government Federal and Unitary Government; State and Local Government; Cabinet Government; Bureaucracy.

2. India : (a) Colonialism and Nationalism in India; the national liberation movement and constitutional development.

(b) The Indian Constitution, Fundamental Rights, Directive Principles of State Policy; legislature; Executive, Judiciary, including Judicial Review; the Rule of Law.

(c) Federalism, including Centre State Relations, Parliamentary System in India.

(d) Indian Federalism compared and contrasted with federalism in the USA, Canada, Australia, Nigeria and Federal Republic of Germany and the U.S.S.R.

PSYCHOLOGY

1. Scope and methods, Subject Matter.

2. Methods, Experimental methods, Field studies, Clinical and case methods, Characteristics of psychological studies.

3. Physiological Basis. Structure and functions of the nervous system, Structure and functions of the endocrine system.

4. Development of Behaviour, Genetic mechanism. Environmental factors. Growth and maturation. Relevant experimental studies.

5. Cognitive processes (I). Perception, Perception process, Perceptual organisation, Perception of form, Colour, depth and time. Perceptual constancy. Role of motivation, social and cultural factors in perception.

6. Cognitive processes (II). Learning, Learning process, Learning theories : Classical conditioning. Operant conditioning, Cognitive theories. Perceptual learning. Learning and motivation. Verbal learning. Motor learning.

7. Cognitive Processes (III). Remembering, Measurement of remembering. Short-term memory. Long-term memory, forgetting, theories of forgetting.

8. Cognitive Processes (IV). Thinking Development of thinking, language and thought, images, concept formation, problem solving.

9. Intelligence, nature of intelligence, Theories of intelligence, Measurement of intelligence, Intelligence and creativity.

10. Motivation, Needs, drives and motives, Classification of motives, Measurement of motives, Theories of motivation.

11. Personality, Nature of personality, Trait and type approaches, Biological and socio-cultural determinants of personality. Personality assessment techniques and tests.

12. Coping Behaviour, Coping mechanisms, Coping with frustration and stress Conflicts.

13. Attitudes, Nature of attitudes, Theories of attitudes, Measurement of attitudes, Change of attitudes.

14. Communication, Types of communication, Communication process. Communication network, Distortion of communication.

15. Applications of psychology in industry. Education and Community.

PUBLIC ADMINISTRATION

1. Introduction : Meaning, scope and significance of public administration. Private and Public Administration; Evolution of Public Administration as a discipline.

2. Theories and Principles of Administration: Scientific Management; Bureaucratic Model; Classical Theory; Human Relations Theory; Behavioural Approach; Systems Approach. The Principles of Hierarchy; Unity of Command; Span of Control; Authority and Responsibility; Coordination; Delegation; Supervision; Line and Staff.

3. Administrative Behaviour: Decision Making Leadership theories Communication Motivation.

4. Personnel Administration: Role of Civil Service in developing society; Position Classification; Recruitment; Training; Promotion; Pay and Service Condition, Neutrality and Anonymity.

5. Financial Administration: Concept of Budget: Formulation and execution of budget; Accounts and Audit.

6. Control over Administration: Legislative, Executive and Judicial Control, Citizen and Administration.

7. Comparative Administration: Salient features of administrative systems in U.S.A, U.S.S.R., Great Britain and France.

8. Central Administration in India : British legacy; constitutional context of Indian administration: The President; the Prime Minister as Real Executive; Central Secretariat; Cabinet Secretariat; Planning Commission, Finance Commission; Comptroller and Auditor General of India; Major patterns of Public Enterprises.

9. Civil Service in India : Recruitment of All India and Central Services, Union Public Service Commission, Training of lAS and IPS, Generalists and specialists; Relations with the Political Executive.

10. State, District and Local Administration : Governor, Chief Minister; Secretariat; Chief Secretary; Directorates; Role of District Collector in revenue, law and order and development administration; Panchayati Raj; Urban local government; Main features, Structure and problem-areas.

SOCIOLOGY

Concepts: race and culture; human evolution, phases of culture, culture change-culture contact, acculturation, cultural relativism society, group, status, role, primary, secondary and reference groups, community and association, social structure and social

organisation, structure and function, objective facts, norms, values and belief systems, sanctions deviance, socio-cultural processes- assimilation, integration cooperation, competition and conflict, Social Demography Institutions: Kinship system and kinship usages; rules of residence and descent; marriage and family; economic systems of simple and complex societies-barter and ceremonial exchange, market economy, political institutions in simple and complex societies; religion in simple and complex societies, magic, religion and science. Practices and Organizations, Social stratification: Caste, class and estate. Communities: village, town, city, region.

Types of society: tribal agrarian, industrial, post-industrial, Constitutional provisions regarding scheduled castes and scheduled tribes.

STATISTICS

I. Probability (25 per cent weight):

Classical and axiomatic definitions of probability, simple theorems on probability with examples, conditional probability, statistical independence Bayes' theorem, Discrete and continuous random variables probability mass function and probability density function, cumulative distributions function, joint marginal and conditional probability distributions of two variables, functions of one and two random variables moments, moment generating function chebichev's inequality, Binomial; Poisson Hypergeometric, Negative Binomial, Uniform, exponential, gamma, beta, normal and bivariate normal probability distributions Convergence in probability weak law of large numbers, simple form of central limit theorem.

(II) Statistical Methods (25 per cent weight):

Compilation, classification, tabulation and diagrammatic representation of statistical data, measures of central tendency, dispersion, skewness and kurtosis measures of association and contingency correlation and linear regression involving two variables, correlation ratio, curve fitting.

Concept of a random sample and statistics, sampling distributions of X, X^2, T and F statistics, their properties, estimation and tests of significance based on them. Order statistics and their sampling distributions in case of uniform and exponential parent distribution.

(III) Statistical Inference (25 percent weight):

Theory of estimation, unbiasedness, consistency, efficiency, sufficiency, Cramer-Rao Lower bound, best linear unbiased estimates, methods of estimation, methods of moments, maximum likelihood, least squares, minimum X^2 properties of maximum likelihood estimators (without proof) simple problems of constructing confidence intervals.

Testing of hypothesis, simple and composite hypothesis, Statistical tests, two kinds of error, optimal critical regions for simple hypothesis concerning one parameter, likelihood ratio tests, tests for the parameters of binomial, Poisson, uniform, exponential and normal distributions. Chi-square test, sign test, run test, medium test, Wilcoxon test rank correlation methods.

(IV) Sampling Theory and Design of Experiments (25 per cent weight):

Principles of sampling, frame and sampling units, sampling and non sampling errors, simple random sampling, stratified sampling, cluster sampling, systematic sampling, ratio and regression estimates, designing of sample surveys with reference to recent large scale surveys in India.

Analysis of variance with equal number of observations per cell in one, two and three way classifications, transformations to stabilize variance. Principles of experimental design, completely randomized design. Randomized block design, Latin square design, missing plot technique, factorial experiments with confounding in 2n design balanced incomplete block designs.

ZOOLOGY

1. Cell structure and function: Structure of an animal cell, nature and function of cell organells, mitosis and meiosis, chromosomes and genes, laws of inheritance mutation.

2. General survey and Classification of non-chordates, (upto sub-classes) and chordates (upto orders) of following : Protozoa, Porifera, Coelenterate, Platyhelminthes, Aschminthes, Annelida, Arthropoda, Mollusca, Echinodermata and Chordata.

3. Structure, Reproduction and life history of the following types: Amoeba, Monocytis, Plasmodium, Paramaecium, Sycon, Hydra, Obelia, Fasciola, Taenia, Ascaris, Nereis, Pheretima, Leech, prawn, scorpion, cockroach, a bivalve, a snail, Balanaglosus, an ascidian, Amphioxus.

4. Comparative anatomy of vertebrates: Integument endoskeleton, locomotory organs, digestive system, respiratory system, heart and Circulatory system, urinogenitial system and sense organs.

5. Physiology: Chemical composition of protoplasm, nature and function of enzymes, colloids and hydrogen-ion concentration biological oxidation. Elementary physiology of digestion, excretion, respiration, blood, mechanism of circulation with special reference to man, nerve impulse, conduction and transmission across synaptic junction.

6. Embryology: Gametogenesis, fertilization, cleavage, gastrulation; Early development and meta-morphogenesis of frog. Ascidian and retrogressive metamorphosis. Neoteny, development of foetal membranes in chick and mammals.

7. Evolution : Origin of life, Principles and evidences of evolution, speciation, mutation and isolation.

8. Ecology : Biotic and abiotic factors; concept of ecosystem, food chain and energy flow; adaptation of aquatic and desert fauna, parasitism, and symbiosis; factors causing environmental pollution and its prevention. Endangered species Chronobiology and circadian rhythm.

9. Economic Zoology-beneficial and harmful insects.

APPENDIX-II

Part-B

MAIN EXAMINATION

The main Examination is intended to assess the overall intellectual traits and depth of understanding of candidates rather than merely the range of their information and memory sufficient choice of questions would be allowed to the candidates in the question papers.

The scope of the syllabus for the optional subject papers for the examination is broadly of the honours degree level i.e. a level higher than the bachelors degree and lower than the Masters Degree. In the case of Engineering and law, the level corresponds to the bachelors degree.

COMPULSORY SUBJECTS

ENGLISH

The aim of the paper is to test the candidate's ability to read and understand serious discursive prose and to express his ideas clearly and correctly, in English.

The pattern of questions would be broadly as follows :—

i) Comprehension of given passages.

ii) Precise writing.

iii) Usage and vocabulary.

iv) Short Essay.

Note 1:—The paper on English will be of Matriculation or equivalent standard and will be of qualifying nature only. The marks obtained in these papers will not be counted for ranking.

Note 2 :—The candidates will have to answer the English paper in English.

ESSAY

Candidates will be required to write an essay on a specific topic. The choice of subjects will be given. They will be expected to keep closely to the subject of the essay to arrange their ideas in orderly fashion and to write concisely. Credit will be given for effective and exact expression.

GENERAL STUDIES

General Studies:- Paper-I and Paper-II will cover the following areas of knowledge :—

Paper-I

1. Modern History of India and Indian Culture.

2. Current events of national and international importance.

3. Statistical analysis, graphs and diagrams.

Paper-II

1. Indian Polity;

2. Indian Economy and Geography of India;

3. The role and impact of Science and technology in the development of India.

In Paper I, Modern 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 relating to statistical analysis, graphs and diagrams will include exercises to test the candidate's ability to draw common sense conclusions from information presented in statistical, graphical or diagrammatical form and to point out deficiencies, limitations or inconsistencies therein.

In Paper II, the part relating to Indian Polity, will include questions on the political system in India. In the part pertaining to the Indian Economy and Geography of India, questions will be put on planning in India and the physical, economic and social geography of India. In the third part relating to the role and impact of science and technology in the development of India, questions will be asked to test the candidate's awareness of the role and impact of science and technology in India; emphasis will be on applied aspects.

OPTIONAL SUBJECTS

AGRICULTURE

Paper-I

Ecology and its relevance to man, natural resources, their management and conservation. Physical and social environment as factors of crop distribution and production. Climatic elements as factors of crop growth, impact of changing environments on cropping pattern as indicators of environments. Environmental pollution and associated hazards to crops, animals and humans.

Cropping patterns in different agro climatic zones of the country-impact of high yielding and short duration varieties on shifts in cropping patterns. Concepts of multiple cropping, multi-storey, relay and inter-cropping and their importance in relation to food production, package of practices for production of important cereals, pulses, oilseed

fibre, sugar and commercial crops grown during Kharif and Rabi seasons in different regions of the country.

Important features, scope and propagation of various types of forestry plantations, such as, extension/social forestry, agro forestry and natural forests.

Weeds, their characteristics, dissemination and association with various 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 constituents of soils and their role in maintaining soil productivity. Problem soils, 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, functions and cycling in soils. Symbiotic and non-symbiotic nitrogen fixation, Principles of soil fertility and its evaluation for judicious fertilizer use.

Soil conservation planning on water shed basis, Erosion and run off management in hilly, foot hills and valley lands; processes and factors affecting them. Dryland agriculture and its problems. Technology for stabilizing agriculture production in rainfed agriculture area.

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.

Farm management, scope, importance and characteristics, farm planning and budgeting, Economics of different types of farming systems.

Marketing and pricing of agricultural inputs and outputs, price fluctuations and their cost; role of co-operatives in agricultural economy, types and systems of farming and factors affecting them.

Agricultural extension, its importance and role, methods of evaluation of extension programmes, socio-economic survey and status of big, small and marginal farmers and landless agricultural labourers, the farm mechanization and its role in agricultural production and rural employment. Training programmes for extension workers, lab to land programmes.

Paper-II

Heredity and variation, Mendels law of inheritance, Chromosomal theory of inheritance, Cytoplasmic inheritance, Sex linked, sex influenced and sex limited characters. Spontaneous and induced mutations. Quantitative characters.

Origin and domestication of field crop. Morphology patterns of variations in varieties and related species of important field crops. Causes and utilization of variations in crop improvement.

Application of the principles of plant breeding to the improvement of major field crops; methods of breeding of self and cross pollinated crops. Introduction, selection, hybridization.

Heterosis and its exploitation, Male sterility and self incompatibility utilization of Mutation and polyploidy in breeding.

Seed technology and importance; production, processing and testing of seeds of crop plants; Role of national and state seed organizations in production, processing and marketing of improved seeds.

Physiology and its significance in agriculture nature, physical properties and chemical constitution of protoplasm; imbibition, surface tension, diffusion and Osmosis. Absorption and translocation of water, transpiration of water economy.

Enzymes and plant pigments: photosynthesis-modern concepts and factors affecting the process, aerobic and anaerobic respiration.

Growth and development; photo periodings and vernalization. Auxin, hormones and other plant regulators and their mechanism of action and importance in agriculture.

Climatic requirements and cultivation of major fruits, plants and vegetable crops, the package of practices and the scientific basis for the same. Handling and marketing problems of fruits & vegetables, Principal methods of preservation, important fruits and vegetable products, processing techniques and equipment. Role of fruit and vegetable in human nutrition; landscape and floriculture including raising of ornamental plants and design and layout of lawns and gardens.

Diseases and pests of field vegetable, orchard and plantation crops of India and measures to control these. Causes and classification of plant diseases; Principles of plant disease control including exclusion, eradication, immunization and protection, Biological control of pests and disease; integrated management of pests and diseases. Pesticides and their formulations, plant protection equipment, their care and maintenance.

Storage pests of cereals and pulses, hygiene of storage godowns, preservation and remedial measures.

Food production and consumption trends in India. National and International food policies. Procurement, distribution, processing and production constraints, Relation of food production to national dietary pattern, major deficiencies of calorie and protein.

ANIMAL HUSBANDRY AND VETERINARY SCIENCE

Paper-I

1. Animal Nutrition: Energy sources, energy, metabolism and requirements for maintenance and production of milk, meat, eggs and wool. Evaluation of feeds as sources of energy.

1.1. Advanced studies in Nutrition-protein-sources of protein, metabolism and synthesis, protein quantity and quality in relation to requirements. Energy protein ratios in ration.

1.2. Advanced studies in Nutrition Minerals: Sources, Functions, requirements and their relationship of the basic minerals nutrients including trace elements.

1.3 Vitamins, Hormones and Growth stimulating, substances-Sources-functions, requirements and inter-relationship with minerals.

1.4. Advanced Ruminant Nutrition: Dairy Cattle Nutrients and their metabolism with reference to milk production and its composition Nutrient requirements for calves, heifers dry and milking cows and buffaloes. Limitations of various feeding systems.

1.5. Advanced Non-Ruminant Nutrition Poultry-Nutrients and their metabolism with reference to poultry, meat and egg production. Nutrients requirements and feed formulation and broilers at different ages.

1.6. Advanced Non-Ruminant Nutrition Swine- Nutrients and their metabolism with special reference to growth and quality of meat production, Nutrient requirement and feed formulation for baby growing and finishing pigs.

1.7. Advanced Applied Animal Nutrition- A critical review and evaluation of feeding experiments, digestibility and balance studies. Feeding standards and measures of feed energy. Nutrition requirements for growth, maintenance and production Balanced rations.

2. Animal Physiology :

2.1. Growth and Animal Production: Prenatal and postnatal growth, maturation, growth curves, measures of growth factors affecting growth, conformation, body composition meat quality.

2.2. Milk production and reproduction and digestion-Current status of hormonal control of mammary, development milk secretion and milk ejection, composition of milk of cows and buffaloes. Male and female reproduction organs their components and function. Digestive organs and their functions.

2.3. Environmental Physiology - Physiological relations and their regulation; mechanisms of adaption, environmental factors and regulatory mechanism involved in animal behaviour, methods of controlling climatic stress.

2.4. Semen quality: Preservation and Artificial insemination Components of semen, composition of spermatozoa chemical and physical properties of ejaculated semen, factors affecting semen in vivo and in vitro. Factors affecting semen preservation, composition of diluents, sperm concentration transport of diluted semen. Deep Freezing techniques in cows, sheep and goats, swine and poultry.

3. Livestock Production and management.

3.1. Commercial Dairy Farming—comparison of dairy farming in India with advanced countries. Dairying under mixed farming and as a specialised farming, economic dairy

farming, starting of a dairy farm. Capital and land requirement, organisation of the dairy farm. Procurement of goods; opportunities in dairy farming, factors determining the efficiency of dairy animal, Herd recording, budgeting, cost of milk production, pricing policy; Personnel Management.

3.2. Feeding practices of dairy-cattle-Developing Practical and Economic ration for dairy cattle, supply of greens throughout the year, field and fodder requirements of Dairy Farm, Feeding regimes for day and young stock and bulls, heifers and breeding animals; new trends in feeding young and adult stock; Feeding records.

3.3. General problems of sheep, goat, pigs and poultry management.

3.4. Feeding of animals under drought conditions.

4. MilkTechnology:

4.1. Organization of rural milk procurement, collection and transport of raw milk.

4.2. Quality, testing and grading raw milk, Quality storage grades of whole milk. Skimmed milk and cream.

4.3. Processing, packaging, storing distributing marketing defects and their control and nutritive properties of the following milks. Pasteurized, standardized, toned, double toned, sterilized, homogenized, reconstituted, recombined, field and flavoured milks.

4.4. Preparation of cultured milks, cultures and their management. Vitamin D soft curd acidified and other special milks.

4.5. Legal standards, Sanitation requirement for clean and safe milk and for the milk plant equipment.

Paper-II

1. Genetics and Animal breeding: Probability applied to Mendelian inheritance Hardy Weinberg Law. Concept and measurement of inbreeding and heterozygosity Wright's approach in contrast to Malecot's Estimation of Parameters and measurements. Fishers theorem of natural selection, polymorphism. Polygenic systems and inheritance of quantitative traits. Casual components of variation Biometrical models and covariance between relatives. The theory of Patho coefficient applied to quantitative genetic analysis. Heritability Repeatability and selection models.

1.1. Population, Genetics applied to Animal Breeding-Population Vs. individual, population size and factors changing it. Gene numbers, and their estimation in farm animals, gene frequency and zygotic frequency and forces changing them, mean and variance approach to equilibrium under different situations, sub-division of phenotypic variance; estimation of additive non-additive genetic and environmental variances in Animal population. Mendelism and blending inheritance. Genetic nature of differences between species, races, breeds and other sub-specific grouping and the grouping and the origin of group differences. Resemblances between relatives.

1.2. Breeding systems - Heritability repeatability, genetics and environmental correlations, methods of estimation and the precision of estimates of animal data. Review of biometrical relations between relatives, mating systems, inbreeding outbreeding and uses phenotypic assortive mailing aids to selections. Family structure of animal population under non random mating systems. Breeding for threshold trans, selection index, its precision. General and specific combining ability, choice of effective breeding plans.

Different types and methods of selection, their effectiveness and limitations, selection indices construction of selection in retrospect; evaluation of genetic gains through selection, correlated response in animal experimentations.

Approach to estimation of general and specific combining ability, Diallele, fractional dialele crosses, reciprocal recurrent selection: inbreeding and hybridization.

2. Health and Hygiene-Anatomy of Ox and Fowl. Histological technique freezing, paraffin embeding etc. Preparation and staining of blood films.

2.1. Common histological stains, Embryology of a cow.

2.2. Physiology of blood and its circulation, respiration, excretion, Endocrine glands in health and disease.

2.3. General knowledge of pharmacology and therapeutics of drugs.

2.4. Vety Hygiene with respect of water, air and habitation.

2.5. Most common cattle and poultry diseases, their mode of infection, prevention and treatment etc. Immunity, General Principles and Problems of meat inspection jurisprudence of Vet practice.

2.6. Milk Hygiene.

3. Milk Product Technology-Selection of raw materials assembling, production, processing, storing, distributing and marketing milk products such as Butter, Ghee, Khoa, Channa, Cheese; Condensed evaporated, dried milk and baby foods; Ice cream and Kulfi; by-products; whey products, butter milk lactose and casein. Testing, Grading, judging milk products ISI and Agmark specifications, legal standards, quality control nutritive properties. Packaging, processing and operational control costs.

4. Meat Hygiene

4.1. Zoonosis Diseases transmitted from animals to man.

4.2. Duties and role of Veterinarians in a slaughter house to provide meat that is produced under ideal hygienic conditions.

4.3. By-products from slaughter houses and their economic utilisation.

4.4. Methods of collection, preservation and processing of hormonal glands for medicinal use.

5. Extension:

5.1. Extension different methods adopted to educate farmers under rural conditions.

5.2. Utilisation of fallen animals for profit extension education etc.

5.3. Define Trysem Different possibilities and methods to provide self employment to educated youth under rural conditions.

5.4. Cross breeding as a method of upgrading the local cattle.

ANTHROPOLOGY

Paper-I

Foundation of Anthropology

Section I is compulsory, candidates may offer either section Il -a or II-b. Each section (i.e. I & Il carries 150 marks)

Section I

i) Meaning and scope of Anthropology and its main branches; (1) Social-cultural Anthropology (2) Physical Anthropology (3) Archaeological Anthropology (4) Linguistic Anthropology (5)Applied Anthropology

ii) Community and Society institutions, group and association; culture and civilization; band and tribe.

iii) Marriage: The problems of universal definition; incest and prohibited categories; preferential forms of marriage; marriage payments; the family as the corner stone of human society; universality and the family, functions of the family; diverse forms of family nuclear, extended, joint etc. Stability and change in the family.

iv) Kinship : Descent, residence, alliance, kins, terms and kinship behaviour, lineage and clan.

v) Economic Anthropology: Meaning and scope; modes of exchange; barter and ceremonial exchange, reciprocity and redistribution; market and trade.

vi) Political Anthropology: Meaning and scope: the. locus and power and the functions of Legitimate authority in different societies. Difference between State and Stateless political systems, Nation building processes in new State, law & justice in simpler societies.

vii) Origins of religions: animism and animatism, difference between religions and magic.

Tolemism and Taboo

viii) Field work and field work traditions in Anthropology

Section II-a

1. Foundations of the theory of organic evolution Lamarckism, Darwinism and the Synthetic theory. Human evolution, biological and cultural dimensions, Micro-evolution.

2. The order Primate. A Comparative study of Primates with special reference to the anthropoid apes and man.

3. Fossil evidence for human evolution. Dryopithecus, Ramapithecus. Australopilkecines, Homoerectus (Pithecanthropines), homosapiens neanderthalensis and Homo sapiens.

4. Genetics definition; The mendelian principles and its application to human population.

5. Racial differentiation of Man and bases of racial classification morphological, serological and genetic. Role of heredity and environment in the formation of races.

6. The effects of nutrition in breeding and hybridization.

Section II-b

1. Technique, method and methodology distinguished.

2. Meaning of evolution biological and socio-cultural, the basic assumptions of 19th century evolutionism. The comparative method. Contemporary trends in evolutionary studies.

3. Diffusion and diffusionism - American distributionism and historical ethnology of the German speaking ethnologists. The attack on the "the" comparative method by diffusionists and Franz Boss. The nature, purpose and methods of comparison in social cultural anthropology, Redcliffe-Brown, Eggan, Oscar Lewis and Sarana.

4. Patterns, basic personality construct and model personality. The relevance of anthropological approach to national character studies. Recent trends in psychological anthropology.

5. Function and cause, Malinowski's contribution to functionalism in social anthropology. Function and structure Redcliff-Brown, Fifth, Fortes and Nadel.

6. Structuralism in linguistics and in social anthropology Levi-Strauss and Leach in viewing social structure as a model the structuralist method in the study of myth. New Ethnography and formal semantic analysis.

7. Norms and Values. Values as a category of anthropological description. Values of anthropologist and anthropology as a source of values. Cultural relativism and the issue of universal values.

8. Social anthropology and history, Scientific and humanistic studies distinguished. A critical examination of the plea for the unity of method of the natural and social sciences. The nature and logic of anthropological field work method and its autonomy.

INDIAN ANTHROPOLOGY

Paper-II

Palaeolithic, Mesolithic, Neolithic, Protonistoric (Indus civilization) dimensions of Indian culture.

Distribution and racial and linguistic elements in Indian population.

The basis of Indian social system: Verna, Ashram, Purusharatha, Caste, Joint family.

The growth of Indian anthropology. Distinctiveness of anthropological contribution in the study of tribal and peasant sections of the Indian population. The basic concepts used Great tradition and little tradition. Sacred complex Universalization and parochialization, sanskritization and Westernization ; Dominant caste. Tribe-caste continum, Nature-Man-Spirit complex.

Ethnographic profiles of Indian tribes; racial linguistic and socio-economic characteristic. Problems of tribal peoples land alienation, indebtedness, lack of educational facilities, shifting cultivation, migration, forests and tribals unemployment agricultural labour. Special problems of hunting and food gathering and other minor tribes.

The problems of culture contact; impact of urbanization and industrialization depopulation regionalism, economic and psychological frustrations.

History of tribal administration. The constitutional' safeguards for the Scheduled Tribes, Policies, Plans programmes of tribal development and their implementations. The response of the tribal people to the government measures for them. The different approaches to tribal problems. the role of anthropology in tribal development.

The constitutional provisions regarding the scheduled caste. Social disabilities suffered by the scheduled castes and the socio economic problems faced by them.

Issues relating to national integration.

BOTANY

Paper-I

1. Microbiology: viruses, bacteria, plasmids- structure and reproduction. General account of infection and immunology, Microbes in agriculture industry & medicine, and air, soil and water. Control of pollution using micro-organisms.

2. Pathology: Important plant diseases in India caused by viruses, bacteria, mycoplasma, fungi and nematodes. Modes of infection, dissemination, physiology and parasitism and methods of control, Mechanism of action of biocides. Fungal toxins.

3. Cryptogams Structure and reproduction from evolutionary aspect and ecology and economic importance of algae-fungi, bryophytes and pteridophytes. Principal distribution in India.

4. Phanerogams: Anatomy of wood, secondary growth Anatomy of C and C plants. Stomatal types Embryology, barriers to sexual incompatibility. Seed structure, Apomixis and polyembryony. Palynology and its applications. Comparison of systems of classification of angiosperms. Modern trends in biosystematics. Taxonomic and economic importance of Cycadaceae, Pinaceae, Gnetabes, Magnoliaceae, Ranunculaceae, Cruciferae, Rosaceae, Leguminosae, Euphorbiaceae. Malvaceae Dipterocarpaceae. Umbelliferae, Asclepiadaceae, Verbaneceae, Solanceae, Rubiaceae, cucurbitaceae. Compositae, Gramineae, Plame, Liliaceae. Musacease and Orchidaceae.

5. Morphogenesis, Polarity symmetry and totipotency. Differentiation and dedifferentiation of cells and organs. Factors of morphogenesis, Methodology and applications of cell, tissues, organ and protoplast cultures from vegetative and reproductive parts, Somatic hybrids.

Paper-II

Cell Biology : Scope and perspective General knowledge of modern tools and techniques in the study of cytology-Prokarytic and eukaryotic cells-structural and ultrastructural details. Functions of organelles including membrances. Detailed study of mitosis and meiosis.

Numerical and structural variations in chromosome and their significance. Study of poltyene and lampbrush chromosomes-structure, behaviour and cytological significance.

2. Genetics and Evolutions: Development of genetics and gene concept. Structure and role of nucleic acids in protein synthesis and reproduction. Genetic code and regulation of gene expression. Gene amplification. Mutation and evolution, Multiple factors, linkage and crossing over. Methods of gene mapping. Sex chromosomes and sex linked inheritance. Male sterility, its significance in plant breeding. Cytoplasmic inheritance. Elements of human genetics. standard deviation and Chi-square analysis. Gene transfer in micro-organisms. Genetic engineering. Organic-evolution evidence, mechanism and theories.

Physiology and Biochemistry: Detailed study of water relations. Mineral nutrition and ion/transport. Mineral deficiencies. Photosynthesis-mechanism and importance, photosystems I and II, photorespiration. Respiration and fermentation. Nitrogen fixation and nitrogen metabolism. Protein synthesis. Enzymes. Importance of secondary metabolites. Pigments as photoreceptors, photoperiodism, flowering.

Growth indices, growth movements. Senescence.

Growth substances their chemical nature, role and applications in agri-horticulture.

Agrochemicals, Stress physiology. Vernalization Fruit and seed physiology - dormancy, storage and germination of seed. Parthenocarphy, fruit ripening.

Ecology: Ecological factors. Concept and dynamics of community, succession. Concept of biospheres. Conservation of ecosystems. Pollution and its control. Forest types of India. Afforestation, deforestation and social forestry Endangered plants.

Economic Botany: Origin of cultivated plants. Study of plants as sources of food, fodder and forage, fatty oils, wood and timber, fiber, paper rubber, beverages, alcohol, drugs, .narcotics, resins and gums, essential oils, dyes, mucilage, insecticides and pesticides, Plant indicators Ornamental plants. Energy plantation.

CHEMISTRY

Paper-1

1. Atomic structure and chemical bonding: Quantum theory, Heisenberg's uncertainty principle, Schrödinger wave equation (time independent) Interpretation of the wave function, particle in a one dimensional box, quantum numbers, hydrogen atom wave functions. Shapes of s.p. and d orbitals, ionic bond, Lattice energy, Born Haber cycle, Fajans rule, dipole moment, characteristics of ionic compounds, electro-negativity differences.

Covalent bond and its general characteristics; valence bond approach Concept of resonance and resonance energy. Electronic configuration of H^2, H^2N0^3, F, NO, CO and HF molecules in terms of molecular orbital approach. Sigma and pi bonds, bond order, bond strength and bond length.

2. Thermodynamics: Work, heat and energy: First law of thermodynamics Enthalpy, heat capacity Relationship between Cp and Cv. Laws of thermo-chemistry Kirchoffs equation Spontaneous and non-spontaneous changes, second law of thermodynamics, Entropy changes in gases for reversible and irreversible processes. Third law of thermodynamics Free energy, variations of free energy of a gas with temperature, pressure and volume. Gibbs-Helmholtz equation. Chemical potential, Thermodynamic criteria for equilibrium. Free energy change in chemical reaction and equilibrium constant. Effect of temperature and pressure on chemical equilibrium. Calculation of equilibrium constants from thermodynamic measurements.

3. Solid State: Forms of solids, law of constancy of interfacial angles crystal systems and crystal classes (crystallographic groups). Designation of crystal laces, lattice structure

and unit cell. laws of rational indices. Bragg's law X-ray diffraction by crystals. Defects in crystals Elementary study of liquid crystals.

4. Chemical kinetics : Order and molecularity of a reaction. Rate equations (differential and integrated forms) of zero, first and second order reactions half life of a reaction. Effect of temperature, pressure and catalysts on reaction rates. Collision theory of reaction rates of bimolecular reactions. Absolute reaction rate theory. Kinetics of polymerisation and photo chemical reactions.

5. Electrochemistry : Limitations of Arrhenius theory of dissociation, Debye-huckel theory of strong electrolytes and its quantitative treatment. Electrolytic conductance theory and theory of activity coefficients. Derivation of limiting laws for various equilibria and transport properties of electrolyte solutions.

6. Concentration cells, liquid junction potential, application of e.m.f measurements of fuel cells.

7. Photochemistry : Absorption of light, Lambert-Beer's Laws. Laws of photochemistry. Quantum efficiency. Reasons for high and low quantum yields. Photoelectric cells.

8. General Chemistry of 'd' block elements.

(a) Electronic configuration; Introduction to theories of bonding in transition metal complexes, Crystal field Theory and its modifications; applications of the theories in the explanation of magnetism and electronic spectra of metal complexes.

(b) Metal Carbonyls: Cyclopentadienyl, Olefin and acetylene complexes.

(c) Compounds with metal -metal bonds and metal atom clusters.

9. General Chemistry of 'f' block elements Lanthanides and actinides: Separations, Oxidation states, magnetic and spectral properties.

10. Reactions in non aqueous solvents (liquid ammonia and sulphur dioxide).

Paper-II

Reaction mechanisms: General methods (both kinetic and non-kinetic) of study of mechanisms of organic reactions illustrated by examples:

Formation and stability of reactive intermediates (carbocations, carbanions, free redicals, carbenes, nitrenes and benzynes)

SN 1 and SN2 mechanisms - Hi, E2 and EtcB eliminations-cis and trans addition to carbon, to carbon double bonds-mechanism of addition to carbon oxygen double bonds - Michael addition-addition to conjugated carbon-carbon double bonds - aromatic electrophilic and nucleophilic substitutions allylic &. benzylic substitutions.

2. Pericyclic reactions- Classification and examples an elementary study of Woodward Hoffmann rules of pericyclic reactions.

3. Chemistry of the following name reactions Aldol condensation, Claisen condensation, Dieck-mann reaction, Perkin reaction, Reimer- Tieman reaction, Cannizzaro reaction.

4. Polymeric Systems

(a) Physical chemistry of polymers, End group analysis, Sedimentation, Light Scattering and viscosity of polymers.

(b) Polyethylene, Polystyrene, Polyvinyl Chloride, Ziegler Natta Catalysis, Nylon Terylene.

(c) Inorganic Polymeric Systems; Phosphonitric halide compounds; silicones, Borazines. Friedel - Craft reaction, Reformatsky reaction, Pinacol pinacolone, Wagner-Meerwein' and Beckmann rearrangements and their mechanism - uses of the following reagents in organic synthesis: $O^5O^4HIO^4$, NBS, diborane, Na-liquid ammonia, $NaBH^4$, LiA IH^4

5. Photochemical reactions of organic and inorganic compounds, types of reactions and examples and synthetic uses-Methods used in structure determination; Principles and applications of UV-visible, IR, IH, NMH, and mass spectra for structure determination of simple organic and inorganic molecules.

6. Molecular Structural determinations: Principles and Applications to simple organic and inorganic Molecules.

i) Rotational spectra of diatomic molecules (Infra red and Raman), isotopic substitutions and rotational constants.

ii) Vibrational spectra of diatomic linear symmetric, linear asymmetric and bent triatomic molecules (infrared and Raman)

iii) Specificity of the functional groups (Infrared and Raman)

iv) Electronic Spectra - Singlet and triplet states, conjugated, double bonds, alpha beta. unsaturated carbonyl compounds.

v) Nuclear magnetic resonance: Chemical shifts, spin-spin Coupling.

vi) Electron Spin Resonance: Study of inorganic complexes and free radicals.

CIVIL ENGINEERING

Paper I

A) Theory and Design of Structure

a) Theory Structures: Energy theorems Castrigliano I theorems I and II: Unit load method and method of consistent deformation to beams and pinjointed plane frames.

Slope deflection, Moment distribution and Kani methods of analysis applied to indeterminate beams and rigid frames.

Moving loads: Criteria for maximum sheer force and bending moment in beams traversed by a system of moving loads influence lines for simply supported plane pinjointed, girders.

Arches: Three hinged, two hinged and fixed arches rib. Shortening and temperature effects. Influence lines.

Matrix: Methods of analysis. Force method and displacement method.

b) Structural Steel: Factors of safety and load factors.

Designs of tension and compression members. Beams of built up section, riveted and welded plate girders. Gantry girders. Stanchions with battens and facing, Slab and gusseted bases.

Design of Highway and Railway Bridges: Through and deck type plate girder. Warren girder and Pratruss.

c) Reinforced concrete, Limit state, method, design. Recommendations of IS codes. Design of one way and two way slabs, staircase slabs, simple and continuous beams of rectangular T and L sections.

Compression members under direct load with or without accentricity fottings isolated and combined.

Retaining walls, Cantilever and counterfort types. Methods and systems of prestressing. Anchorages Analysis and design of sections for flexure, loss of prestress

(B) FLUID MECHANICS

Fluid properties and their role in fluid motion, fluid statics including forces acting on plane and curved surfaces.

Kinematics and Dynamics and fluid flow velocity and accelerations, stream lines equation of continuity ir-rotational and rotational flows velocity potential and stream function, flow nets and methods of drawing flow net sources and sinks flow separation and stagnation.

Euler's equation of motion, energy and momentum equation and their application to pipe flow free and forced vortices, plane and curved stationary and moving vanes sluice gates weirs otieive meters and venturimeters.

Dimensional Analysis and similitude, Buckingham's Pi theorem similarities models laws undistorted and distorted models movable bed models model calibration.

Laminar Flow: Laminar flow between parallel stationary and moving plates, flow through tube Reynolds experiments lubrication principles.

Boundary Layers: Laminar and turbulent boundary Layer on a flat plate laminar sub layer smooth and rough boundaries drag and lift.

Turbulent Flow Through Pipes: Characteristics of turbulent flow, velocity distribution and variation of friction factor, hydraulic grade line and total energy line siphons expansions and contractions in pipes, pipe networks water hammer.

Open Channel flow Uniform and non-uniform flows specific energy and specific force critical depth, resistance equations and variation of roughness coefficient. Rapidly varied flow, flow in contractions, flow at sudden drop, hydraulic jump and its applications, surges and waves, Gradually varied flow differential equation for gradually varied flow classification of surface profiles control section step method of integration of varied flow equation.

(C) SOIL MECHANICS AND FOUNDATION ENGINEERING

Soil composition influence of clay minerals on engineering behaviour. Effective stress principles, change in effective stress due to water flow condition Static water table and steady flow conditions. Permeability and compressibility of soils.

Strength behaviour, strength determination through direct and triaxial tests Total and effective stress strength parameters Total and effective stress paths.

Methods of site exploration, planning a sub-surface exploration programme sampling procedures and sampling disturbance. Penetration tests and plate load tests and data interpretation.

Foundation types and selection. Footings, rafts, piles, floating foundations, effect of footing shapes, dimensions, depth of embedment load inclination and ground water on bearing capacity. Settlement components. Computation for immediate and consolidation settlements limits on total and differential settlement correction for rigidity.

Deep foundations, philosophy of deep foundations, piles, estimation of individual and group capacity. Static and dynamic approaches. Pile load tests, separation into skin friction and point bearing under-reamed piles. Well foundations for bridges and aspects of design.

Earth pressure, states of plastic equilibrium. Cullman's procedure for determination of lateral, thrust determination of anchor force and depth of penetration. Reinforced earth retaining walls concept, Materials and applications.

Machine foundations, Modes of vibrations. Determination of natural frequency, Criteria for design. Effect of vibration on soils. Vibration isolation.

(D) COMPUTER PROGRAMMING

Types of computers - components of computers, history and development different languages.

Fortran/Basic programming constant variables expressions arithmetic statements library functions control statements unconditional GO-TO statements computed GO-TO Statements IF and DO statements CONTINUE CALL RETURN STOP END Statements 1/0 Statements FORMATS field specifications.

Subscripted variables arrays DIMENSION statement function and sub routine sub-programmes application to simple Problems with flow charts in Civil Engineering.

Paper- II

Note:— Candidate shall answer questions from any two parts.

PART A

BUILDING CONSTRUCTION

Physical and mechanical properties of construction materials factors influencing selection brick and clay products limes and cements polymeric materials and special uses, damp proofing materials.

Bickward for walls type cavity walls design of brick masonry walls as per LS code factors of safely serviceability and strength requirements detailing of walls floors roofs ceiling finishing of building plastering pointing painting.

Functional planning of buildings orientation of buildings elements of fire proof construction repair to damaged and cracked buildings use of teno cement, more reinforced and polymer concrete in construction techniques and materials for low cost housing.

Building estimates and specifications construction scheduling PERT and CPM methods.

PART B

TRANSPORTATION ENGINEERING

Railway: Permanent way ballast sleeper, fastenings points and, crossing different types or turn outs cross-over. Setting out of points.

Maintenance of track super-elevation creep of rail ruling gradients trick resistance, tractive effort, curve resistance.

Station yards and machinery, Station building platform siding cum tables signals and interlocking level crossings.

Roads and Railways, Traffic engineering and traffic surveys, Inter sections, road signs signals and marking.

Classification of roads, planning and geometric design.

Design of flexible and rigid pavements. Indian Roads congress Guidelines on pavement, layers and design methodologies.

PART C

WATER RESOURCE AND IRRIGATION ENGINEERING

Hydrology: Hydrologic cycle, precipitation, evaporation, transpiration depression, storage, infiltration, hydrograph unit, hydrograph frequency analysis, flood estimation.

Ground water flow, Specific yield, storage coefficient, coefficient of permeability. Confined and unconfined aquifers. Radial flow into a well under confined and unconfined conditions. Tubewells pumping and recuperation tests. Ground water potential.

Water resources planning. Ground and surface water resources single and multipurpose projects. Storage capacity of reservoirs, reservoir losses, reservoir sedimentation, flood routing through reservoirs. Economics of water resources projects.

Water requirements for crops, consumptive use of water. Quality of irrigation water, duty and delta, Irrigation methods and their efficiencies.

Canals: Distribution system for canal irrigation, Canal capacity, canal losses, Alignment of main and distributory canals. Most efficient section, lined channels their design, regime theory, Critical shear stress bed load. Local and suspended load. Transport cost. Analysis of lined and unlined canals. Drainage behind lining.

Water Logging: Causes and control, Drainage system. Design salinity.

Canal structures: Design of regulation, cross drainage and communication works, cross regulators, head regulators, canal falls, aqueducts, metering, flumes and outlets. Diversion head works, Principles of design of weirs on permeable and impermeable foundations. Khosla's theory Energy dissipation. Stilling basins, sediments exclusion. Storage Works, Types of dams design. Principles of rigid gravity and earth dams stability analysis foundation treatment joints and galleries. Control of seepage construction methods and machinery.

Spillways: Types, crest, gates, energy Dissipation River training, objectives of river training. Methods of river training.

PART-D ENVIRONMENTAL

ENGINEERING

Water supply : Estimation of water resources, ground and surface water. Ground water hydraulic, predicting demand of water. Impurities of water and their significance. Physical chemical and bacteriological analysis, water borne diseases. Standards for portable water.

Intake of water, Pumping and gravity schemes. Water treatment Principles of coagulation flocculation and sedimentation. Slow rapid pressure, biflow and multi-media filters, chlorination, softening, removal of taste odour and salinity.

Water storage and distribution. Storage and balancing reservoirs- types location and capacity.

Distribution systems: Layout hydraulics of pipelines. Pipe fittings valves including check and pressure. Reducing valves meters analysis of distribution systems using Hardy Cross Method General principles of optimal, design based on cost headloss ratio criterion. Leak detection maintenance of distribution systems pumping stations and their operations.

Sewerage systems: Domestic and industrial wastes, storm sewage, separate and combined systems flow through sewers. Design of sewers, sewer appurtenances. Manholes inlets. Junctions syphon.

Sewage characterisation. BOD COD solids. Dissolved oxygen, nitrogen and TOS, Standards of disposal in normal water course and on land.

Sewage treatment: Working principles, Units chambers sedimentation tank, trickling, filters, oxidation ponds, activated sludge process septic tank disposal of sludge. Recycling of waste water.

Solid Waste: Collection and disposal. Environmental pollution. Ecological balance. Water pollution control acts. Radio active wastes and disposal. Environmental impact. Assessment for thermal power plants, mines.

Sanitation: Site and orientation of buildings. Ventilation and damp proof courses. House drainage. Conservancy and water born system of waste disposal. Sanitary appliances, latrines and urinals. Rural sanitation.

COMMERCE AND ACCOUNTANCY

PAPER I

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 with particular reference to Current Purchasing Power (CPP) 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.

Important provisions of the Income Tax Act 1961. Definition, Change of Income Tax, Exemptions, Depreciation and Investment allowance-Simple problems of computation of income under the various heads and determination of assessable income-income Tax authorities.

Nature and functions of Cost Accounting Cost classification Techniques of segregating, semi variable costs into fixed and variable components Job costing FIFO and weighted average methods of calculating equivalent units of production Reconciliation of cost and financial accounts marginal cost volume profit relationship; Algebric formulae and graphical , representation shutdown point Techniques of cost control and cost reduction Budgetary control florible budgets standard costing and variable analysis 'Responsibility accounting bases of charging overheads and their inherent fallacy costing for pricing decision.

Significances of the assets 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 of share capital and transfer of shares Special points in the audits of banking and insurance companies.

Part-II: Business, Finance and Financial Institution.

Concept and scope of Financial Management Financial goals of corporations Capital budgeting Rules of the thumb and discounted cash flow approaches incorporating uncertainty in investment decisions designing and optimal capital structure weighed average cost of capital and the controversy surrounding the Modigliani and Miller model sources of raising short term intermediate and long term finance Role of public and convertable debenture. Norms and guidelines regarding debt-equity ratio. Determinants of an optimal dividend policy optimising models of James E Walter and John Lintner forms of dividend payment structure of working and capital and the variable affecting the level of difference of components. Cash flow approach of forecasting working capital needs profiles of working capital in Indian Industries Credit Management and credit policy consideration of tax in relation to financial planning and cash flow statements.

Organisation and deficiencies of Indian Money Market structure of assets and liabilities of commercial banks. Achievements and failures of nationalisation. Regional rural banks, Recommendations of the Tandon (P. L. study group) on following of bank credit 1976 and their revision by the Chore (K.B) Committee, 1979. An assessment of the monetary and credit policies of the Reserve Bank of India, Constituents of the Indian Capital Market Functions and working of All India term financial institutions (IDBI, IFCI, ICICI and ITCI) Investment policies of the Life Insurance Corporation of India and the Unit Trust of India Present State of stock exchanges and their regulation.

Provision of the Negotiable Instruments Act 1881.

Crossings and endorsements with particular reference to statutory protection to the paying and collecting bankers Salient provision of the Banking Regulation Act, 1949 with regard to chartering supervision and regulation of banks.

PAPER-II

ORGANISATION THEORY AND INDUSTRIAL RELATIONS.

Part-I: Organisation Theory:

Nature and concept of organisation, Organisation, goals, primary and secondary goals, ends means chain. Displacement succession expansion and multiplication of goals. Format organisation. Type Structure. Line and Staff functional matrix and project. Informal organisation, functions and limitations.

Evolution of organisation Theory. Classical, Neoclassical, and system approach. Bureaucracy: Nature and basis of power sources of power, power structure and politics. Organisational behaviour as a dynamic system, technical, social, and power systems. Interrelations and interactions Perception status system theoretical and empirical foundation of Maslow, Mcgregore, Herzberg, Likert Vroom porter and Lawler Adam and Human Models of motivation Morale and productivity Leadership: Theories and styles management of conflicts in organisation. Transactional Analysis-Significance of culture to organisations Limits of rationality, Simon March approach Organisational change, adaptation, growth and development. Organisation control and effectiveness.

Part II: Industrial Relations:

Nature and scope of industrial relations, Industrial labour in India and its commitment Theories of unionism. Trade Union movement in India. Growth and structure. Role of outside leadership Workers education and other problems. Collective bargaining approaches, conditions, limitations and its effectiveness in Indian conditions. Workers participation in management philosophy rational. Present day state of affairs and its future prospects.

Prevention and settlement of industrial disputes in India. Preventive measures Settlement machinery and other measures in practice Industrial relations in Public enterprises. Absenteeism and Labour turn over in Indian industries Relative Wages and Wage differentials Wage Policy in India.

The Bonus issue. International Labour Organisation and India. Role of personnel department in the organisation. Executive development personnel policies, personnel audit and personnel research.

ECONOMICS

Paper-I

1. The framework of an Economy: National income Accounting.

2. Economic choice: Consumer behaviour, Producer behaviour and market forms.

3. Investment decisions and determination of income and employment Micro-economic models of income distribution and growth.

4. Banking objectives and Instruments of Central Banking and Credit policies in a planned developing economy.

5. Types of taxes and their Impacts on the economy. The impacts of the size and the content of Budgets Objectives and instruments of budgetary and fiscal policy in a planned developing economy.

6. International trade tariffs. The rate of exchange. The balance of payments.

International monetary and banking institutions.

Paper-II

1.The Indian Economy: Guiding principles of Indian Economic policy. Planned growth and distributive justice, Eradication of poverty. The institutional frame work of the Indian economy-Federal governmental structure-Agricultural and industrial sectors Public and private sectors. National income-its sectoral and regional distribution. Extent and incidence of poverty.

2. Agricultural Production: Agricultural policy land reforms technological change. Relationship with the industrial sector.

3. Industrial Production: Industrial Policy public and private sectors. Regional distribution. Control of monopolies and monopolistic practices.

4. Pricing Policies for agricultural and industrial outputs procurement and public distribution.

5. Budgetary trends and fiscal policy.

6. Monetary and credit trends and policy. Banking and other financial institutions.

7. Foreign trade and the balance of payments.

8. Indian Planning Objectives strategy experience and problems.

ELECTRICAL ENGINEERING

Paper-I

Network: Steady state analysis of d.c and a.c networks, network theorems, Matrix Algebra, network functions transient response frequency response, Laplace transform, Fourier series and Fourier transform, frequency spectral polezero concept, elementary network synthesis.

Statics and Magnetics:

Analysis of electrostatic and magnetostatic fields: Laplace and Poisson Equations, solution of boundary value problems. Maxwell's equations, electromagnetic wave propagation, ground. and space waves, propagation between earth station and satellites.

Measurements:

Basic methods of measurements, standards, error analysis, indicating instruments cathode ray oscilloscope; measurement of voltage current, power, resistance, inductance, capacitance, time, frequency and flux; electronic meters.

Electronics:

Vacuum and semiconductor devices: equivalent circuits transistor parameters, determination of current and voltage gain input and output impedances biasing technique, single and multistage, audio and radio small signal and large signal amplifiers and their analysis, feedback amplifiers and oscillators: wave shaping circuits and time base generators, analysis of different types of multivibrator and their uses; digital circuits.

Electrical Machines:

Generation of e.m.f. —m.m. f and torque in rotating machines, motor and generator characteristics of d.c. synchronous and induction machines equivalent circuits, commutation parallel operation; phasor diagram and equivalent circuits of power transformer, determination of performance and efficiency, autotransformers, 3-phase transformers.

Paper-II

SECTION A

Control Systems

Mathematical modelling of dynamic linear control systems, block diagrams and signal flow graphs, transient response steady state error, stability, frequency response techniques, root-locus techniques series compensation.

Industrial Electronics

Principles and design of single phase and polyphase rectifiers controlled rectification, smoothing filters; regulated power supplies, speed control circuits for drivers, inverters, a.c. to d.c. Conversion, Choppers; timers and welding circuits.

SECTION B (Heavy currents)

ELECTRICAL MACHINES

Induction Machines - Rotating magnetic field; poly phase, motor, principle of operation; Phasor diagram; Torque slip characteristic; Equivalent circuit and determination of its parameters; circle diagram; starters; speed control double cage motor; induction generator; Theory; Phasor diagram, characteristics and application of single phase motors. Application of two phase induction motor.

Synchronous Machines - e.m.f. equation phasor and circle diagrams operation on infinite bus: synchronizing power, operating characteristic and performance by different methods; sudden short circuit and analysis of oscillogram to determine machine

reactances and time constants, motor characteristics and performance methods of starting application. Special machines-Amplidyne and metadyne operating characteristics and their applications.

Power Systems and Protection - General layout and economics of different types of power stations ; Baseload, peakload and pumped storage plants; Economics of different systems of d.c and a.c power distribution. Transmission line parameter calculation; concept of G.M.D. short, medium and long transmission line; insulators, voltage distribution in a string of insulators and grading; Environmental effects on insulators. Fault calculation by symmetrical components; load flow analysis and economic operation; steady state and transient stability; Switch-gear Methods of arc extinction; Restriking and recovery voltage; testing of circuit breaker, Protective relays; protective schemes for power system equipment; C.T. and P.T. Surges in transmission lines; Traveling waves and protection.

Utilisation - Industrial drives electric motors for various drives and estimates of their rating; Behaviour of motor during starting acceleration, braking and reversing operation; Schemes of speed control for d.c and induction motors.

Economic and other aspects of different systems of rail traction; mechanics of train movement and estimation of power and energy requirements and motor rating characteristics of traction motors, Dielectric and induction heating.

OR

SECTION C (Light Currents)

Communication Systems - Generation and detection of amplitude - frequency phase and pulse modulate signals using oscillators, modulators and demodulators, Comparison of. modulated systems, noise, problems, channel efficiency sampling theorem, sound and vision broadcast transmitting and receiving system, antennas, feeders and receiving circuits, transmission line at audio radio and ultra high frequencies.

Microwaves - Electromagnetic wave in guided media, wave guide components cavity resonators, microwaves tubes and solid state devices; Microwave generators and amplifiers, filters microwave measuring techniques microwave radiation pattern, communication and antenna systems, Radio aids to navigation.

D.C. Amplifiers - Direct coupled amplifiers, difference amplifiers, choppers and analog computation.

GEOGRAPHY

Paper- I

Principles of Geography

Section A: Physical Geography

(i) Geomorphology - Origin and evolution of the earth's crust; earth movements and plate tectonics; volcanism, rocks, weathering and erosion; cycle of erosion - Davis and

Penck fluvial, glacial and marine and Karst landforms; rejuvenated and polycyclic landforms.

(ii) Climatology - The atmosphere, its structure and composition; temperature; humidity, precipitation, pressure and winds; jet stream, air masses and fronts; cyclones and related phenomena; climatic classification - Koeppon and Thorthwall; groundwater and hydrological cycle.

(iii) Soils and vegetation - Soil genesis, classification and distribution; Biotic successions and major biotic regions of the world with special reference to ecological aspects of savanna and monsoon forest biomes.

(iv) Oceanography - Ocean bottom relief; salinity, currents and tides; ocean deposits and coral reefs; marine resources - biotic mineral, and energy resources and their utilization.

(v) Ecosystem - Ecosystem concept, inter-relations of energy flows, water circulation, geomorphic processes, biotic communities and soils; land capability, Man's impact on the ecosystem, global ecological imbalances.

Section B: Human and Economic Geography

(i) Development of Geographical Thought - Contributions of European and Arab Geographers, determinism and possibilism, regional concept; system approach, models and theory; quantitative and behavioural revolutions in geography.

(ii) Human Geography - Emergence of man and traces of mankind; cultural evolution of man; Major cultural realms of the world; international migrations, past and present; world population distribution and growth; demographic transition and world population problems.

(iii) Settlements Geography - Concepts of rural and urban settlements; Origins of urbanization ; Rural settlement patterns ; central place theory; rank size and primate city distributions; city classification urban spheres of influence and the rural urban fringe; the internal structure of cities - theories and cross cultural comparisons; problems of urban growth in the world.

(iv) Political Geography - Concepts of nation and state; frontiers boundaries and buffer zones; concept of heartland and rimland; federalism, political regions of the world; world geopolitics; resources, development and international politics.

(v) Economic Geography - World economics development - measurement and problems; world resources, their distribution and global problems, world energy crisis, the limits to growth, world agriculture - typology and world agricultural regions ; theory of agricultural location diffusion of innovation and agricultural efficiency; world food and nutrition problems; world industry - theory of location of industries, world industrial patterns and problems, world of trade - theory and world patterns.

Paper-II GEOGRAPHY

OF INDIA

Physical Aspects - Geological history, physiography and drainage systems; origin and mechanism of the Indian monsoon, identification and distribution of drought and flood prone areas; soils and vegetation; land capability; schemes of natural physiographic drainage and climate regionalisation.

Human Aspects - Genesis of ethnic/racial diversities; tribal areas and their problems; the role of language, religion and culture in the formation of regions; historical perspectives on unity and diversity, population distribution, density, and growth, population problems and policies. Resources Conservation and utilisation of land, mineral, water, biotic and, marine resources; man and environment - ecological problems and their management. Agriculture - The infrastructure, irrigation, power fertilizers, and seeds; institutional factors -land holdings, tenure, consolidation and land reforms, agricultural efficiency and productivity; intensity of cropping, crop combinations and agricultural regionalisation, green revolution, dry zone agriculture, and agricultural land use policy; food and nutrition; Rural economy - animal husbandry, social forestry and household industry.

Industry - History of industrial development factors of localisation, study of mineral based, agro-based and forest based industries, industrial decentralization and industrial policy; industrial complexes and industrial regionalisation, identification of backward areas and rural industrialisation.

Transport and Trade- Study of the network of roadways, railways, airways and waterways competition and complementarity in regional context; passenger and commodity flows, infra and interregional trade and the role of rural market centres.

Settlements - Rural settlement patterns; urban development in India; Census concepts of urban areas, functional and hierarchical patterns of Indian cities, city regions and the rural urban fringe; internal structure of Indian cities; town planning, slums and urban housing, national urbanisation policy.

Regional Development and Planning - Regional policies in Indian Five Years Plan; experiences of regional planning in India, multi-level planning state, district and block level planning, Centre-State relations and the constitutional framework for multi-level planning. Regionalisation for planning for metropolitan regions; tribal and hill areas, drought prone areas command areas and river basins, regional disparities in development in India.

Political Aspects- Geographical basis of Indian federalism, State reorganisation; regional consciousness and national integration; the international boundary of India and related issues; India and geopolitics of the Indian Ocean Area.

GEOLOGY

Paper-I

(General Geology, Geomorphology, Structural Geology, Palaeontology and Stratigraphy)

(i) General Geology:

Energy in relation to Geo-dynamic activities. Origin and interior of the Earth. Dating of rocks by various methods and age of the Earth. Volcanoes - causes and products; volcanic belts. Earthquakes-causes, geological effect and distribution, relation to volcanic belts.

Geosynclines and their classification. Island arcs, deep sea trenches and mid-ocean ridges, sea-floor spreading and plate tectonics, Isostracy Mountains - types and origin. Brief ideas about continental drift, Origin of continents and oceans. Radioactivity and its application to geological problems.

(ii) Geomorphology:

Basic concepts and significance. Geomorphic processes and parameters. Geomorphic cycles and their interpretation. Relief features; topography and its relation to structures and lithology. Major landforms Drainage systems. Geomorphic features of Indian subcontinent.

(iii) Structural Geology:

Stress and strain ellipsoid, and rock deformation. Mechanics of folding and faulting. Linear and planer structures and their genetic significance. Petrofabric analysis, its graphic representation and application to geological problems. Tectonic framework of India.

(iv) Palaeontology :

Micro and Macro-fossils, Modes of preservation and utility of fossil General idea about classification and nomenclature. Organic evolution and the bearing of paleontological studies on it.

Morphology, classification and geological history including evolutionary trends of brachiopods, bivalves, gastropods, ammonids, trilobites, echinoids and corals.

Principal groups of vertebrates and their main morphological characters, Vertebrates life through ages; dinosaurs; Siwalik vertebrates. Detailed study of horses, elephants and man, Gondwana flora and its importance.

Types of microfossils and their significance with special reference to petroleum exploration.

(v) Stratigraphy:

Principles of Stratigraphy. Stratigraphic classification and nomenclature. Standard stratigraphical scale. Detailed study of various geological systems of Indian subcontinent. Boundary problems in stratigraphy. Correlation of the major Indian formations with their world equivalents. An outline of the stratigraphy of various geological systems in their type-areas. Brief study of climates and igneous activities in Indian subcontinent during geological past. Palaeogeographic reconstructions.

Paper-II

(Crystallography, Mineralogy, Petrology and Economic Geology)

(i) Crystallography:

Crystalline and non-crystalline substances. Special groups. Lattice symmetry. Classification of crystals into 32 classes of symmetry. International system of crystallographic notation. Use of stereographic projections to represent crystal symmetry. Twinning and twin laws. Crystal irregularities. Application of X-rays for crystal studies.

(ii) Optical Mineralogy:

General principles of optics. Isotropism and anisotropism; concepts of optical indicatrix, Pleochroism; interference colours and extinction. Optic orientation in crystals. Dispersion, optical accessories.

(iii) Mineralogy:

Elements of crystal chemistry - types of bondings. Ionic radii-coordination number, Isomorphism polymorphism & psudoneorphism. 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, nature and composition. Simple phase diagrams of binary and ternary systems, and their significance. Bowen's Reaction Principle.. Magmatic differentiation; assimilation. Textures and structures, and their petrogenetic significance. Classification of igneous rocks.

Petrography and Petrogenesis of important rock types of India; granites and granites charnockites and charnockites. Decan basalts.

Processes of formation of sedimentary rocks. Diagenesis and lithification. Textures and structures and their significance. Classification of sedimentary rocks, clastic and non-clastic. Heavy minerals and their significance. Elementary concept of depositional environments, sedimentary facies and provenance. Petrography of common rock types.

Variable of metamorphism. Types of metamorphism. Metamorphic grades, zones and facies. ACF, AKF and AEM diagram Textures, structures and nomenclature of metamorphic rocks. Petrography and petrogenesis of important rock types.

(v) Economic Geology:

Concept of ore, ore mineral and gangue; tenor or ores. Processes of formation of mineral deposits. Common forms and structures of ore deposits. Classification of ore deposits. Control of ore deposition Metalloginitic epochs. Study of important metallic and non metallic deposits, oil and natural gas fields, and coal fields of India Mineral wealth of India, Mineral economics, National Mineral Policy. Conservation and utilisation of minerals.

(vi) Applied Geology:

Essentials of prospecting and exploration techniques. Principal methods of mining, sampling, ore-dressing and beneficiation. Application of Geology in Engineering works.

Elements of soil and ground water geology and geochemistry. Use of aerial photographs in geological investigations.

HISTORY

Paper-1

SECTION A

History of India (Down to AD.750)

(i) The Indus Civilization :

Origins: Extent; characteristic features, major cities, Trade and contacts, causes of decline, Survival and continuity

(ii) The Vedic Age :

Vedic literature, Geographical area known to Vedic texts. Differences and similarities between Indus Civilization and Vedic culture. Political, social and economic patterns. Major religious ideas and rituals.

(iii) The Pre-Maurya Period :

Religious movements (Jainism, Buddhism and other sects). Social and economic conditions. Republics and growth of Magadha imperialism.

(iv) The Maurya Empire :

Sources, Rise, extent and fall of the empire Administration, Social and Economic conditions. Ashoka's policy and reforms art.

(v) The post-Maurya Period (200 B.C.-300 AD.):

Principal dynasties in Northern and Southern India. Economy and society. Sanskrit, Prakrit and Tamil, Religion (rise of Mahayana and theistic cults). Art (gandhara, Mathura and other schools). Contacts with Central Asia.

(vi) The Gupta Age :

Rise and fall of the Gupta Empire, the Vakalakas, Administration, society, economy, literature, art and religion. Contacts with South East Asia.

(vii) Post-Gupta period (B.C.500-750 A.D.) :

Pushyabhutis. The Maukharis. The later Guptas. Harshvardhana and his times. Chalukyas of Badami. The Pallavas, society, administration and art. The Arab conquest.

(viii) General review of science and technology, education and learning.

SECTION B

MEDIEVAL INDIA

INDIA: 750 A.D. to 1200 A.D.

i) Political and Social conditions; the Rajputs their polity and social structure, Land structure, and its impact on society.
ii) Trade and Commerce.
iii) Art, Religion and Philosophy; Sankaracharya.
iv) Maritime activities; contacts with the Arabs, Mutual, cultural impacts.
v) Rashtrakutas, their role in History - Contribution to art and culture. The Chola Empire Local Self Government, features of the Indian village system; Society, economy, art and learning in the South.
vi) Indian society on the eve of Mahmud of Ghazni's Campaigns; Al-Biruni's observations.

INDIA: 1200 - 1785

vii) Foundation of the Delhi Sultanate in Northern India: causes and circumstances; its impact on the Indian society.

viii) Khilji imperialism, significance and implications, Administrative and economic regulations and their impact on State and the People.

ix) New Orientation of State policies and administrative principles under Muhammed bin Tughluq, Religious policy and public works of Firoz Shah.

x) Disintegration of the Delhi Sultanate; causes and its effects on the Indian polity and society.

xi) Nature and character of state; political ideas and institutions. Agrarian structure and relations, growth of urban centres, trade and commerce, condition of artisans and peasants, new crafts, industry and technology, Indian medicines.

xii) Influence of Islam on Indian Culture. Muslim mystic movements; nature and significance of Bhakti Saints, Maharashtra Dharma; Role of the Vaisnave revivalist movement; social and religious significance of the Chaitanya Movement, impact of Hindu Society on muslim Social life.

xiii) The Vijay Nagar Empire; its origin and growth; contribution to art, literature and culture, social and economic conditions; system of administration; breakup of the Vijaynagar Empire.

xiv) Sources of History: important chronicles Inscriptions and Travellers Accounts.

xv) Establishment of Mughal Empire in Northern India: political and social conditions in Hindustan on the eve of the Babur's invasion. Babur and Humayun Establishment of the Portuguese control in the Indian ocean, its political and economic consequences.

xvi) Sur Administration, political, revenue and military administration.

xvii) Expansion of the Mughal Empire under Akbar: political unification; new concept of monarchy under Akbar; Akbar's religio-political out-look; Relations with the non-Muslims.

xviii) Growth of regional languages and literature during the medieval period, Development of art and architecture.

xix) Political ideas and institutions; Nature of the Mughal State, land Revenue administration; The Mansabdari and the jagirdari systems, the land structure and the role of Zamindars, agrarian relations, the military organisation.

xx) Aurangzeb's religious policy; expansion of the Mughal Empire in Deccan; Revolts against Aurangzeb - Character and consequences,

xxi) Growth of urban centres: industrial, economy- urban and rural; Foreign Trade and Commerce. The Mughals and the European trading companies.

xxii) Hindu-Muslim relations; trends of integration; composite culture (16th to 18th centuries).

xxiii) Rise of Shivaji; his conflict with the Mughals; administration of Shivaji; expansion of the Maratha power under the Peshwas (1707-1761); Maratha political structure under the First three Peshwas; Chauth and Sardeshmukhi; Third Battle of Panipat, causes and effects; emergence of the Maratha confederacy, its structure and role.

xxiv) Disintegration of the Mughal Empire Emergence of the new Regional States.

PAPER II

SECTION A

MODERN INDIA
(1757-1947)

1. Historical Forces and Factors which led to the British conquest of India with special reference to Bengal, Maharashtra and Sind; Resistance of Indian Powers and causes of their failure.

2. Evolution of British Paramountcy over princely States.

3. Stages of colonialism and changes in Administrative structure and policies. Revenue, Judicial and Social and Educational and their linkages with British colonial interests.

4. British economic policies and their impact: Commercialisation of agriculture, Rural indebtedness, Growth of agriculture labour, Destruction of handicraft industries, drain of wealth, Growth of modern industry and rise of a capitalist class. Activities of the christian Missions.

5. Efforts at regeneration of Indian society—Socio-religious movements; social, religious, political and economic ideas of the reformers and their vision of future; nature and limitation of 19th Century "Renaissance" caste movements in general with special reference to South Indian and Maharashtra ; tribal revolts, specially in Central and Eastern India.

6. Civil rebellions Revolt of 1857, Civil Rebellions and peasant Revolts with special reference to indigo revolt, Deccan riots and Mapplia uprising.

7. Rise and growth of Indian National Movement - Social basis of Indian nationalism policies, Programme of the early nationalists and militant nationalists, militant revolutionary group terrorists rise and Growth of communalism. Emergence of Gandhiji in Indian politics and his techniques of mass mobilisation; Non-Cooperation, Civil Disobedience and Quit India Movement; Trade Union and peasant movements State(s) people movements, Rise and growth of Left-wing within the Congress - The Congress Socialists and communists; British official response to National Movement Attitude of the Congress to Constitutional changes. 1909-1935; Indian National Army. Naval Mutiny of 1946. The partition of India and Achievement of Freedom.

SECTION B

WORLD HISTORY (1500 -1950)

A. Geographical Discoveries - Decline of feudalism, Beginning of Capitalism. Renaissance and Reformation in Europe.

The New absolute monarchies- Emergence of the Nation State. Commercial Revolution in Western Europe - Mercantilism. Growth of Parliamentary institutions in England.

The Thirty Years war. Its significance in European History. Ascendancy of France.

B. The emergence of a scientific view of the world. The Age of Enlightenment. The American Revolution - its significance.

The French Revolution and Napoleonic Era (1789-1815) Its significance in world History.

The growth of liberalism and Democracy in Western Europe (1815- 1914). Scientific and Technological background to the Industrial Revolution-Stages of the Industrial Revolution in Europe.

Socialist and Labour Movements in Europe.

C. Consolidation of Large Nation States- The Unification of Italy- The founding of the German Empire.

The American Civil War.

Colonialism and Imperialism in Asia and Africa in the 19th and 20th centuries. China and the Western Powers.

Modernisation of Japan and its emergence as a great power, The European Powers and the Ottoman Empire (1815-1914).

The First World War - The Economic and Social impact of the War -The Peace of Paris, 1919.

D. The Russian Revolution, 1917 - Economic and Social Reconstruction in Soviet Union. Rise of Nationalist Movements in Indonesia, China and Indo-China.

Rise and establishment of Communism in China. Awakening in the Arab World-Struggle for freedom and reform in Egypt-Emergence of Modern Turkey under Kamal Ataturk - The Rise of Arab nationalism.

World Depression of 1929-32

The New Deal of Franklin D. Roosevelt.

Totalitarianism in Europe - Fascism in Italy, Nazism in Germany. Rise of Militarism in Japan. Origins and Impact of Second World War.

LAW

Paper-1

CONSTITUTIONAL LAW OF INDIA

1. Nature of the Indian Constitution; the distinctive features of its federal character.
2. Fundamental Rights; Directive Principles and their relationship with Fundamental Rights; Fundamental Duties.
3. Right to Equality.
4. Right to Freedom of Speech and Expression.
5. Right to Life and Personal Liberty.
6. Religious, Cultural and Educational Rights.
7. Constitutional Position of the President and relationship with the Council of Ministers.
8. Governor and his Powers.
9. Supreme Court and High Courts, their powers and jurisdictions.
10. Union Public Service Commission and State Public Service Commission; their powers and functions.
11. Principles of Natural Justice.
12. Distribution of Legislative powers between the Union and the States.
13. Delegated legislation: Its constitutionality, judicial and legislative controls.
14. Administrative and Financial Relations between the Union and the States.
15. Trade, Commerce and Intercourse of India.
16. Emergency provisions.
17. Constitutional safeguards to Civil Servants.
18. Parliamentary privileges and immunities.
19. Amendment of the Constitution.
20. Constitution of Jammu and Kashmir and its development.

INTERNATIONAL LAW

1. Nature of International Law.
2. Sources; Treaty, Custom, General Principles of Law recognized by civilized nations, subsidiary means for the determination of law. Resolutions of International Organs and Regulations of Specialized Agencies.
3. Relationship between International Law and municipal law.
4. State Recognition and State Succession.
5. Territory of State; modes of acquisition, boundaries, international rivers.
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 procedures available for their enforcement.
10. Jurisdiction of States; Bases of jurisdiction, immunity from jurisdiction.
11. Extradition and Asylum.
12. Diplomatic Missions and Consular Posts.
13. Treaties; Formation, application and termination.
14. State responsibility.
15. United Nations: its principal organs, powers and functions.

16. Peaceful settlement of disputes.
17. Lawful recourse to force; aggression, self defence, intervention.
18. Legality of the use of nuclear weapons; ban on testing of nuclear weapons; Nuclear Non-Proliferation Treaty.

Paper-II

LAW OF CRIMES AND TORTS

i) Law of Crimes :

1. Concept of Crime; actus reus mens rea, mens rea in statutory offences, punishments, mandatory sentences, preparation and attempt.

2. Indian Penal Code & Ranbir Penal Code

(a) Application of the Code.
(b) General exceptions
(c) Joint and constructive liability
(d) Abetment
(e) Criminal conspiracy
(f) Offences against the State
(g) Offences against public tranquility
(h) Offences by or relating to public servants
(i) Offences against human body
(j) Offences against property
(k) Offences relating to marriage; Cruelty by husband or his relatives to wife.
(l) Defamation
3. Protection of Civil Rights Acts, 1955.
4. Dowry Prohibition Act, 1961.
5. Prevention of Food Adulteration Act, 1954.

LAW OF TORTS:

1. Nature of tortious liability.
2. Liability based upon fault and strict liability.
3. Statutory liability
4. Vicarious liability
5. Joint Tort-feasors
6. Remedies
7. Negligence
8. Occupier's liability and liability in respect of structures
9. Detinue and conversion
10. Defamation
11. Nuisance
12. Conspiracy
13. False Imprisonment and malicious Prosecution.

II. LAW OF CONTRACTS AND MERCANTILE LAW

1. Formation of contract
2. Factors vitiating consent
3. Void, voidable, illegal and unenforceable agreements.
4. Performance of contracts.
5. Dissolution of contractual obligations, frustration of contracts.
6. Quasi-contracts
7. Remedies for breach of contract
8. Sale of goods and hire purchase
9. Agency
10. Formation and dissolution of Partnership.
11. Negotiable Instruments
12. The Banker-customer relationship.
13. Government Control over private Companies.
14. The Monopolies and Restrictive Trade Practices Act, 1969.
15. The Consumer Protection Act, 1986.

Literature of the following languages.

Note (i):—A candidates may be required to answer some or all the questions in the language concerned.

Note (ii) :—In regard to the languages included in the Eighth schedule of Constitution, the scripts will b the same as indicated in Section II(B) of Appendix 1 relating to Main Examination.

Note(iii) :—Candidates should note that the questions not required to be answered in a specific language will have to be answered in the language medium indicated by them for answering papers on General Studies and Optional Subjects.

ARABIC

Paper-I

1. (a) Origin and development of the language in outline.

(b) Significant features of the grammar of the language, Rhetoric's, Prosody.

2. Literary, History and Literary criticism—Literary movements, classical background ; Socio-Cultural influences, and modern trends, Origin and development of modern literary geners including drama, novel, short story, essay.

3. Short Essay—in Arabic

Paper-II

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

POETS

1. Imraul Qais: His Maullaqah: "Qifaa Nabki mim Zikraa Hawibin Wa Manzil" (Complete)

2. Zohair Bin Abi Sulma: His maullaqah:- "A min Aufaa dimnatun lam takaleami" (Complete)

3. Hassan Bin Thabit : The following live Qasaid from his Diwan: From Qasidah No.1 to Qasidah IV and the Qasidah: "Lillahi, Darru isaabatin Nadamtuhum + Yauman bijlilaqa."

4. Umar Bin Abi Rabiah: 5 Ghazals from his Diwan :

   i) Falanma to waqafna was sallantu oshwaqat + Wujudhum Zahahal Husnu and tataquanna, (Complete)

   ii) Lalta Hindan anjazanta ma taidu + Washaft anfusona mimma tajidu (Complete)

   iii) Katabtuilaiki min baladi + Kitaba muwallahin Kamadi (Complete).

   iv) Amin aali Numin anta qhaadin famubkiru ghadata ghadia amraaihum famuhajjaru (Complete).

   v) Qaalaii Feeha Attequn Maqaalan + FajaratMimma Yaqooluddumoou. (Complete)

5. Farazdaq : The following 4 Qasaid from his Diwan:

   i) "Haazallazi taariful Bathaau watatahu" in praise of Zainul Abideen Ali Bin Hussain.

   ii) "Zarrat Sakeenatu atlaahan anakha bihim in praise of Umar Bin A. Aziz.

   iii) "Wa Koomin tanamul adhyal ainan" in praise of Saeed Bin al- aas. (Complete).

   iv) "Wa atlasa assaalinwa maakano sahiban" in praie of "the Wolfs"

6. Bashhar Bin Murd. The following two Qasaid from his Diwan:

   i) "Izaa balaghar raaiul mashwarata fastain + Biraai naseehinaw naseehate haazimi (Complete)
   Khaliaiya min Kaabin aeenaa akhookumma - Allaa darahi innal Kareem muinu. (Complete).

7. Abu Nawas . First three Qasaid from his Diwan.
8. Shaqui : The following five Qasaid from his Diwan "Al- Shauqiyal".

   i) "Ghaaba Boloum" (Complete).

ii) "Kaneesaturn saarat ilia masjidi" (Complete).

iii) "Ashloo hawaki liman yaloomu fayaozaru" (Complete).

iv) "Salaamummin sabaa Baradaa araqqu" (Nakbatu Dimashk). (Complete).
"Salaamun Neel yaa Gandhi - Wa hazaz Zahru min indi" (Complete)

Authors:

1 Ibnul Muqalf: "Kaliala Wa Dimna" excluding Muqaddamah:- Chapter 1 : Complete "AI Asad wa-al thaus."

2. Al-Jahiz: Al-Bayan Wat Tab'in : VII Edited by Abdul Salam Mohd. Haroon. Cairo, Egypt from pp. 31 to 85.

3. Ibn Khaldun: his Muqaddamah : 39 pages; part six from the first chapter: From "Affaslul saadis minal kitaabil awal" to "wa min Furooihi al Jabruwal muqabla"

4. Mohmud Timur: Story "Amml Mutawallji" from his book "Qaalar Raavi".

5. Taufiq Al-Hakim: Drama: "Sinnul muntahiraa" from his book "Masrahiyatu Tahtiqal Hakim".

Note:—Candidates will be required to answer some questions carrying not less than 25 percent marks in Arabic also.

DOGRI

1 . History of Dogri language

i) Origin and development of Dogri language.
ii) Major Dialects of Dogri language and their inter-relationship.

iii) Chief Characteristics of Dogri language.
iv) Structural features of Dogri language.

a. Sound patterns.
b. Merphological formations.
c. Sentence structure.

v) Influences of English, Hindi, Sanskrit, Urdu and Punjabi on Dogri language.
vi) Significant grammatical features of standard Dogri.
vii) Origin and development of Dogri Script.
viii) Problems of standardisation of Dogri.

2. History of Dogri literature

i) Chief Characteristics of the Pre-independence Dogri literature.
ii) Chief Characteristics of the Post-independence Dogri literature.

iii) Significant features of the literary trends and tendencies of Dogri literature.
iv) Origin and development of literary genres in Dogri.

a. Epic.
b. Drama.
c. Novel.
d. Lyrics, essay, literary criticism etc.

v) Theories of literary criticism in Dogri and major Dogri literary Critics.
vi) Folk literature: Folk songs, folk ballads, folk tales, riddles, Proverbs.

Paper-II

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

1. Hardatt-Shastri (page32-72) Published by Cultural Academy, Jammu.

2. Ajkani Dogri Kavita (1st eleven poets) published by Sahitya Academy, New Delhi.

3. Aste Aan Bajare Lok by Ved Paul Deep Published by Dogri Sanstha, Jammu.

4. Amrit Varsha (1st 30 pages and last 4 pages) by Swami Brahmanand Published by Dogri Sanstha, Jammu.

5. Jot Jagai Din Raati (Folk Bhajans only) published by Cultural Academy, Jammu.

6. Ramayan (Ayodya Kand only) by Shambhu Nath Sharma published by Dogri Sanstha, Jammu.

7. Ghar by Kunwar Viyogi published by Dogri Sanstha, Jammu.

8. Neela Amber Kale Badal (1st seven stories) by Narinder Khajuria published by Dogri Sanstha, Jammu.

9. Ajkani Dogri Kahani (Collection of short stories) published by Dogri Sanstha, Jammu.

10. Phull Biga Dali by Vatss Vikal published by Arun Rashmi Prakashan Ramnagar, Distt. Udhampur.

11. Nanga Rukkh by O.P. Sharma Sarthi published by Sharma Parakashan, Vijay Garh, Jain Bazar, Jammu.

12. Sarpanch by Deeno Bhai Pant published by J&K Board of School Education, Jammu.

13. Navrang (Selection of one Act Play) published by J&K Academy of Art, Culture and languages.

14. Saptak by Vishwanath Khajuria published by Vibhakar Prakashan, 140- Panjtirthi, Jammu.

15. Akkhar Akkhar Chanani (1st 12 essays) published by Sahitya Akademi, New Delhi.

16. Dogri Sahitya Charcha by Prof. Laxmi Narayan Sharma published by Dogri Sanstha. Jammu.

17. Dogri Sahitya Da Itihas by Shiv Nath (119 to 187) published by Sahitya Akademi, New Delhi.

18. Sarha Sahitya 1984 (1 to 91 pages) published by J&K Cultural Academy.

19. Sarha Sahitya 1985 (1 to 38 pages) published by J&K Cultural Academy.

ENGLISH

Paper-I

Detailed study of a literary age (19th century)

The paper will cover the study of English literature from 1798 to 1900 with special reference to the works of Wordsworth, Coleridge, Shelley, Keats, Lamb, Hazlitt, Thackeray, Dickens, Tennyson, Robert Browning, Arnold, George Eliot, Carlyle, Ruskin, Pater.

Evidence of first hand reading will be required. The paper will be designed to test not only the candidate's knowledge of the authors prescribed but also their understanding of the main literary trends during the period. Questions having a bearing on the social and cultural background of the period may be included.

Paper-II

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

1. Shakespeare As you like it; Henry IV Part I and II; Hamlet; the Tempest
2. Milton Paradise Lost
3. Jane Austen Emma
4. Wordsworth The Prelude
5. Dickens David Copperfield
6. George Eliot Middlemarch
7. Hardy Jude the Obscure
8. Yeats Easter 1916
   The second Coming Byzantium
   A Prayer for My Daughter: Leda and the swan Sailing to Byzantium Meru
   The Tower: Lapis Lazudili
   Among School Children
9. Eliot The Waste land
10. D.H. Lawrence: The Rainbow

HINDI

Paper-I

1. History of Hindi Language

i) Grammatical and Lexical features of Apabhransa, Avahatta and early Hindi.
ii) Evolution of Avadhi and Braj Bhasa as literary Language during the Medieval period.
iii) Evolution of Khari Boli Hindi as Literary language during the 19th century.
iv) Standardization of Hindi Language with Devanagri Script.
v) Development of Hindi as Rastra Bhasa during the Freedom Struggle.
vi) Development of Hindi as official language of Indian Union since Independence
vii) Major Dialects of Hindi and their inter-relationship.
viii) Significant grammatical literature of standard Hindi.

2. History of Hindi Literature

i) Chief -characterstics of the major periods of Hindi literature viz. Adi Kal, Bhakti Kal, Riji Kal, Bharatendu Kal and Dwivedi Kal etc.
ii) Significant features of the main literary trends, and tendencies in Modern Hindi viz. Chhayavad Rahasyavad, Pragativad, Proyogvad, Nayi Kavita, Nayi Kahani, Akavita etc.
iii) Rise of Novel and Realism in Modern Hindi.
iv) A brief history of theater and drama in Hindi.
v) Theories of literary criticism in Hindi and major Hindi literary critics.
vi) Origin and development of literary generes in Hindi.

Paper -II

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

Kabir	Kabir Granthavali by Shyam Sunder Dass (200 Stanza from the beginning)
Surdas	Bhramara Geet Saar (200 Stanza from the beginning only)
Tulsidas	Ramcharitmanas (Ayodhyakand only) KAVITAVALI (Uttarakand only)
Bharatendu Harishchandra	Andher Nagari
Prem Chand	Godan, Mansrovar (Bhag EK)
Jayashanker Prasad	Chandragupta Kamayani (Chinta, Lajja, Shradda & Ida only)

Ramchandra Shukla	Chintamani (Pahila Bhag) (10 essays from the beginning)
Suryakant Tripathi Nirala	Anamika (Saroj Smriti, Ramki Shakti Pooja only)
S.H. Vatsyayan Ageya	Shekhar Ek Jeevani (Two parts)
Gajanan Madhav Muktibodh	Chand ki Mukh Tehra Hei (Andhere men only)

KASHMIRI

Paper-I

1. (a) Origin and development of the Kashmiri Language:

i) Early stages (before Lal Ded)
ii) Lal Ded and after
iii) Influence of Sanskrit and Persian

(b) Structural features of the Kashmiri Language

i) Sound patterns
ii) Morphological formation

(c) Dialects/variation of the Kashmiri Language

2. Literary History and Criticism:

a) Literary traditions and movements: folk and classical background; Shaivism, Rishi Cult: Sufism; Devotional Veres; Lyricism (Particularly L.O.L) Masnavi Narrative

b) Socio-cultural influences: Socio-political verse. (including the progressive) and the contemporary development.

3. Development genres :

i) Vaskh Shruk Vasturn; Shaar; Ladee Shah;Marsiy 1.0.1 Mansavi Leelaa; Naat, Ghazal, Aazaad Nazm, Rubaay,Opera Sonnet

ii) Pasthur, Naatukh, Alsasunu, Maquaalu; Tasqueed Naaval, Mizah and Tanz

Paper-II

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

1.	Lal Ded	(Cultural Academy)
2.	Noor Naama of Nund Rishi	(C.A.)
3.	Shamas Faqir : Selections	(Cultural Academy)

4. Gulrez of Maqbool Kraalawaari (C.A.)
5. Sodaam - T sareth of Parmanand (from Paramand's Complete works published by) (C.A.)
6. Kuliyaat -I-Naadim (C.A.)
7. Rasul Mir (Selections, published by) (C.A.)
8. Mahjoor (Selections published by) (C.A.)
9. Aazaad (C.A.)
10. Azichi Kaa'shi'ri Nazama (C.A.)
11. Azykkaa'ShurAfsaana (C.A.)
12. Kaa' Shur Nasr (C.A.)
13. Surya by Ali Mohd. Lone (C.A.)
14. Tshaay Moti Lal Komu
15. Do : Ddag by Akhtar Mohi-ud-Din
16. Akhdo : R. by Bansi Nirdosh
17. Myul by G.N. Gauhar
18. Lavu 'Tapravu' by Amin Kamil
19. Pata 'Laaraan Parbath by Hari Krishan Kaul
20. Manikaaman by Muzattar Aazim
21. Massiy (Edited by Shahid Badagami)

PERSIAN

Paper-I

1. a) Origin and development of the language (in outline)

   b) Significant features of the grammar of the language Rhetorics Prosody

2. Literary History and Literary criticism-Literary movements, classical backgrounds, Socio Cultural influences and Modern trends; Origin and development of modern literary genres, including drama, novel, short story, essay.

3. Short Essay in Persian

Paper-II

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

1. Firdausi

   Shah Nama:

   i) Dastan Rustam wa Suhrab

   ii) Dastan Vizanba Maniza

2. Nizammi Aruzi Samarquadi
Chahar Maqala
3. Khayyam, Rabaiyat (Radif Alif, Be, Dal)
4. Minucheheri - Qasaid (Racif Lam and Mim)
5. Maulana Rum Masunawi (1st Vol. 1st Half)
6. Sadi Shirazi Gulistan
7. Amir Khusrau
Majma-i-Dawawin Khusrau (Radif Alif and Te)
8. Hafiz
Diwan -i-Hafiz (1st half)
9. Abdul Fazi
Ain-i-Akbari
10. Bahar Mashhadi
Diwan-i-Bahar (I Vol.) (1st half)
11. Jawal Zadesh
Yake Bud Yake Na Bud

Note:—Candidates will be required to answer in Persian questions carrying not less than 25 per cent marks.

PUNJABI

Paper-I

1.a) Origin and development of the language - the development of tones from voiced aspirates and older vedic accent - the geminates- the interaction of Punjabi vowels and tones - Consonantal mutation in Punjabi from Sanskrit to Prakrit and Punjabi.

b) The number gender system - animate and inanimate -concord -different categories of post positions- the notion of 'subject' and 'object' in Punjabi - Gurumukhi orthography and Punjabi word formation -noun and verb phrases-sentence structure - spoken and written style -sentences structure in prose and poetry.

c) Major dialects Pathohari, Multani Majhi, Doabi, Malwai Puadhi-the notions of dialect and idiolect-dioglossis and isoglosses-the Validity of speech variation on the basis of social stratification-the distinctive features with special reference to tones, of the various dialects- why's' 'h' 'tones' and 'vowels' interact in dialects of Punjabi ?

Classical background: Nath Jogi Sahi

Literary movements: Gurmat, Suli , Kissa and Var Literature

Modern Trends: Romantics and Progressive (Mohan Singh, Amrita Pritam, Bawa Balwant Pritam Singh, Safeer) Experimentalists (Jasbir S. Ahluwalia, Ravinder Ravi, Sukhpalvir Singh Hasrat), Aesthetes: (Harbhajan Singh, Tara Singh, Sukhbir Singh), Neo-Progressives; (Pash and Patar)

Socio Cultural Influences of English, Sanskrit, Persian, Urdu and Hindi on Punjabi. Origin & Development of Genres Epic: (Damodar, Waris Shah Mohammad, Vir Singh, Avtar Singh Azad, Mohan Singh).

Drama: (I.C. Nanda, Harcharan Singh, Balwant Gargi, S.S. Sekhon, K.S. Duggal)
Novel: (Vir Singh, Nanak Singh, Sohan Singh Seetal, Jaswant Singh Kanwal, K.S. Duggal, S.S. Narula, Gurdial Singh, Mohan Kahlon)

Lyrics: (Gurus, Sulis and Modern Lyricists - Mohan Singh, Amrita Pritam, Shiv Kumar, Harbhajan Singh).

Essays: (Puran Singh, Teja Singh, Gurbaksh Singh) .

Literary Criticism: (S.S. Sekhon , Jasbir S. Ahluwalia, Attar Singh, Kishan Singh, Harbhajan Singh)
Folk Literature: Folk Songs, Folk Tales, Riddles Proverbs.

Paper-II

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

1. Sheikh Farid : The complete bani as included in the Adi Grantha.

2. Guru Nanak : Selected writings of Guru Nanak entitled Guru Nanak Bani, Ed. Bhai Jodh Singh published by National Book Trust of India.

3. Shah Hussain: Kafian

4. Waris Shah: Heer

5. Shah Mohammad: Jangnama, Jang Singhan te Farangian

6. Vir Singh (Poet) : Matak Hulare, Rana Surat Singh, Kalgidhar Chamatkar.

7. Nanak Singh (Novelist) : Chitta Lahu, Pavittar Papi, Ek Miyan Do Talwaran

8. Gurbaksh Singh (Essayist) : Zindgi Di Ras, Manzil dis Pai, Merian Abhul Yadaan

9. Balwant Gargi (Dramatist) : Loha Kutt, Dhuni-di-Agg, Sultan Razia

10. Sant Singh Sekhon (Critic) : Damyanti, Sahityarath, Baba Asman

SANSKRIT

Paper-I

There will be four sections:

i) a) Origin and development of language (from Indo-European to middle Indo-Aryan languages) (General outline only)

b) Significant features of the grammar with particular stress on Sandhi Karaka, Samasa and Vachya (voice)

2. General knowledge of literary history and Principal trends of literary criticism. Origin and development of literary, genres, including Epic, Drama, Prose, Kavya, Lyric and Anthology.

3. Essentials of Ancient Indian Culture and Philosphy with special stress on: Varnashrama Vyavastha, Sanskaras and principal philosphical trends.

4. Short Essay in Sanskrit

Note:—Questions on sections (3) and (4) are to be answered in Sanskrit

Paper-II

1. General Study of the following works:

a. Kathopanisad
b. Bhagavadgita
c. Budhacharita- (Asvaghosha)
d. Svapnavasavadatta - (Bhasa)
e. Abhijinanshakuntalam - (Kalidasa)
f. Meghaduta - (Kalidasa)
g. Raghuvansa - (Kalidasa)
h. Kumarashambhava - (Kalidasa)
i. Mricchakalika - (Sudraka)
j. Kiratarjuniya -(Bharavi)
k. Sisupalavadha - (Magha)
l. Utlararamacharita - (Bhavabhuti)
m. Mudraaksasa - (Visakhadatta)
n. Naisadhacharita - (Sriharsa)
o. Rajatarangini - (Kathana)
p. Nitisataka - (Bhartrihari)
q. Kadambari - (Banabhatta)
r. Harsacharita (Banabhatta)
s. Dasakumaracharita - (Dandi)
t. Probodhachandrodaya - (Krishna Misra)

2. Evidence of first hand reading of the following selected texts:
Texts for reading (textual questions will be asked from these portions only)

1. Kathopanishad I Chapter III Valli - Verses 10 to 15
2. Bhagwatgita II Chapter (13 to 25 verses)
3. Budhacharita Canto III (1 to 10 Verses)
4. Svapna Vasavadattam (6th Act)
5. Abhijnana Shakuntalam (4th Act)
6. Meghaduta (1 to 10 opening verses)
7. Kirtarjuniyam (1st Canto)
8. Uttara Ramacharitam (3rd Act)
9. Nitishataka (1 to 10 verses)
10. Kadambari (Shukanasopadesha)
11. Kautilya Arthasastra - I Adhikarana;

1. Prakarana—2nd Adhyaya entitled : Vidyasamuddesha, tatra anvikisthapana and VII Prakarana—11th Adhyaya entitled : Gudhapurusolpattih. Prescribed editions R. P. Kangle. The Kautilya Arthasastra, Part-I, A critical edition, Motilal Banarsidas, Delhi 1986.

Note to item No. 2 : Question carrying minimum of 25 per cent marks should be answered in Sanskrit.

URD

U Paper-I

(a) The coming of the Aryans in India the development of the Indo-Aryan through three stages Old Indo-Aryan (OIA), Middle Indo-Aryan (MIA) and New Indo-Aryan (NIA) Grouping of the New Indo-Aryan Languages Western Hindi and its Dialects—Khari Boli, Braj Bhasha and Harayanvi—Relationship of Urdu to Khadi—Persio—Arabic elements in Urdu. Development of Urdu from 1200 to 1800 in the North and 1400 to 1700 in the Deccan

(b) Significant feature of Urdu Phonology—Morphology Syntax—Persio—Arabic elements in its Phonology, Morphology and Syntax its vocabulary.

(c) Dakhni Urdu—its origin and development its significant linguistic features.

(d) The significant features of the Dakhani Urdu literature (1450-1700). The two classical backgrounds of Urdu Literature—Persio—Arabic and Indian Mysnavi, Indian tales the influence of the West on Urdu Literature classics genres—Ghazal, Mysticism, Qasida, Rubar, Qita, Prose Fiction, Modern Genres, Blank Verse, Free verse, Novel Short Stories, Drama Literary criticism and Essay.

Paper-II

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

PROSE

1.	Mir Amman	Bagh-o-Bahar
2.	Ghalib	Khatut-e-Ghalib (Anjuman Tartaque- e-Urdu)
3.	Hali	Muqaddama-e-Sher-o-Shair
4.	Ruswa	Umar-o-Jan Ada
5.	Prem Chand	Wardat
6.	Abdul Kalam Azad	Ghubar-e-Khatir
7.	Imtiaz Ali Taj	Anar Kali

POETRY

8.	Mir	Inti khab-e-Kalam-e-mir (Ed. Abdul Haq)

9.	Sauda	Qasaid (including Hajwaiyat)
10.	Ghalib	Diwan-e-Ghalib
11.	Iqbal	Bal-e-Gibrail
12.	Josh Malihabadi	Saif-o-Sabu
13.	Firaq Gorakhpuri	Ruhe-e-Kainat
14.	Faiz	Kalam-e-Fiaz (Complete)

MANAGEMENT

Paper-I

The candidate should make a study of the development of the field of management as a systematic body of knowledge and acquaint himself adequately with the contributions of leading authorities on the subject. He should study the role, function and behaviour of a manager and relevance of various concepts and theories to the Indian context. Apart from these general concepts, the candidate should study the environment of business and also attempt to understand the tools and techniques of decision making.

The candidate would be given choice to answer any five questions.

Organisational Behaviour & Management Concepts

Significance of social, psychological factors for understanding organisational behaviour. Relevance of theories of motivation, Contribution of Maslow, Herzberg, McGregor, McClelland and other leading authorities, Research studies in leadership. Management by Objectives. Small group and intergroup behaviour. Application of these concepts for understanding the managerial role, conflict and cooperation, work norms, and dynamics of organisational behaviour. Organisational change.

Organisational Design: Classical, neo-classical and open systems, theories of organisation. Centralisation, decentralisation, delegation, authority and control. Organisational structure, systems and processes, strategies, policies and objectives, Decision making, communication and control. Management information system and role of computer in management.

ECONOMIC ENVIRONMENT

National Income, analysis and its use in business forecasting. Trends and structure in Indian Economy, Government programmes and policies. Regulatory policies: monetary, fiscal and planning and the impact of such macro-policies on enterprise decisions and plans- Demand analysis and forecasting, cost analysis, pricing decisions under different market structures-Pricing of joint products and price discrimination - capital budgeting - applications under Indian conditions. Choice of projects and cost benefit analysis, choice of production techniques.

QUANTITIATVE METHODS

Classical Optimization: maxima and minima of single and several variables: optimization under constraints - Applications. Linear Programming: Problem formulation Graphical Solution - Simplex Method Duality - Post optimality analysis - Applications of

integral Programming and dynamic programming - Formulation of Transportation and assignment. Models of linear programming and methods of solutions.

Statistical Methods: Measures of Central tendencies and variations - Application of Binomial, Poisson and Normal distributions. Time series - Regression and correlation - Tests of Hypotheses - Decision making under risk: Decision Trees - Expected Monetary Value - Value of Information - Application of Baves Theorem to posterior analysis. Decision making under uncertainty. Different criterion for selecting optimum strategies.

Paper-II

The candidate would be required to attempt five questions but not more than two questions from anyone Section.

Section I - Marketing Management

Marketing and Economic Development - Marketing Concept and its applicability to the Indian economy- Major tasks of management in the context of developing economy - Rural and Urban marketing, their prospects and problems.

Planning and Strategy in the context of domestic and export marketing - concept of marketing mix - Market Segmentation and Product differentiation strategies - Consumer Motivation and Behaviour - Consumer Behavioural Models - Product, Brand, distribution, public distribution systems, price and promotion.

Decisions - Planning and control of marketing programmes - marketing research and Models - Sales Organisation dynamics - Marketing Information System. Marketing audit and control.

Export incentives and promotional strategies - Role of Government, trade association and individual organisation - problems and prospects of export marketing.

Section II - Production and Materials Management

Fundamentals of Production from Management point of view. Types of Manufacturing systems, continuous repetitive, intermittent. Organising for Production, Long-range, forecast and aggregate Production Planning. Plant Design: Process planning, plant size and scale of operations, location of plant, layout of physical facilities. Equipment replacement and maintenance.

Functions of Production Planning and Control Routing. Loading and Scheduling for different types of production systems. Assembly Line, Balancing, Machine Line Balancing.

Role and Importance of materials management, Material handling, Value analysis, Quality Control, Waste and Scrap disposal, Make or Buy decision, Codification, Standardisation and spare parts inventory. Inventory control- ABC Analysis. Economic order quantity, Reorder point Safety stock. Two Bin system. Waste management DGS&D purchase process and procedure.

Section III - Financial Management

General tools of Financial Analysis: Ratio analysis, funds flow analysis, cost-volume profit analysis, cash budgeting, financial and operating leverage.

Investment Decision: Steps in capital expenditure management, criteria for investment appraisal, cost of capital and its application in public and private sectors, Risk analysis in investment decisions, organisational evaluation of capital expenditure management with special reference to India.

Financing decision: Estimating the firms of financial requirements, financial structure determinations, capital markets, institutional mechanism for funds with special reference to India, security analysis, leasing and sub contracting.

Working Capital Managements: Determining the size of working capital, managing the managerial attitude towards risk in working capital, management of cash, inventory and accounts receivables, effects of inflation on working capita management Income Determination and Distribution: internal financing, determination of dividend policy, implication of inflationary tendencies in determination of dividend policy, valuation and dividend policy.

Financial Management in Public Sector with special reference to India.

Performance budgeting and principles of financial accounting. Systems of management control.

Section- IV: Human Resource Management

Characteristics and significance of Human Resources, Personnel Policies-Manpower, Policy and Planning- recruitment and Selection Technique- Training and Development Promotions and Transfer; Performance Appraisal-Job Evaluation: Wage and Salary.

Administration: Employee morals and Motivation; Conflict Management; Management of change and Development.

Industrial Relations, Economy and Society in India; Worker profile and Management Styles in India; Trade Unionism in India; Labour Legislation with special reference to Industrial disputes Act; Payment of Bonus Act: Trade Unions Act; Industrial democracy and Workers participation in management; Collective Bargaining; Consiliation and adjudication; Discipline and Grievances Handling in industry.

MATHEMATICS

Paper-I

Any five questions may be attempted out of 12 questions to be set in the paper.

Linear Algebra

Vector space, bases, dimension of a finitely generated space, Linear Transformations, Rank and nullity of a linear transformation, Cayley Hamilton theorem, Eigen values and Eigen-vectors.

Matrix of a linear transformation. Row and Coloumn reduction. Echelon form. Equivalence, Congruence and similarity. Reduction to canonical forms.

Orthogonal, symmetrical, skew-symmetrical, unitary, Hermitian and skew-Hermitian matrices-their eigen values, orthogonal and unitary reduction of quadratic and Hermitian forms. Positive definite quadratic forms. Simultaneous reduction.

Calculus.

Real numbers, limits, continuity, differentiability, Mean-value theorem, Taylor's theorem, indeterminate forms, Maxima and minima. Curve Tracing.

Asymptotes.

Functions of several variables, partial derivatives, maxima and minima, Jacobian, Definite and indefinite integrals, Double and triple integrals (techniques only). Application to Beta and Gamma Functions. Areas volumes; centre of gravity.

Analytic Geometry of two and three dimensions.

First and second degree equations in two dimensions in cartesian and polar coordinates. Plane, sphere, paraboloid, Ellipsoid, hyperboloid of one and two sheets and their elementary properties. Curves in space, curvature and torsion, Frenet's formulae.

Differential Equations.

Order and Degree of a differential equation; differential equation of first order and first degree, variables seperable. Homogeneous, linear, and exact differential equations. Differential equations with constant coefficients. The complementary function and the particular integral of e^{ax}, Cos^{ax}, sin^{ax}, x^m, e^{ax},Cos^{bx}, e^{ax} Sin^{bx}

Vector, Tensor, Statics, Dynamics and Hydrostatics.

(i) Vector Analysis- Vector Algebra, Differentiation of Vector function of a scalar variable, Gradient, divergence and curl in cartesian, cylindrical and spherical coordinates and their physical interpretation. Higher order derivatives. Vector identities and Vector equations, Gauss and Stokes Theorems.

(ii) Tensor Analysis- Definition of a Tensor, Transformation of coordinates, contravariant and covariant tensors. Addition and multiplication of tensors, contraction of tensors. Inner product, fundamental tensor, christoffel symbols, covariant differentiation, Gradient, Curl and divergence in tensor notation.

(iii) 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.

(iv) Dynamics- Degree of freedom and constraints. Rectilinear motion, Simple harmonic motion. 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 resistance.

(v) 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 of gases, problems relating to atmosphere.

Paper-II

This paper will be in two sections. Each section will contain eight questions. Candidates will have to answer any five questions.

Section-A

Algebra, Real Analysis, Complex Analysis, Partial Differential equations.

Section-B

Mechanics, Hydrodynamics, Numerical Analysis, Statistics including probability, operational Research.

Algebra

Groups, Subgroups, normal subgroups, homomorphism of groups, quotient groups. Basic isomorphism theorems. Sylow theorems Permutation Groups. Cayley's theorem. Rings and Ideals, Principal Ideal domains unique factorization domains and Euclidean domains. Field Extensions finit fields.

Real Analysis

Metric spaces, their topology with special reference to R sequence in a metric space, Cauchy sequence, Completeness, completion, Continuous functions, Uniform Continuity, Properties of continuous functions on compact sets. Riemann Steilties Integral, Improper integrals and their conditions of existence. Differentiation of functions of several variables.

Implicit function theorem, maxima and minima. Absolute and Conditional Convergence of series of real and Complex terms, Rearrangement of series, Uniform convergence, infinite products. Continuity, differentiability and integrability for series, Multiple integrals.

Complex Analysis

Analytic functions, Cauchy's theorem, Cauchy's integral formula power series, Taylor's series, Singularities, Cauchy's Residue theorem and Contour integration.

Partial Differential Equations

Formation of partial differential equations, Types of integrals of partial differential equations of first order, Charpits methods, partial differential equation with constant coefficients.

Mechanics

Generalised Coordinates, Constraints, holonomic and non holonomic systems, D'Alembert's principle and Langranges equations, Moment of Inertia, Motion of rigid bodies in two dimension,

Hydrodynamics.

Equation of continuity, momentum and energy. Inviscid Flow Theory :—

Two dimensional motion, Streaming motion, Sources and Sinks

Numerical Analysis

Transcedental and Polynomial Equations:- Methods of tabulation, bisection, regulatalsi, secants and Newton- Raphson and order of its convergence.

Interpolation and Numerical Differentiation:- Polynomial interpolation with equal or unequal step size. Spline interpolation-Cubic splines, Numerical differentiation furmulae with error terms.

Numerical Integration:- Problems of approximate quadrative, quadrature formulae with equispaced arguments, Caussian quadrature Convergence.

Ordinary Differential Equations:- Euler's method, multisteppredictore Corrector methods-Adam's and Milne's method, Convergence and stability, Runge-Kutta methods. Probability and Statistics.

1. Statistical Methods :- Concept of Statistical population and random sample, collection and presentation of data, Measure of location and dispersion. Moment and Shepard's corrections. Comulants. Measures of Skew ness and Kurtosis.

Curve fitting by least squares Regression, correlation and correlation ratio. Rank correlation, partial correlation co-efficient and Multiple Correlation co-efficient.

2. Probability:- Discrete sample space, Events, their union and intersection etc. Probability Classical relative frequency and exiomatic approaches, Probability in continuum, Probability space Conditional probability and independence, Basic laws of Probability, Probability of combination of events, Bayes theorem, Random Variable probability function, Probability density function. Distributions function, mathematical expectation, Marginal and conditional distributions, Conditional expectation.

3. Probability distributions:- Binomial, Poisson, Normal, Gamma, Beta Cauchy, Multinomial, Hypergeometric, Negative Binomial, Chebychev's lemma (weak) Law of large numbers, Central limit theorem for independent and identical varieties. Standard

errors, Sampling distribution of t F and Chi-square and their uses in tests of significance large sample tests for mean and proportion.

Operational Research

Mathematical Programming:- Definition and some elementary properties of convex sets, simplex methods, degeneracy, duality, and sensitivity analysis, rectangular games and their solutions, Transportation and assignment problems, Kuha Tukcer condition for non-linear programming. Bellman's optimality principle and some elementary applications of dynamic programming.

Theory of Queues:- Analysis of steady- State and transient solutions for quequeing system with Poisson arrivals and exponential service time.

Deterministic replacement models, Sequencing problems with two machines, n jobs 3 machines, n jobs (Special case) and n machines 2 jobs.

MECHANICAL ENGINEERING

Paper-I

Statics:- Equilibrium in three dimensions suspension cables. Principle of virtual work.

Dynamics:- Relative motion coriolis force Motion of a rigid body. Gyroscopic motion impulse.

Theory of Machines:- Higher and lower parts inversions, steering mechanisms, Hooks joint, velocity and acceleration of links, inertia forces. Cams Conjugate action of gearing and interference, gear trains epicyclic gears, Clutches, belt drives, brakes, dynamometers, Flywheels Governors. Balancing of rotating and reciprocating masses and multicylinder engines. Free, forced and damped vibrations for a single degree of freedom. Degree of freedom. Critical speed and whirling of shafts.

Mechanics of solids:- Stress and strain in two dimensions. Mohr's circle. Theories of failure, Deflection of beams. Buckling of columns. Combined bending and torsion. Castiglapo's theorem. Thick cylinders Rotating disks, Shrink fit. Thermal Stresses.

Manufacturing Science:- Merchants theory Taylors equation Machineability. Unconventional machining methods including EDM, ECM and ultrasonic machining. Use of lasers and plasms. Analysis of forming process. High velocity forming. Explosive forming. Surface roughness, gauging comparators jigs and Fixtures.

Production management:- Work simplification, work sampling, value engineering, Line balancing, work station design, storage space requirement, ABC analysis, Economic order, quantity including finite production rate. Graphical and simplex methods for linear programming; transportation model, elementary queing theory. Quality control and its uses in product design. Use of X,R,P (Sigma) and C charts. Single sampling plans, operating characteristics curves, Average sample size. Regression analysis.

Paper-II

Thermodynamics:- Applications of the first and second laws of thermodynamics. Detailed analysis of thermodynamics cycles.

Fluid Mechanics:- Continuity momentum and energy equations. Velocity distribution in laminar and turbulent flow. Dimensional analysis. Boundary layer on a flat plate. Adiabatic and isentrophic flow. Mach number.

Heat transfer:- Critical thickness of insulation conduction in the presence of heat sources and sinks. Heat transfer from fins. One dimensional unsteady conduction Time constant for thermocouples. Momentum and energy equations for boundary layers on a flat plate. Dimensionless numbers Free and Forced convection Boiling and condensation nature of radiant heat. Steafan- Boltzmann Law, Configuration factor logarithmic mean temperature difference. Heat exchanger effectiveness and number of transfer units.

Energy Conversion:- Combustion phenomenon in C.I. and S.I. engines Carburetion and fuel injection. Selection of pumps, classification of compressor Analysis of steam and gas turbines. High pressure boilers. Unconventional power systems. including Nuclear power and MHD systems. Utilisation of solar energy.

Environmental control:- Vapour compression, absorption, steam jet and air refrigeration systems. Properties and characteristics of important refrigerants. Use of psychrometric chart and comfort chart, estimation of cooling and heating loads. Calculation of supply air state and rate. Air conditioning plants layout.

PHILOSOPHY

Paper-I

Metaphysics and Epistemology

Candidates will be expected to be familiar with theories and types of Epistemology and Metaphysics- Indian and Western- with special reference to the following:

(a) Western-Idealism; Realism; Absolutism; Empiricism Rationalism; logical 'I' Positivism; Analysis; Phenomenlogy; Existentialism and Pragmatism.

(b) Indian-Paramands and Paramanys; Theories of truth and error; Philosophy of language of Meaning; Theories of reality with reference to main system (Orthodox and Heterodox) of Philosophy.

Paper-II

Socio-Political Philosophy and Philosophy of Religion.

1. Nature of Philosophy its relation to life, thougth and culture.

2. The following topics with special reference to the Indian context including Indian Constitution:

Political Ideologies: Democracy Socialism, Fascism, Theocracy, Communism and Sarvodaya.

Methods of Political Action: Constitutionalism, Revolution, terrorism and Satyagrah.

3. Tradition, Change and Modernity with reference to Indian Social Institutions.

4. Philosophy of Religious language and meaning.

5. Nature and scope of Philosophy of religion. Philosophy of Religion, with special reference to Buddhism, Jainism, Hinduism, Islam, Christianity, and Sikhism.

a. Theology and Philosophy of Religion.

b. Foundations of religious belief: Reason, Revelation Faith and Mysticism.

c. God, immortality of Soul, Liberation and Problem and Evil and Sin.

d. Equality; Unity and Universality of Religions; Religious tolerance; Conversion Secularism.

6. Moksha- Paths leading to Moksha

PHYSICS

Paper-I

MECHANICS, THERMAL PHYSICS AND WAVES AND OSCILLATIONS

1. Mechanics

Conservation laws; Collision impact parameter, scattering cross-section, centre of mass and lab systems with transformation of physical quantities, Rutherford Scattering. Motion of a rocket under constant force field. Rotating frames of reference, Coriolis force, Motion of rigid bodies, Angular momentum, torque and Procession of a Top, gyroscope, Central forces Motion under inverse square law, Kepler's law, Motion of Satellites (including geostationary). Galilean Relativity, Special theory of Relativity, Michelson- Morley Experiment, lorentz Transformations addition theorem of velocities. Variation of mass with Velocity, Mass-energy equivalence. Fluid dynamics, streamlines, turbulance, Bernoulli's Equation with simple applications. .

2. Thermal Physics:

Laws of Thermodynamics, Entropy, Carnot's cycle, Isothermal and Adiabatic changes. Thermodynamic Potentials, Maxwell's relations, the Clausius- Clapeyron equation, reversible cell, Joule- Kelvin effect, Stefan Boltzmann Law. Kinetic Theory of Gases, Maxwell's Distribution law of Velocities, Equipartition of Energy, Specific heats of gases, mean Free path, Brownian Motion, Black Body radiation, specific heat of solids- Einstein and Debye theories, Wein's Law, Planck's Law, Solar constant. Thermalionization and stellar spectra. Production of low temperatures using adiabatic demagnetization and dilution refrigeration, Concept of negative temperature.

3. Waves and Oscillations:

Oscillations, Simple harmonic motion, stationary and travelling waves, Damped harmonic motion, Forced Oscillation and Resonance. Wave equation, Harmonic solutions, Plane and Spherical waves, superposition of waves, Phase and Group velocities, Beats, Huygen's principle, interference. Diffraction Fresnel and Fraunhofer. Diffraction by straight edge, single and multiple slits. Resolving power of grating and Optical Instruments. Rayleigh criterion. Polarization; Production and Detection of polarized light (linear, circular and elliptical), Laser sources (Helium-Neon, Ruby, and semi conductor diode). Concepts of spatial and temporal coherence. Diffraction as a Fourier Transformation. Fresnel and Fraunhofer diffraction by rectangular and circular apertures, Holography; theory and applications.

Paper-II

ELECTRICITY AND MAGNETISM, MODERN PHYSICS AND ELECTRONICS

1. Electricity and Magnetism

Coulomb's Law. Electric field. Gauss's Law, Electric -potential, Poisson and Laplace equations for a homogeneous dielectric, uncharged conducting sphere in a uniform field, Point charge and infinite conducting plane. Magnetic shell. Magnetic induction and field strength. Biot-Savart law and applications. Electromagnetic induction, Faradays's and Lenz's laws, Self and Mutual inductances. Alternating currents. L.C.R. circuits, series and parallel resonance circuits, quality factor. Kirchoffs laws with applications. Maxwell's equations and electromagnetic waves. Transverse nature of electromagnetic waves, Poynting vector. Magnetic fields in matter-dia para, ferro antiferro and ferri magnetism (qualitative approach only).

2. Modern physics

Bohr's theory of hydrogen atom. Electron spin. Optical and X-ray Spectra. Stern-Gerlach experiment and spatial quantization. Vector model of the atom, spectral terms, fine structure of spectral lines J-J and L-S coupling, Zeeman effect, Paulis 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. Debroglie waves. Wave Particle duality and uncertainty principle. Schrodinger wave equation with application to (i) particle in a box, (ii) motion across a step potential, One dimensional harmonic oscillator eigen values and eigen functions. Uncertainty, Principle Radioactivity. alpha, beta and gamma radiations. Elementary theory of the alpha decay. Nuclear binding energy. Mass spectroscopy, Semi empirical mass formula. Nuclear fission and fusion-Elementary reactor Physics.

Elementary particles and their classification, Strong, and weak Electromagnetic interactions. Particle accelerator; cyclotron, Leniar accelerators, Elementary particles and their classification Strong, and Weak electromagnetic interactions.

Particle accelerator ; cyclotron, Linear accelerators, Elementary ideas of superconductivity.

3. Electronics

Band theory of solids- conductors, insulators and semiconductors, intrinsic and extrinsic semiconductors P-N junction, thermistor, Zenner diodes reverse and forward biased P-N junction, solar cell. Use of diodes and transistors for rectification, amplification, oscillation, modulation and detection of r.t. waves. Transistor receiver, Television, Logic Gates.

POLITICAL SCIENCE AND INTERNATIONAL RELATIONS

Paper-I

Section A

POLITICAL THEORY

1. Main features of ancient Indian political thought; Manu and Kautilya; Ancient Greek thought; Plato, Aristotle; General characteristics of European medieval political thought; St Thomas Aquinas, Marsiglio of Padua; Machiavelli; Hobbes, Locke, Montesquieu, Rousseau, Bentham, J.S.MiII, T.H. Green, Hegal, Marx, Lenin and Mao-Tse-Tung.

2. Nature and scope of Political Science: Growth of Political Science as a discipline. Traditional Vs contemporary approaches; Behaviouralism and post-behavioural developments; Systems theory and other recent approaches to political analysis, Marxist approach to political analysis.

3. The emergence and nature of the modern State: Sovereignty: Monistic and Pluralistic analysis of sovereignty; Power Authority and Legitimacy.

4. Political obligation: Resistance and Revolution; Rights, Liberty, Equality, Justice.
5. Theory of Democracy.

6. Liberalism, Evolutionary Socialism (Democratic and Fabian) : Marxian -socialism Fascism.

Section B

GOVERNMENT AND POLITICS WITH SPECIAL REFERENCE TO INDIA

1. Approaches to the study of Comparative Politics: Traditional Structural-Functional approach

2. Political Institutions: The Legislature, Executive and Judiciary; Parties and Pressure-. Groups; Theories of Party system, Lenin, Michels and Duverger, Electoral System; Bureaucracy-Weber's views and modern critiques of Weber.

3. Political Process: Political Socialization, modernization and Communication; the nature of the non-western political process; A general study of the constitutional and political problems affecting Afro-Asian Societies.

Indian Political System (a) - The Roots; Colonialism and Nationalism in India; A General study of modern Indian social and political thought; Raja Ram Mohan Roy, Dadabhai Nauroji, Gokhale, Tilak, Sri Aurobindo, Iqbal, Jinnah Gandhi,B.R. Ambedkar, M.N. Roy and Nehru.

(b) The structure of Indian Constitution. Fundamental Rights and Directive Principles; Union Government, parliament, Cabinet, Supreme Court and Judicial Review; Indian Federalism Centre-State relations with spl. focus on Jammu and Kashmir State, State Government, Role of the Governor; Panchayati Raj.

(c) The Functioning-Class and caste in Indian politics, politics of regionalism, Linguism and communalism. Problems of secularization of the policy and national integration, Political elites; the changing composition, Political Parties and political participation, Planning and developmental administration. Socio-economic changes and its impact on Indian democracy. Emergence and evoution of party system in J&K.

Paper-II

PART I

1. The nature and functioning of the Sovereignation State system.

2. Concepts of International Politics; Power: National Interest; Balance of Power; "Power Vaccum."

3. Theories of International Politics, The Realist theory; Systems theory; Decision making.

4. Determinants of foreign policy: National Interest; Ideology; Elements of National Power (including nature of domestic socio-political institution).

5. Foreign Policy choices: Imperialism; balance of Power; Allegiances; Isolationalism; Nationalistic Universalism (Pax Britiannica, Pax Americana, Pax-Sovietica); The 'Middle Kingdom' complex of China; Non-alignment.

6. The cold War: Origin, evolution and its impact on international relations: Defence and its impact; a new Cold War?

7. Non-Alignment: Meaning, Bases (National and international) the non-aligned Movement and its role in international relations.

8. De-colonization and expansion of the international community; Neo-colonialism and racialism their impact on international relations; Asian-African resurgence.

9. The present International economic order; Aid, trade and economic development; the struggle for the New International Economic Order; Sovereignty over natural resources; the crisis in energy resources.

10. The Role of the International law in international relations; The International Court of Justice.

11. Origin and Development of International Organizations; The United Nations and specialized Agencies; their role in international relations.

12. Regional Organisations : OAS, OAU, the Arab League, the ASEAN, the EEC, their role in international relations.

13. Arms race disarmament and arms control; Conventional and nuclear arms, The Arms Trade; its impact on Third world role in international relations.

14. Diplomatic theory and practice

15. External intervention; ideological, Political and economic, "Cultural imperialism" Covert intervention by the major powers.

Part-II

1. The uses and mis-uses of nuclear energy; the impact of nuclear weapons on international relations; the Partial Test-ban Treaty; the Nuclear Non-Proliferation Treaty (NPT); Peaceful nuclear explosions (PNE).

2. The problems and prospects of the Indian Ocean being made a peace-zone.

3. The Conflict situation in West Asia.

4. Conflict and co-operation in South-Asia.

5. The (Post-war) foreign policies of the major powers: United States, Soviet Union, China.

6. The Third world in international relations; the North-South" Dialogue" in the United Nations and outside.

7. India's foreign policy and relations; India and the Super Powers; India and its neighbour; India and South-east Asia; Indian and African problems; India's economic diplomacy; India and the question of nuclear weapons.

PSYCHOLOGY

Paper - I

FOUNDATIONS OF PSYCHOLOGY

1. The Scope of Psychology
   Place of Psychology in the family of social and behavioural sciences.

2. Methods of Psychology
   Methodological problems of psychology.
   General design of psychological research.

Types of psychological research. The characteristics of psychological measurement.

3. The nature, origin and development of human behaviour. Heredity and environment. Cultural factors and behaviour. The process of socialisation, Concept of National Character.

4. Cognitive Processes

Perception, Theories of perception, Perceptual organisation. Person perception. Perceptual defence. Transactional approach to perception, Perception and personality. Figural after-effect. Perception styles. Perceptual abnormalities, Vigilance.

5. Learning

Cognitive, Operant and Classical conditioning approaches. Learning phenomena, Extinction, Discrimination and generalisation. Discrimination learning. Probability learning . Programmed learning.

6. Remembering

Theories of remembering, Short term memory. Long term memory. Measurement of memory. Forgetting. Reminiscence.

7. Thinking

Problem solving concept formation, Strategies of concept formation, Information processing, Creative thinking. Convergent and Divergent thinking. Development of thinking in children, theories.

8. Intelligence

Nature of intelligence. Theories of Intelligence. Measurement of intelligence. Measurement of creativity. Aptitude. Measurement of aptitudes. The Concept of social intelligence.

9. Motivation

Characteristics of motivated behaviour. Approaches to motivation. Psycho-analytic theory; Drive theory; Need hierarchy theory, Vector valence approach, Concept of level of aspiration. Measurement of motivation. the apathetic and the alienated individual, Incentives.

10. Personality

The concept of personality. Trait and type approaches. Factorial and dimensional approaches. Theories of personality; Freud, Allport, Murray, Cattell, Social learning theories and Field theory. The Indian approach to personality the concept of Gunas. Measurement of personality Questionnaires:

Rating scales: Psychometric Tests; Projective Tests; observation method.

11. Language and communication.

Psychological basis of language. Theories of language development skinner and chomsky. Non-Verbal communication. Body language. Effective communication: Source and receiver characteristics. Persuasive communications.

12. Attitudes and Values

Structure of attitudes. Formation of Attitudes. Theories of attitudes. Attitude measurement. Types of attitude scales. Theories of attitude change values types of value, Motivational properties of values, Measurement of values.

13. Recent trends

Psychology and the Computer, Cybernetic model of behaviour. Simulation "studies in psychology. Study of consciousness. Altered states of consciousness; Sleep, dream, meditation and hypnotic trance; drug induced changes, Sensory deprivation, Human problems in aviation and space flight.

14. Models of Man.

The Mechanical Man. The organic Man. The organisational man. The humanistic Man. Implications of the different models for behaviour changes. An integrated model.

Paper II

PSYCHOLOGY ISSUES AND APPLICATIONS

1. Individual difference :

Measurement of individual differences: Types of psychological tests. Construction of psychological tests. Characteristics of a good psychological test. Limitations of. psychological test.

.2. Psychological Disorders:

Classification of disorders and nosological systems. Neurotic, psychotic and psychophysiologic disorders. Psychopathic personality. Theories of psychological disorder. The problem of anxiety, depression and stress

3. Therapeutic Approaches:

Psychodynamic approach, Behaviour therapy, Client centered therapy, Cognitive therapy, Group therapy.

4. Application of psychology to organisations and industrial problems:

Personnel selection, Training, Work motivation, Theories of work motivation, job designing, Leadership training, Participatory management.

5. Small Group:

   The concept of small group, properties of groups, Group at work. Theories of group behaviour. Measurement of group behaviour, interaction process analysis, interpersonal' relations.

6. Social Change:

   Characteristics of social change, Psychological basis of change, Steps in the change process. Resistance to change. Factors contributing to resistance. Planning for change. The concept of change proneness.

7. Psychology and the Learning Process:

   The Learner, School as an agent of socialisation. Problems relating to adolescents in learning situations, Gifted and retarded children and problems related to their training.

8. Disadvantaged Groups.

   Types: Social, Cultural and economic, Psychological consequences of disadvantage. Concept of deprivation. Educating the disadvantaged groups. Problems of motivating the disadvantaged groups.

9. Psychology and the problem of Social integration.

   The problem of ethnic prejudice. Nature of prejudice. Manifestations of prejudice. Development of prejudice.' Measurement of prejudice. Amelioration of prejudice. Prejudice and personality. Steps to achieve social integration.

10. Psychology and Economic Development.

    The. nature of achievement motivation. Motivating people for achievement. Promotion of entrepreneurship. The Entrepreneur Syndrome, Technological change and its impact on human behaviour.

11. Management of information and Communication.

    Psychological factors in Information management, information overload. Psychological basis of effective communication. Mass media and their role in social change. Impact of television. Psychological basis of effective advertising.

12. Problems of Contemporary Society, Stress, Management of stress.

    Alcoholism and Drug Addiction. The Socially Deviant. Juvenile Delinquency. Crime Rehabilitation of the deviant. The problem of the aged.

PUBLIC ADMINISTRATION

Paper-I

Administrative theory

1. Basic Premises, Meaning scope and significance of public administration; Private and public administration; its role in developed and developing societies; Ecology of administration- social, economic, cultural, political and legal; Evolution of Public administration as a discipline; Public Administration as an art and a Science; New Public Administration.

2. Theories of Organisation- Scientific management (Taylor and his associates); The Bureaucratic theory of organisation (Weber), Classical theory of Organisation (Henri Fayol, Luther Gulic and others): The Human Relations theory of Organisations (Elton Mayo and his Colleagues): Behavioural approach, systems Approach; Organisation Effectiveness.

3. Principles of Organisation- Hierarchy, Unity of Command authority and Responsibility, Co-ordination, Span of Control, Supervision, Centralization and decentralization, delegation.

4. Administrative Behaviour- Decision making with Special Reference to the contribution of Herbert Simon, Theories of Leadership; Communication; Morale; Motivation (Maslow and Herzberg).

5. Structure of Organisations- Chief Executive; Types of chief Executives and their functions; Line staff and Auxiliary agencies; Departments; Corporations, Companies, Boards and Commissions, Headquarters and field relationship.

6. Personnel Administration- Bureaucracy and Civil Services; Position Classification; Recruitment; Training; Career Development; Performance Appraisal; Promotion; Pay and Service Conditions; Retirement Benefits; Discipline; Employee Relations, Integrity in Administration; Generalists and Specialists Neutrality and Anonymity.

7. Financial Administration- Concept of Budget; Preparation and Execution of the Budget; Performance Budgeting; Legislative Control Accounts and Audit.

8. Accountability and Control - The concepts of Accountability and control; Legislative Executive and Judicial Control over Administration, Citizen and Administration.

9. Administrative Reforms- O&M, work study, Work Measurement; Administrative Reforms; Processes and Obstacles.

10. Administrative Law- Importance of Administrative Law; Delegated Legislation; Meaning, Types, Advantages, Limitations, Safeguards, Administrative Tribunals.

11. Comparative and Development Administration Meaning, Nature and Scope of Comparative Public Administration, Contribution of Fred Riggs with particular

reference to the Prismatic. Sale model. The concept, Scope and significance of Development Administration, Political Economic and socio- Cultural Context of Development Administration. The Concept of Administrative Development.

12. Public Policy- Relevance of Policy Making in Public Administration. The process of policy Formulation and implementation.

Paper-II

INDIAN ADMINISTRATION

i) Evolution of Indian Administration - Kautilya; Mughal period; British period.

ii) Environmental Setting- Constitution, Parliamentary Democracy, Federalism Planning, Socialism.

iii) Political Executive at the Union Level-President, Prime Minister, Council of Ministers, Cabinet Committees.

iv) Structure of Central Administration- Secretariat, Cabinet Secretariat, Ministries and Departments Boards and Commissions, field Organisations.

v) Centre-State Relations - Legislative, Administrative. Planning and Financial.

vi) Public Services- All India Services, Central Services, State Services, Local Civil Services, Union and State Public Service Commission Training of Civil Services.

vii) Machinery for Planning—Plan Formulation at the National Level ; National Development Council ; Planning commission ; Planning Machinery at the State and District Levels.

viii) Public Undertakings- Forms, management control and problems.

ix) Control of Public Expenditure- Parliamentary control; Role of the Finance Ministry, Comptroller and Auditor General.

x) Administration of Law and Order- Role of Central and State Agencies in maintenance of Law and Order.

xi) State Administration- Governor; Chief Minister. Council of Ministers; Secretariat, Chief Secretary. Directorates.

xii) District and local Administration- Role and Importance; District Collector; land and revenue, law and order and development functions District Rural Development Agency; Special Development Programmes.

xiii) Local Administration- Panchayati Raj; Urban Local Government features, Forms, Problems, Autonomy of local Bodies.

xiv) Administration for Welfare- Administration for the Welfare of weaker Sections with Particular Reference to Scheduled Castes, Scheduled Tribes, and Programmes for the Welfare of Women.

xv) Issue Areas in Indian Administration- Relationship between Political and Permanent Executives. Generalists and Specialists in Administration. Integrity in Administration. People's Participation in Administration, Redressal of Citizens Grievances, Lok Pal and Lok Ayuktas, Administrative Reforms in India.

SOCIOLOGY

Paper-I

GENERAL SOCIOLOGY

Scientific Study of Social phenomena: The emergence of sociology and its relationships with other disciplines; science and social behaviour, the problems of objectivity; the scientific method and design of sociological research; techniques of data collection and measurement including participant and non participant observation, interview schedules and questionnaires and measurement of attitudes.

Pioneering contribution to sociology: The seminal ideas of Durkheim, Weber, Red cliffe- Brown, Malinowski. Parsons, Merton and Marx historical materialism, alienation, class and class struggle Durkheim- division of labour, social fact, religion and society; Weber- social action types of authority, bureaucracy, rationality. Protestant ethnic and the spirit of capitalism ideal types.

The individual and society: Individual behaviour; Social interaction, society and social group; social system status and role; culture, personality and socialization; conformity, deviance and social control; role conflicts.

Social stratification and mobility: Inequality and stratification; different conceptions of class; theories of stratification; caste and class; class and society; types of mobility; intergenerational mobility; open and closed models of mobility.

Family, marriage and kinship; Structure and functions of family; structural principles of kinship; family, descent and kinship; change in society, change in age and sex roles and change in marriage and family; marriage and divorce.

Formal organisations; Elements of formal and informal structures bureaucracy; modes of participation-democratic and authoritarian forms, voluntary associations.

Economic system; Property Concepts, Social dimensions of division of labour and types of exchange; social aspects of pre-industrial and industrial economic system; industrialization and changes in the political, educational, religious familiar and stratificational spheres; social' determinants and consequences of economic development.

Political system; The nature of social power- community power structure; power of the elite, class power, organisation power, power of unorganized masses; power authority and legitimacy; power in democracy and in totalitarian society; political parties and voting.

Educational system; Social origins and orientation of students and teachers, equality of educational opportunity, education as a medium of cultural reproduction, indoctrination, social stratification and mobility; education and modernisation.

Religion; The religious phenomenon; the sacred and the Profane; social functions and dysfunctions of religion; magic religion and science; changes in society and changes in religion secularization.

Social change and development; Social structure and social change continuity and change as fact and as value; Processes of change; theories of change; social disorganization and social movements; types of social movements; directed social change, social policy and social development.

Paper-II

Society of India

Historical moorings of the Indian society. Traditional Hindu social organization; socio-cultural dynamics through the ages, especially the impact of Buddhism, Islam and the modern West; factors in continuity and change.

Social stratification; Caste system and its transformation aspects of ritual, economic and caste status, cultural and structural views about caste, mobility in caste, issues of equality and social justice caste among the Hindus and the non-Hindus; casteism; the Backward Classes and the Scheduled Castes; untouchability and its eradication; agrarian and industrial class structure.

Family, marriage and kinship; Regional variation in Kinship systems and its socio-cultural correlates changing aspects of kinship; the joint family its structural and functional aspects and its changing form and disorganization; marriage among different ethnic groups and economic categories, its changing trend and its future; impact of legislation and socioeconomic change upon family and marriage, intergenerations gap and youth unrest; changing status of women.

Economic system; The jajmani system and its bearing on the traditional society; market economy and its social consequences; occupational diversification and social structure profession trade unions; social determinants and consequences of economic development; economic inequalities, exploitation and corruption.

Political systems; The functioning of the democratic political system in a traditional society; political parties and their social composition; social structural origins of political elites and their social orientations, decentralization of power and political participation.

Educational system; Education and society in the traditional and the modern contests, educational inequality and change; education and social mobility, educational problems of women, the Backward Classes and the Schedule Castes.

Religion: Demographic dimensions, geographical distribution and neighbourhood living patterns of major religious categories; interreligious interaction and its

manifestation in the problems of conversion, minority status and communalism, secularism.

Tribal societies and their integrations: Distinctive features of tribal communities, tribes and caste; accuituration and integration.

Rural social system and community development; Socio- cultural dimensions of the village community traditional power structure democratization and leadership; poverty, indebtedness and bonded labour; social consequences of land reforms, Community Development Programme and other planned development projects and of Green Revolution; New strategies to rural development.

Urban social organization; Continuity and change in the traditional cases of social organization, namely, kinships, caste and religion in the urban context; stratification and mobility in urban communities, ethnic diversity and community integration; urban neighbourhoods; rural urban differences in demographic and socio-cultural characteristics and their social consequences. Population dynamics: Socio-cultural aspects of sex and age structure, marital status, fertility and mortality; the problem of population explosion, social, psychological, cultural and economic factors in the adoption of family planning practices.

Social change and modernization; Problems of Role conflict- youth unrest- intergenerational gap changing Status of Women; Major Sources of social change and of Resistance to change, impact of West, reform movements, social movements industrialization and urbanization, pressure groups factors of planned change- Five year Plans legislative and executive measures; process of change- sanskritization, westernization and modernization; means of modernization- mass media and education; problem of change and modernization - structural contradictions and breakdowns.

Current Social Evils: Corruption and Nepotism- Smuggling -Black money.

STATISTICS

Paper-I

Attempt any 5 questions choosing at most 2 from each section. Four questions of equal weightage will be set in each section.

i) Probability

Sample space and events, probability measure and probability space, Statistical independence, Random variable as a measureable function, discrete and continuous random variables, Probability density and distribution functions, marginal and conditional distributions functions of random variables and their distributions, expectations and movements, conditional expectation, correlation coefficient; convergence in probability in LP almost everywhere; Markov, Chebychev and Kolmogrov inequalities, Borel- Cantelli lemma, weak and strong law of large numbers probability generating and characteristic functions. Uniqueness and continuous probability distributions, their interrelations including limiting cases.

ii) Statistical Inference

Properties of estimates, consistency, unbiasedness, efficiency, sufficiency and completeness. Cramer-Rao bond, Minimum variance unbiased estimation, Rao Blockwell and Lehmann Sheffe's theorem methods of estimation by movements maximum likelihood, minimum Chi-square. Properties of maximum likelihood estimators confidence intervals for parameters of standards distributions.

Simple and composite hypotheses, statistical tests and critical region, two kinds of error, power function unbiased tests, most powerful and uniformly most powerful tests Neyman Person Lemma, Optimal tests for simple hypotheses concerning one parameter, monotone likelihood ratio property and its use in constructing UMP test, Likelihood ratio criterion and its asympiotic distribution, Chi-square and Kolmogoro tests for goodness of fit. Run test for randomness Sign test for Location, Wilcoxon-Mann-Whitney test and Kolmogor- Smirnov test for the two sample problem. Distribution free confidence intervals for quantities and confidence bands for distribution function.

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Notions of a sequential test, walds SPRT, its CC and ASN function.

iii) Linear Inference and Multivariate Analysis

Theory of least squares and Analysis of variance, Gauss-Mark off theory, normal equations, least square estimates and their precision. Tests of significance and intervals estimates based on least square theory in one way, two way and three way classified data. Regression Analysis, linear regression, estimates and tests about correlation and regression coefficient curve linear regression and orthogonal polynomials, test for linearity of regression Multivariate normal distribution, multiple regression, multiple and partial correlation. Mahalanoblis D2 and Hotening T2— Statistics and their applications (derivatiorns of distribution of D2 and T2 excluded) Fisher's discriminant analysis.

Paper-II

(i) Select any three sections

(ii) Attempt any 5 questions from the selected sections, choosing at most, two questions from each selected section. Four questions of equal weight will be set in each section.

I. Sampling Theory and Design of Experiments.

Nature and scope of sampling, simple random sampling, sampling from finite populations with and without replacements estimation of the standard errors sampling with equal probabilities and PPS sampling. Stratified random and systematic sampling two stage and multistage sampling multi phase and cluster sampling schemes.

Estimation of Population total and mean, use of biased and unbiased estimates auxiliary variables, double sampling standard errors of estimates cost and variance functions ratio and regression estimates and their relative efficiency. Planning and

organization of sample surveys with special reference to recent large scale surveys conducted in India.

Principles of experimental designs, CRD, RBD, LSD, missing plot technique factor experiments 2n and 3n design general theory of total and partial confounding and fractional replication. Analysis of split plot, BIB and simple lattice designs.

II. Engineering Statistics

Concepts of quality and meaning of control. Different type of control charts like X-R charts, P charts np charts and cumulative sum control charts.

Sampling inspection Vs 100 percent inspection. Single, double, multiple and sequential sampling plans for attributes inspection, OC, ASN and ATI curves, Concepts of producer risk and consumer's risk AQL, AQQL, LTPD etc. Variable Sampling plants.

Definition of Reliability, maintainability and availability. Life distribution failure rate and both tub, failure curve expotential and Weibull model. Reliability of series and Parallel systems and other simple configuration different types of redundancy like hot and cold and use of redundancy in reliability improvement problem in life testing censored and truncated experiments for exponential model.

III. Operational Research

Scope and definition of OR different types of models, their construction and obtaining solution.

Homogenous discrete time Markov chains, transition probability matrix, classification of states and ergodic theorems. Homogenous continuous time Markov chains. Elements of queuing theory, M/M/I and M/M/K queues, the problem of machine interference and GI/M/I and M/GI queues.

Concepts of scientific inventory management and analytical structure of inventory problems Simple models with deterministic and stochastic demand with and without lead time. Storage models with particular reference to dam type.

The Structure and formation of a linear programming problem. The simplex procedure two phase methods and charnes- M Method with artificial variables. The quality theory of linear programming and its economic interpretation Sensitivity analysis.

Transportation and assignment problems.

Replacement of items that fail and those that deteriorate, group and individual replacement policies.

Introduction to computers and elements of Fortran IV Programming formats for input and output, statements specification and logic statements and sub-routines. Applications to some simple statistical problems.

IV. Quantitative Economics

Concept of time series, additive and multiplicative models, resolution into four components, determination of trend by free- hand drawing, moving averages, and fitting of mathematical curves, seasonal indices and estimate of the variance of the random components.

Definition, construction, interpretation, and limitations of index numbers, Lespeyre Parsche Edgewoth- Marshall and Fisher index numbers their comparisons tests for index numbers and construction of cost of living index.

Theory and analysis of consumer demand- specification and estimation of demand function. Demand elasticities. Theory of production, supply functions and elasticities, input demand functions. Estimation of parameters in single equation model-classical least squares, generalised least squares heterscedasticity, serial correlation, multicollinearity, errors in variables model simultaneous equation models - identification, rank and order conditions, Indirect least squares and two stage least squares. Short term economic forecasting.

V. Demography and Psychometry

Sources of demographic data; census registration; NSS and other demographic surveys. Limitation and uses of demographic data.

Vital rates and rations; Definition construction and uses

Life tables- complete and abridged: construction of life tables from vital statistics and census returns Uses of life tables.

Logistic and other population growth curves.

Measure of fertility, Gross and net reproduction rates
Stable population theory, Uses of stable--- and quasi stable population techniques in estimation of demographic parameters.

Morbidity and its measurement Standard classification by cause of death. Health surveys and use of hospital statistics.

Educational and psychological statistics methods of standardisation of scales and tests, IQ tests, reliability of tests and T and Z scores.

ZOOLOGY

Paper-I

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

Section A

Non Chordata and Chordata

1. A general survey, classification and relationship of the various phyla.
2. Protozoa: Study of the structure, bionomica and life history of Paramaecium, Monocyotis, malarial parasite, Trypanosoma and Leishmania
   Locomotion, nutrition and reproduction in Protozoa

3. Porifiera ; Canal system, skeleton and reproduction.

4. Coelenterata: Structure and life history of Obelia and Aurelia, polymorphism in Hydrozoa, coral formation, metagenesia, phylogenetic relationship of Cinidaria and Acnidaria

5. Helminths: Structure and life History of Planaria, Fasciola, Taenia and ascaris. Parasitic adaptation, Helminths in relation to man.

6. Annelida: Neries, earth work and leech; coelom and metamerism; modes of life in polychaetes.

7. Arthropoda: Palemon, scorpion, Cockroach, larvel forms and parasitism in Crustace, mouth part vision and respiration in arthropods, social life and metamorphosis in insects. Importance of Peripatus.

8. Mollusca: Unio Pila, oyster culture and pearl formation, cephalopodes.

9. Echinodermata-General organisation, larval forms and affinities of Echinodermata.

10. General organisation and characters, outline classification and interrelationship of protochordata, Pisces,Amphibia, Reptilila, Aves and Mammalia.

11. Neoteny and retrogressive metamorphosis.

12. A general study of comparative account of the various systems of vertebrates.

13. Locomotion; migration and respiration in fishes; structure and affinities of Dipnoi.

14. Origin of Amphibia: distribution, anatomical peculiarities and affinities of Urodela and Apoda.

15. Origin of Reptiles; adaptive radiation in reptiles; 'fossil reptiles; poisonous and non poisonous snakes of India; poison apparatus of snake.

16. Origin of birds: flightless birds, aerial adaptation and migration of birds.

17. Origin of mammals; homologies of ear ossicles in mammals; dentition and skin derivatives of mammals; distribution, structural peculiarities and phylogenetic relations of Prototheria and Methatheria.

Section B

ECOLOGY, ETHOLOGY, BIOSTATICS AND ECONOMIC ZOOLOGY

Ecology

1. Environment; Abiotic factors and their role; Biotic factors- Inter and inter-specific relations.

2. Animal: Organisation at population and community levels, ecological successions.

3. Ecosystem: Concept, components, fundamental operation, energy flow, biogeo chemical cycles, food chain and trophic levels.

4. Adaptation in fresh water, marine and terrestial habitats.

5. Pollution in air, water and land.

6. Wild life in India and its conservation.

Ethology

7. General survey of Various types of animal behaviour.

8. Role of hormones and pheromones in behaviour

9. Chronobiology; Biological clock, seasonal rhythms, tidal rhythms.

10. Neuro-endocrine control of behaviour.

Economic Zoology

11. Parasitism, commensalism and host parasite relationship.

12. Parasitic protozoan's helminthis and insects of man and domestic animals.

13. Insect pests of crops and stored products.

14. Beneficial insects.

15. Pisiculture and induced breeding.

Paper-II

Cell Biology, Genetics, Evolution and Systematics, Biochemistry, Physiology and Embryology.

Section A

Cell Biology, Genetics, Evolution and Systematics

1. Cell Biology- Structure and function of cell and cytoplasmic constituents; structure of nucleus, plasma membrane, mitochondria, golgibodies, endo-plasmic reticulum and ribosomes, cell division; mitotic spindle and chromosome movements and meiosis.

Gene structure and Function; Watson -Crick model of DNA, replication of DNA Genetic code; protein synthesis cell differentation sex chromosomes and sex determination.

2. Genetics- Mendelian laws of inheritance re-combination linkage and linkage maps, multiple alleles; mutation (natural and induced) mutation and evolution, meiosis, chromosome number and form, structural rearrangements; polyploidy; cytoplasmic inheritance, regulation of gene expression in prokaryotes and eukaryotes; biochemical genetics, elements of human genetics; normal and abnormal karyotypes; genes and diseases. Eugenics.

3. Evolution and systematics- Origin of life, history of evolutionary thought Lamarck and his works. Darwin and his works sources and nature of organic variation. Natural Selection, Hardy-Weinberg law, cryptic and warning colouration mimicry; isolating mechanism, and their role Insular fauna, concept of species and sub-species, principles of classification, Zoological nomenclature and international code. Fossils, outline of geological eras phylogeny of horse, elephant, camel, origin and evolution of man, principles and theories of continental distribution of animals Zoogeographical realms of the world.

Section B

BIOCHEMISTRY, PHYSIOLOGY AND EMBRYOLOGY

1. Biochemistry: Structure of carbohydrates, lipids, aminoacids, proteins and nucleic acids, glycolysis and krebs cycle, oxidation and reduction, oxidative phosphorylation, energy conservation and release, ATP Cyclic AMP, saturated and unsaturated fatty acids, cholesterol, steroid hormones Types of enzymes, mechanism of enzyme action immunoglobulins and immunity, vitamins and co-enzymes; Hormones, their classification, biosynthesis and functions.

2. Physiology with special reference to mammals: composition of blood, blood groups in man, coagulation, oxygen and carbon dioxide transport haemoglobin, breathing and its regulation nephron and urine formation, acid base balance and homeostasis; temperature regulation in man, mechanism of conduction along axon and across synapes, neurotransmitters, vision, hearing and other receptors; types of muscles, ultra structures and mechanism of contraction of skeletal muscles, role of salivary gland, liver, pancreas and intestinal glands in digestion, absorption of digested food, nutrition and balanced diet of man, mechanism of action of steroid and peptide hormones, role of hypo-thalamus, pituitary thyroid, parathyroid, pancreas, adrenal testis ovary and pineal organs and their inter-relationships, physiology of reproduction in humans, hormonal control of development in man and insects, pheromones in insects and mammals.

Embryology: Gametogenesis, fertilization, types of eggs, cleavage, development upto gastrulation in branchiostoma, frog and chick, Fate maps of frog and chick, Metamorphosis in frog; Formation and fate of extra embryonic membrance in chick; formation of anmion allantois and types of placenta in mammals, function of placenta in mammals; organisers, Regeneration, genetic, control of development. Organogenesis of central nervous system, sense organs heart and kidney of vertebrate embryos. Aging and its implication in relation to man.

APPENDIX–III

Regulations for the Medical Examination of Candidates for admission to the Jammu and Kashmir Police (Gazetted) Service.

These regulations are intended merely for the guidance of Medical Examiners and are not meant to restrict their discretion in any manner.

1. To be passed as medically fit for admission to the J&K Police (Gazetted) Service, a candidate must be in good mental and bodily health and free from any physical defect likely to interfere with the efficient performance of the duties of his appointment.

2. The candidate's height will be measured as follows:-

He will remove his shoes and be placed against the standard with his feet together, and the weight thrown on the heels and not on the toes of outer sides of the feet. He will stand erect without rigidity and with the heel claves, buttocks and shoulders touching the standard; the chin will be depressed to bring the vertex of the heel level under the horizontal bar, and the height will be recorded in inches and parts of an inch to quarters.

*3. The candidate's chest will be measured as follows:-
He will be made to stand erect with his feet together and to raise his arms over his head. The tape will be so adjusted round the chest that its upper edge touches the interior angles of the shoulders blades behind and its lower edge the upper part of the nipple in front. The arms will then be lowered to hand loosely by the side, and care-be taken that shoulders are not thrown upwards or backwards so as to displace the tape.

The candidate will then be directed to take deep inspiration several times, and the maximum expansion of the chest will be carefully noted. The range of the expansion should not be less than 5 cm. The minimum and maximum will then be recorded in cms-84-89, 86-91 etc etc.

In recording the measurement, the following table is given for the guidance of Medical Officer:-

CHEST

Age last Birthday	Height without shoes in cms.	Girth when fully expanded (cm)	Range of expansion not less than (cm)
21and upwards	159 and under 165	88	5
	165 and under 173	89	5
	173 and under 178	90	5
	178 and under 183	91	5
	183 and upwards	93	5"

Amended vide SRO No. 154 of 2011 dated 19-05-2011

4. The candidate will also be weighed, and his weight recorded in pounds. Fractions of pound should not be noted.

5. The following conditions should be observed in connection with the test for acuteness of vision:-

Vision of Candidates.

(a) No candidate will be accepted whose vision is less than :

Better eye	Worse eye
V-5/6 Reads 6.	V-6/12 Reads 1.

Spectacles will be allowed for either eye up to plus 5.0 or minus 5.0 D; provided that there are no morbid changes in the fundus.

(b) In myopia if there is a posterior staphyloma, the spectacles must not exceed 2.5 D in either eye.

(c) In case of astigmatism, the combined lenses must not exceed 5 Diopters and there should be no fundus changes.

(d) Squint or any other morbid condition of the eyes of the lids of either eye liable to the risk of aggravation or recurrence will cause the rejection of the candidate.

(e) Each eye must have a full field of vision as tested by hand movements.

(f) Any defect in colour vision will be noted, but will not cause rejection of the candidate.

(g) In case of doubt or of serious abnormality, the opinion of the Ophthalmic Specialist will be obtained.

(h) No candidate will be accepted whose standard of vision does not come up to the specified requirements without the use of the contact glasses.

6. The Urine (passed in presence of the Examiner) should be examined and the result recorded.

7. The following additional points should be observed:

(a) That the candidate's hearing in each ear is good, and that there is no sign of disease of the ear;

(b) that his speech is without impediment;

(c) that his teeth are in good order and that he is provided with dentures where necessary for effective mastication (well filled teeth will be considered as sound).

(d) that his chest is well formed and his chest expansion sufficient, and that his heart and lungs are sound;

(e) that there is no evidence of abdominal disease;

(f) that he is not raptured;

(g) that he does not suffer from hydrocelea severe degree of varicose, varico sevens or piles.

(h) that his limbs, hands and feet are well formed and developed and that there is free and perfect motion of all his joints;

(i) that he does not suffer from any inveterate etc. skin disease;

(j) that there is no congenital malformation or defect;

(k) that he does not bear traces of acute or chronic disease pointing to an impaired constitution;

(L) that he bears marks of efficient vaccination and evidence of re-vaccination within the last 12 months.

When any defect is found it must be noted in the certificate and the medical examiner should state his opinion whether or not it is likely to interfere with the efficient performance of the duties which will be required of the candidate. If the condition is remediable by operation it should be stated.

The following intimation is made for the guidance of the Medical Examiner:-

1. In the medical examination of candidates Medical Officers are specially required to use tact and judgment and to take proper precaution to secure privacy with the object of removing any objection which may be made by individuals to stripping.

2. Should a candidate object to the Exposure of his person for the detection of haemorrhoide, venereal diseases, hernia and disease of the testicles, scrotum and rectum, the candidate must if this examination in his case is in the opinion of the Board necessary, be rejected.

3. The opinion of the Board accepting or rejecting a candidate is final and cannot be questioned on this ground. The Board is debarred from disclosing to any candidate, permanently unfit; the reasons for his rejection. In these cases their opinion and report is to be treated as strictly confidential and for the information of Government only. Where, however, the Board detects a temporary defect

amendable to treatment the candidate may be so informed in order that he may have the defect remedied and present himself for re-examination.

4. No person will be deemed qualified for admission to the service who shall not satisfy the Government that he has no disease, constitutional affection or bodily infirmity unfitting him or likely to unfit him, for that service.

5. It should be understood that the question of fitness involves the future as well as the present, and the main object of medical examination is to secure continuous effective service, and in the case of candidates for permanent appointment to prevent early pension or payment in case of premature death. It is at the same time to be noted that the question is one of the likelihood of continuous effective service and that the rejection of a candidate need not be advised on account of the presence of a defect which is only a small pro-portion of cases is found to interfere with continuous effectively service.

The candidate must make the statement required below prior to his medical examination and must sign the declaration appended thereto. His attention is specially directed to the warning contained in the note below:-

1. State your name in full.
2. State your age and birth place.
3. (a) have you ever had small pox intermittent or any other fever, enlargement of suppuration of glands, spitting of blood, asthama, inflammation of lungs, heart disease, fainting attacks, rheumatism, or appendicitis.
   (b) any other disease or accident requiring confinement to bed, and medical or surgical treatment.

OR

   (c) have you ever been rejected by a medical Board or a duly constituted Medical Authority?

4. When were you last vaccinated?
5. Have you or any of your nearer relations been affected with consumption, scrofula, asthama, fits, epilepsy, or insanity?

6. Have you suffered from any from of nervousness due to overwork or any other cause?

7. Furnish the following particulars concerning your family:-

I	II	III	IV
Father share if living and state of health	Father's age at death and cause of death	Number of brothers living, their ages and state of health	Number of brothers dead their ages and cause of death

V	VI	VII	VIII
Mother's age if living and state of health	Mother's age at death and cause of death	Number of sisters living their ages and state of health	Number of sisters dead, their ages and cause of death

I declare all the above answers to be, to the best of my belief, true and correct and accept the finding of the Board as final.

Candidate's Signature

MEDICALEXAMINER'SREPROT

Question Answers Remarks

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1. Has the declaration of the preceding page been signed by the candidate?
2. Are there any evidence of malformation congenital or acquired ?
3. Is he free from scars and has he the full use of all limbs?
4. Are there any indications of a decided cashetic or diathetic state of constitution?
5. Are there any signs of disease of the nervous system ?
6. Is the hearing good? Is there any sign of disease of the ears?
7. Has the candidate been vaccinated within the last 12 months ?
8. What is the candidate's vision? R.E.V. with glass. Reads. L.E.V. with glasses. Spectacles if any R.E.L.E.
9. Is the candidate free from stamer or other serious defect of speech ?
10. Are there any signs of disease of the bones, joints or parts connected therewith?
11. Is there any important affection of the skin?
12. (a) Are the heart and arteries healthy ? (b) Blood pressure-Systolic/Diastolic?
13. Has the candidate haemorrhoide, vericoele or other affection of veins ?
14. Is there any sign of disease of the digestive organs?

15. Are there any signs of disease of the respiratory organs ?
16. Is the candidate free from rapture?
17. Is there any indication of disease of the genial organs?
18. Is the urine free from ____ (1) Albumen (2) Sugar 1. 2. Is the urine otherwise normal?
19. Is there anything in the health of the candidate likely to render him unfit for the efficient discharge of his duties in the service for which he is a candidate?
20. Do you consider the candidate in all respects qualified for the efficient and continuous discharge of his duties in the service for which he is a candidate? Height without shoes, Girth of Chest (full inspiration). Weight President. Dated: Member. Member.

Note 1- The candidate will be held responsible for the accuracy of the above statement. By willfully suppressing any information, he will incur the risk of losing the appointment and if appointed of forfeiting all claims to superannuation allowance or gratuity.

Note 2- A candidate for direct recruitment should attach with the prescribed application a treasury receipt for an amount of Rs.16 on account of Examination fee which shall not be refundable in the event of the candidates failing to be selected by the Medical Board.

APPENDIX-IV

REGULATIONS RELATING TO THE PHYSICAL EXAMINATION OF CANDIDATES.

These regulations are notified for the convenience of candidates and in order to enable them to ascertain the probability of their coming up to the required physical standard. But it must be clearly understood that the Government reserves to themselves an absolute discretion to reject as unfit any candidate whom they may consider on the report of the Medical Board, to be physically disqualified and that their discretion, is in no respect limited by these regulations. These regulations are intended merely for the guidance of Medical Examiners and are not meant to restrict their discretion in any way.

(1) To be passed as fit for appointment, a candidate must be in good mental and bodily health and free from any physical defect likely to interfere with the efficient performance of the duties of his appointment.

Provided that Medical Board shall intimate the nature and degree of disability of physically challenged candidate in terms of Government Order No.62-SW of 2001 dated: 13.03.2001 with specific recommendations, if any, in respect of each of such candidate (s) for appointment to various posts through the Combined Competitive Examination.

(2) In the matter of correlation of age, height and chest girth of candidate, it is left to the Medical Board to use whatever correlation figures are considered most suitable as a guide in the examination of the candidates. If there be any disproportion with regard to height, weight and chest girth, the candidate should be hospitalized for investigation and X-Ray of the chest taken before the candidate is declared fit or not fit by the Board.

(3) The candidate will be weighed and his weight recorded in kilograms; fractions of a half a kilogram should not be noted:-

(4) The candidate's eye sight will be tested in accordance with the following rules. The result of each test will be recorded:-

(i) General: - The candidate's eye will be subjected to a general examination directed to the detection of any disease or abnormality. The candidate will be rejected if he suffers from any squint or morbid conditions of eyes, eye-lids or contiguous structures of such a sort as to render or likely at a future date to render him unfit for service.

(ii) Visual Activity:- The examination for determining the acuteness of vision includes two tests, one for distant, the other for near vision. Each eye will be examined separately.

There shall be no limit for minimum naked eye vision but the naked eye vision of the candidates shall, however, be recorded by the Medical Board or Medical authority in every case, as it will furnish the basic information in regard to the condition of the eye.

The standards for distant and near vision or without glasses shall be as follows:-

Distant vision			Near vision	
Better eye		Worse eye	Better eye	Worse eye
6/9		6/9	Sn 0 6	Sn. 0
	or			
6/6		6/12		

Note: - (1) Total amount of Myopia (including the cylinder) shall not exceed 8.00 D in each eye. Total Hypermetropia shall not exceed + 6.00 D in each eye

(2) Fundus Examination:- Wherever possible, fundus examination will be carried out at the discretion of the Medical Board and results recorded.

(3) Colour Vision: - Colour perception should be graded into a higher and a lower grade depending upon the size of the aperture in the lantern as described in the table below:-

Grade	Higher Grade of Colour perception	Lower Grade of Colour perception
1. Distance between the lambs Candidate.	4.9 meters	4.9 meters
2. Size of aperture	1.8 mm	1.8 mm
3. Time of exposure	5 sec.	5 sec.

(iii) Satisfactory colour vision constitutes recognition with ease and without hesitation of signal red, signal green and white colours. The use of Ishihara's Plates, shown in good light and suitable lantern like Edrige green's shall be considered quite dependable for testing colour vision. In doubtful cases, where a candidate fails to qualify when tested by only one of the two tests, both the tests should be employed.

(5) Field of Vision. The field of vision shall be tested in respect of all services by the confrontation method. Where such test gives unsatisfactory or doubtful results, the field of vision should be determined on the perimeter.

(6) Night Blindness: - Night blindness need not be tested as a routine but only in special cases. No standard test for the testing of night blindness or dark adaptation is prescribed. The medical board should be given the discretion to improvise such rough tests, e.g. recording the visual acuity with reduced illumination or by making the candidate recognize various objects in a darkened room after he/she has been there for 20 to 30 minutes. Candidate's own statements should not always be relied upon but they should be given due consideration.

(7) Ocular conditions other than visual activity:-

(a) Any organic disease or a progressive refractive error which is likely to result in lowering the visual activity should be considered as a disqualification.

(b) Trachoma:- Trachoma unless complicated shall not ordinarily be a cause for disqualification.

(c) One-eyed persons:- The employment of one eyed individuals is not recommended.

(8) Blood pressure:- The Board will use its discretion regarding Blood Pressure. A rough method of calculating normal maximum systolic pressure is as follows:-

(i)With young subjects 15-25 years of age the average is about 100 plus the age.

(ii)With subjects over 25 years of age the general rule of 110 plus half the age seems quite satisfactory.

N.B.:- As a rule any systolic pressure over 140 mm. and diastolic over 90 mm. should be regarded as suspicious and the candidate should be hospitalized by the Board before giving their final opinion regarding the candidate's fitness or otherwise. The hospitalization report should indicate whether the rise in Blood pressure is of a transient nature due to excitement etc. or whether it is due to any organic disease. In all such cases X-Ray and electrocardiographic examinations of heart and blood urea clearance test should also be done as a routine. The final decision as to the fitness or otherwise of a candidate will, however, rest with the medical board only.

Method of taking Blood Pressure.

The mercury manometer type of instrument should be used as a rule. The measurement should not be taken within fifteen minutes of any exercise of excitement. Provided the patient and particularly his arm is relaxed, he may be either lying or sitting. The arm is supported comfortably at the patient's side in a more or less horizontal position. The arm should be free from the clothes to the shoulder. The cuff completely deflated should be applied with the middle of the rubber over the inner side of the arm, and its lower edge an inch or two above the bend of the elbow. The following turns of cloth bandage should spread evenly over the bag to avoid bulging during inflation.

The brachial artery is located by palpitation at the bend of the elbow and the stethoscope is then applied lightly and centrally over it below, but not in contact with the cuff. The cuff is inflated to above 200 mm. Hg. and then slowly deflated. The level at which the column stands when soft successive sounds are heard represents the Systolic Pressure. When more air is allowed to escape the sounds will be heard to increase in intensity. The level at which the well-heard clear sound change to soft muffled fading sounds represents the diastolic pressure. The measurements should be taken in a fairly brief period of time as prolonged pressure of the cuff is irritating to the patient and will vitiate the readings. Re-checking, if necessary, should be done only a few minutes after complete deflation of the cuff. Sometime as the cuff is deflated, sounds are heard at a

certain level; they may disappear as pressure falls and re-appears at a still lower level. This "Silent gap" may cause error in reading.

(9) The urine (passed in presence of the examiner) should be examined and the results recorded. Where a Medical Board finds sugar present in a candidate's urine by the usual chemical tests, the Board will proceed with the examination with all its other aspects and will also specially note any signs or symptoms suggestive of diabetes. If except for the glycosauria the Board finds the candidate conforms to the standard of medical fitness required, they may pass the candidate. "fit subject to the glycosauria being non-diabetic" and the Board will refer the case to a specified specialist in Medicine who has hospital and laboratory facilities at his disposal . The Medical Specialist will carry out whatever examinations clinical and laboratory he considers necessary including a standard blood sugar tolerance test and will submit his opinion to the Medical Board upon which the Medical Board will base its final opinion "fit" or "unfit". The candidate will not be required to appear in person before the Board on the second occasion. To exclude the effects of medication it may be necessary to retain, a candidate for several days in hospital under strict supervision.

(10) The following additional points should be observed:-

(a) that the candidate's hearing in each ear is good and that there is no sign of disease of the ear. In case it is defective the candidate should be examined by the ear specialist. Provided that if the defect in hearing is remediable by operation or by use of a hearing aid a candidate cannot be declared unfit on that account provided he/she has no progressive disease in the ear;

(b) that his/her speech is without impediment.

(c) that his/her teeth, are in good order and that he/she is provided with denture where necessary for effective mastication (well filled teeth will be considered as sound);

(d) that the chest is well formed and his chest expansion sufficient; and that his heart and lungs are sound;

(e) that there is no evidence of any abdominal disease;

(f) that he is not raptured;

(g) that he does not suffer from hydrocele, a severe degree of varicocele, varicose venis or piles;

(h) that his limbs, hands and feet are well formed and developed and that there is free and perfect motion of all his joints;

(i) that he does not suffer from any inveterate skin disease;

(j) that there is no congenital malformation or defect;

(k) that he does not bear traces of acute or chronic disease pointing to an impaired constitution;

(L) That he bears-marks of efficient vaccination and

(m) that he is free from communicable disease.

(11) Radiographic examination of the chest should be done as a routine in all cases for detecting any abnormality of the heart and lungs, which may not be apparent by ordinary physical examination.

(12) When any defect is found it must be noted in the certificate and the medical examiner should state his opinion whether or not it is likely to interfere with the efficient performance of the duties which will be required of the candidate.

NOTE: - Candidates are warned that there is no right of appeal from a Medical Board, special or standing, appointed to determine their fitness for the above service. If however, Government are satisfied on the evidence produced before them of the possibility of an error of judgment in the decision of the First Board, it is open to Government to allow an appeal to a second Board. Such evidence should be submitted within one month of the date of the communication in which the decision of the first Medical Board is communicated to the candidate, otherwise no request for an appeal to a second Medical Board, will be considered.

If any medical certificate is produced by a candidate as a piece of evidence about the possibility of an error of judgment in the decision of the First Board, the certificate will not be taken into consideration unless it contains a note by the medical practitioner concerned to the effect that it has been given in full knowledge of the fact that the candidate has already been rejected as unfit for service by the Medical Board.

MEDICAL BOARD'S REPORT

The following intimation is made for the guidance of the Medical Examiner:-

1. The standard of physical fitness to be adopted should make on due allowance for the age and length of service, if any, of the candidate concerned.

No person will be deemed qualified for admission to the Public Service who shall not satisfy the appointing authority, as the case may be that he has no disease, constitutional affection, or bodily infirmity unfitting him, or likely to unfit him for that service

It should be understood that the question of fitness involves the future as well as the present and that one of the main objects of medical examination is to secure continuous effective service, and in the case of candidates for permanent appointment to prevent early pension or payments in case of premature death. It is at the same time to be noted that the question is one of the likelihood of continuous effective service, and that rejection of a candidate need not be advised on account of the presence of a defect

which is only a small proportion of cases is found to interfere with continuous effective service.

A lady doctor will be co-opted as a member of the Medical Board whenever a woman candidate is to be examined.

The report of the Medical Board should be treated as confidential.

In case where a candidate is declared unfit for appointment in the Government Service the grounds for rejection may be communicated to the candidate in broad terms without giving minute details regarding the defect pointed out by the Medical Board.

In case where a Medical Board considers that a minor disability disqualifying a candidate for Government Service can be cured by treatment (medical or surgical) a statement to that effect should be recorded by the Medical Board. There is no objection to a candidate being informed of the Board's opinion to this effect by the appointing authority and when a cure has been effected it will be open to the authority concerned to ask for another Medical Board.

In the case of candidates who are to be declared "Temporarily Unfit" the period specified for re-examination should not ordinarily exceed six months at the maximum. On re-examination after the specified period these candidates should not be declared temporarily unfit for a further period but a final decision in regard to their fitness for appointment or otherwise should be given.

(a) Candidate's statement and declaration:

The candidate must take the statement required below prior to his Medical Examination and must sign the Declaration appended thereto. His attention is specially directed to the warning contained in the Note below : -

1.	State your name in full (in block letters)	.....
2.	State your age and birth place	.....
3.	(a) have you ever had small-pox, intermittent or any other fever, enlargement or suppuration of glands, spitting of blood, asthma heart disease, lung disease, fainting attacks, rheumatism, appendicitis?	.....
	(b) any other disease or accident requiring confinement to bed and medical or surgical treatment ?	.....
4.	When were you last vaccinated?	.....
5.	Have you or any of your near relations been afflicted with consumption, scrofula, gout, asthma, fits, epilepsy, or insanity ?	.....

6. Have you suffered from any form of nervousness due to over-work or any other cause ? .....

7. Furnish the following particulars concerning your family:-

Father's age if Living & state of health.	Father's age at death and cause of death.	No.of brothers living their age and state of Health.	No.of brothers dead their age, at and cause of death.

Mother's age if Living & state of health.	Mother's age at death and cause of death.	No. of Sisters living, their age and state of health	No. of Sisters dead, their age at and cause of death.

8. Have you been examined by a Medical Board before? .....

9. If answer to the above is yes, please state what service/services you were examined for ? .....

10. Who was the examining authority ? .....

11. When and where was the Medical Board held ? .....

12. Result of the Medical Board's Examination if communicated to you or if known ? .....

I declare all the above answers to be, to the best of my belief, true and correct.

Candidate's Signature.....

Signed in my presence.

Signature of the Chairman of the Board.

Note:- The candidate will be held responsible for the accuracy of the above statement. By willfully suppressing any information he will incur the risk of losing the appointment and, if appointed, of forfeiting all claims to Superannuation Allowance or Gratuity.

(b) Report of Medical Board on (name of candidate) physical examination.

1. General development:- Good.....Fair.....
Poor.....

Nutrition: Thin.....Average.....Obese.....

Height (Without shoes).....Weight.....

Best Weight.....Any recent change
in weight .....Temperature.....

Girth of Chest:-

(1) (After full inspection)
(2) (After full expiration)

2. Skin: Any obvious disease .....

3. Eyes:-

(1) Any disease .....
(2) Night blindness .....
(3) Defect in colour vision .....
(4) Field of vision .....
(5)Visual acuity .....

Acuity of vision	Naked eye	With glasses	Strength of glass Sph.	Cyl.	Axix
Distant Vision	RE				
	LE				
Near Vision	RE				
	LE				

Hypermetropia (Manifest) RE/LE

4. Ears Inspection.....Hearing Right Ear.....
Left Ear.....
5. Glands.....Thyroid.....
6. Condition of teeth.....
7. Respiratory System:- Does physical examination reveal anything abnormal in the respiratory organs ? If yes, explain fully.....

8. Circulatory System:-

(a) Heart : Any organic lesions ? ..... Rate
Standing.....

(After hopping 25 times.....
2 minutes after hopping.....

(b) Blood Pressure: Systolic.....Diastolic.....

9. Abdomen: Girth.....Tenderness.....

Hernia.....

(a) Palpable : Liver.....Spleen.....
Kidneys.....Tumours.....

(b) Hemorrhoids.....Fistula.....

10. Nervous system: Indication of nervous or mental disabilities.

11. Loco-Motor System: Any abnormality.....

12. Genito Urinary System: Any evidence of Hyderocele, Variocele etc.

Urine Analysis:-

(a) Physical appearance.
(b) Sp. Gr.....
(c) Albumen.....
(d) Sugar.....
(e) Castes.....
(f) Cells.....

13. Report of X-Ray Examination of Chest.

14. Is there anything in the health of the candidate likely to render him unfit for the efficient discharge of his duties in the service for which he is a candidate.....

Note:- The Board should record their findings under one of the following three categories:-

(i) Fit.
(ii) Unfit on account of .....
(iii) Temporary unfit on account of .....

Place.....Chairman.....

Member.....

Dated..... Member.....