APPENDIX 4

PLAN OF EXAMINATION:
The competitive examination for the Combined State / Upper Subordinate Services (General Recruitment / Physically Handicapped Backlog / Special Recruitment) Examination, 2018 and Assistant Conservator of Forest / Range Forest Officer Services Examination, 2018 comprise three successive stages viz.:-
1. Preliminary Examination (Objective Type & Multiple choice).
2. Main Examination (Conventional Type, i.e. Written examination).
3. Viva-Voce (Personality Test).

PRELIMINARY EXAMINATION

The Preliminary examination for the Combined State / Upper Subordinate Services (General Recruitment / Physically Handicapped – Backlog / Special Recruitment) Examination and Assistant Conservator of Forest / Range Forest Officer Services Examination will consist of two compulsory papers of which answer sheet be on OMR sheets. The syllabus for Combined State / Upper Subordinate Services (General Recruitment / Physically Handicapped – Backlog / Special Recruitment) Examination and Assistant Conservator of Forest / Range Forest Officer Services Examination is mentioned in Appendix-5 of this advertisement. The papers shall be 200 marks each and of two hour durations. Both the papers shall be objective Type & multiple choice in which there shall be 150-100 questions Respectively. The timing of paper I will be from 9.30 to 11.30 A.M. and paper II from 2.30 to 4.30 P.M.

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

SUBJECTS FOR THE COMBINED STATE / UPPER SUBORDINATE SERVICES (GENERAL RECRUITMENT / PHYSICALLY HANDICAPPED – BACKLOG / SPECIAL RECRUITMENT) MAIN (WRITTEN) EXAMINATION:

The Written examination will consist of the following compulsory and optional subjects. The syllabus whereof is mentioned in Appendix-6 of this advertisement. The candidates have to select any one subject from the list of optional subjects for main examination which will consist of two papers.

<table>
<thead>
<tr>
<th>(A) COMPULSORY SUBJECTS</th>
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<tbody>
<tr>
<td>1. General Hindi</td>
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<tr>
<td>2. Essay</td>
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<tr>
<td>3. General Studies (First Paper)</td>
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<tr>
<td>4. General Studies (Second Paper)</td>
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<tr>
<td>5. General Studies (Third Paper)</td>
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<tr>
<td>6. General Studies (Fourth Paper)</td>
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</tbody>
</table>
Candidates are required to answer only Five questions while they must select papers of Optional subject and each section will include Four questions. The test will relate to the matter of general interest keeping the matter of academic interest in view and for general awareness, intelligence, character, expression power/personality and general suitability for the service.

The candidates will be tested with a variety of questions related to their knowledge and understanding. The test will also contain questions from general knowledge, current events, general science, logical reasoning, comprehension, etc., to assess the candidates' general awareness and intelligence.

The examination will consist of two papers, each of 200 marks. The duration of each paper will be two hours and 30 minutes.

**APPENDIX-D**

**SYLLABUS FOR THE COMBINED STATE/UPPER SUBORDINATE SERVICES (GENERAL RECRUITMENT) / PHYSICALLY HANDICAPPED-BACKLOG / SPECIAL RECRUITMENT BUREAU**

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

The test will be conducted in English and the candidates are expected to have knowledge about the following subjects:

- **History of India and Indian National Movement**: The candidates are expected to have knowledge about the major events and figures that shaped India's history.
- **Indian Polity and Administration**: The candidates are expected to have knowledge about the various aspects of Indian polity and administration.
- **Economics**: The candidates are expected to have knowledge about micro and macro economics.
- **General Science**: The candidates are expected to have knowledge about various scientific concepts and their applications.
- **General Ability**: The candidates are expected to have knowledge about general knowledge and current affairs.

The examination will be conducted in two papers, each of 100 marks. The duration of each paper will be two hours and 30 minutes.

**APPENDIX-E**

**RULES AND SYLLABUS FOR THE COMBINED STATE/UPPER SUBORDINATE SERVICES (GENERAL RECRUITMENT) / PHYSICALLY HANDICAPPED-BACKLOG / SPECIAL RECRUITMENT BUREAU**

**GENERAL EDUCATIONAL LEVEL**

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

The test will be conducted in English and the candidates are expected to have knowledge about the following subjects:

- **History**: The candidates are expected to have knowledge about the major events and figures that shaped India's history.
- **Geography**: The candidates are expected to have knowledge about various geographical concepts and their applications.
- **Economics**: The candidates are expected to have knowledge about micro and macro economics.
- **General Science**: The candidates are expected to have knowledge about various scientific concepts and their applications.
- **General Ability**: The candidates are expected to have knowledge about general knowledge and current affairs.

The examination will be conducted in two papers, each of 100 marks. The duration of each paper will be two hours and 30 minutes.
coping constant.

Problems based on UV, IR and 1H NMR Spectroscopy of simple organic compounds.

6. Organic Polymers:

Melting point determination, Polymerization, Polymers of industrial importance (Polyamides, Polyesters, Polyimides, Polycarbonates, Polylactides), Polyunsaturated fatty acids.

7. Carbohydrates

Chemical properties of disaccharides (Glucose and Fructose), Ring structure of glucose and fructose, Mutarotation, Epimerisation, Amadori rearrangement, Disaccharides (Maltose and Sucrose).

8. Pericyclic Reactions

Classification and examples, Woodward-Hoffmann Rule, Electrocyclic Reactions and CyclodDITION reactions (2+2 and 2+4 cyclodDITION reaction)

9. Heterocyclic Compounds

Preparation, Aromatics and Reactions of Pyrrole, Furan and Thiophene.

10. Environmental Chemistry Air pollutants and their toxic effects, Depletion of Ozone layer, Oxides of nitrogen, Fluorocarbons and their effect on ozone layer, Greenhouse effect, Acid rain.

4. PHYSICS: PAPER-I

Mechanics, Thermal Physics, Waves & Oscillations and Optics


Physics PAPER-II:


3. Oceanography:

Evolution of landforms; fluvial, glacial, aeolion, marine and karst Rejuvenation and Mountain Building. Isostasy; Vulcansim; Weathering and Erosion; Cycle of Erosion, Origin and structure of the Earth, Earth movements, Plate tectonics.


Physics PAPER-II:


9. Psychology: In the Clinical setting: Nature and goals of Psychotherapy, regenerative cell therapy, and behavior therapies, community mental health, illness prevention and Health promotion.

10. Environmental Psychology: Role of environment in behavior, personal space, effects of pollution, crowd and atmospheric pollution, Interventions for reducing adverse impacts.

12. BOTANY: PAPER-I
Microbiology, Pathology, Plant Disease, Morphogenesis
Microbiology: Microbial diversity, early Microbiology of Air, Water and Soil, as important causes of plant disease. Bacterial and fungal diseases, their control.

Plant Pathology: Mode of infection, defence mechanism, control of plant diseases. Important plant diseases caused by viruses, bacteria, fungi and nematodes with special reference to tobacco mosaic, leaf curl of papaya, citrus canker, rust of wheat, smut of barley, leaf blight of potato, rust of sugarcane, ear-cocckle of wheat, ergot of rye, stem gall of coriander and wilt of arhar.

Plant Diversity: Classification, structure, reproduction, life cycles and economic importance of viruses, bacteria, algae, fungi, bryophytes, pteridophytes and gymnosperms including fossils.

Morphology: Morphology of root, stem, leaf, flower and fruits, secondary growth.

Embryology: Growth and development, meiosis and mitosis, megagametophyte, female gametophyte, fertilization, embryo and endosperm development.


Morphogenesis: Correlation, Polarity, Symmetry, totipotency, differentiation and regeneration of tissues and organs; methods and applications of cell tissue, organ and somatic hybridization.

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10. Environmental Psychology:

12. BOTANY: PAPER-I

Part-B (Indian 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

4. State Recognition and State Succession
5. Territory of States: modes of acquisition and loss of territory
6. Sea: Inland waters, Territorial Sea; Contiguous Zone; Continental Shelf; Exclusive Economic Zone and Ocean beyond national jurisdiction
7. Air space and aerial navigation
8. Outer space: Exploration and use of outer space

15. United Nations: Purposes and principles; principal organs and their powers and functions
16. Peaceful means for settlement of international disputes
17. Lawful recourse to force: aggression, self-defence and interventions
18. Legality of the use of nuclear Weapons; Ban on testing of Nuclear and Chemical Weapons; Nuclear Non-proliferation Treaty, CTBT.
19. International Terrorism, State sponsored terrorism, International criminal Court

LAW PAPER-II

1. LAW OF CRIMES: (a) Concept of Crimes, Elements, Preparations, and attempt to commit crime. (b) [1] Indian Penal Code, 1860
- General exceptions
- Joint and Constructive liability
- Abetment
- Criminal conspiracy
- Offences against the state
- Offences against Public Tranquility
- Offences against Human Body
- Offences against Property
- Defamation
- Protection of Civil Rights Act, 1955
- Prevention of Corruption Act, 1986

2. LAW OF TORTS:
- Nature of tortfeasibility
- Liability based upon fault and strict liability
- Statutory liability
- Vicarious liability including State liability
- General Defences
- Joint tortfeasors
- Negligence
- Remedies
- Defamation
- Nuisance
- Conspiracy
- False imprisonment and malicious prosecution

3. LAW OF CONTRACTS and Mercantile Law:
- Nature and formation of contract / E-contract
- Void, Voidable, illegal and unenforceable contracts
- Factors vitiating consent
- Standard form of Contract
- Void, Voidable, illegal and unenforceable contracts
- Performance of contracts.
- Dissolution of contractual obligations
- Frustration of contracts
- Quasi contracts
- Remedies for breach of contract
- Contract Indemnity, Guarantee and Insurance
- Contract of Agency
- Sale of Goods and hire purchase
- Formation, Liability and Dissolution of Partnership
- Negotiable Instruments Act 1881

D. Contemporary Legal Developments:
- Concept of Public Interest Litigation and Environmental Law
- Right to Information Act, 2005
- Alternative Disputes Resolution- Concept, Types and Prospect
- Aims, objectives and salient features of the competition Law 2002
- Defamation of plea bargaining
- Offences under the Information and Technology Act, 2000 specially Civil Liability
- Peaceful means for settlement of International disputes
- Right to Freedom of Speech and Expression
- Right to equality, Right to life and personal liberty, Religious, Cultural and Educational Right, Right to Constitutional remedies
- Presidential and Parliamentary form of Government; Separation of powers and effect to International agreements
- Salient features of Indian Constitution and its Nature.
- Distribution of Legislative powers between the Union and States, Administrative and regulatory powers of the Union, Concurrent and Union list, Administrative and regulatory powers of the State, Concurrent and Union list
- Emergency Provisions
- Interpretation of Constitution and its Nature.
- Protection of Civil RightsAct, 1955
- Jurisdiction of States: basis of jurisdiction and immunity from jurisdiction
- Extradition and Asylum
- Diplomatic and Consular Agents
- Treaties: Formation, application and termination
- State Responsibility

14. ANIMAL HUSBANDRY AND VETERINARY SCIENCE

Part-B (Indian Law)

9. Individuals:
10. States:
11. International Organisations:
12. International Institutions:
13. United Nations:
15. Lawful recourse to force:
16. Lawful recourse to force:
17. Peaceful means for settlement of international disputes
18. Lawful recourse to force:
19. International Terrorism, State sponsored terrorism, International criminal Court


SECTION-4


SECTION-B


SECTION-B

PAPER-I

1. Concept and Theories:
(a) Concepts and components of Strategic Thought.
(b) Socio-political and its relevance for conflict at Inter-State level.
(c) War-Principles and Causes: Psychological Dimensions; Conventional Warfare in the Nuclear Age; Limited War: NBC Warfare and Low Intensity Conflict (L.I.C.))

2. Strategic Thinkers:
(a) Upto 19th Century A.D.
(b) Manu and Kautilyaya
(c) Machiavelli
(d) Jorini
(e) Clausewitz
(f) 18th Century to World War – II
(1) Engels & Marx
(2) Lenin
(3) Trotsky
(4) Stalin
(5) Hitler
(6) N. K. Dulid Hart
(7) J.F.C. Fuller

3. Theories of Sea, Land, Air and Revolutionary Warfare:
(a) J. T. Mahan – Theory of Sea Power, Continental Doctrine and Naval Strategy
(b) Haldor Mackinder – Heart Land Theory
(c) Doblet, Mitchell and Servesky – Theories of Air Warfare
(d) Mao Tse-Tung & Che Guevara – Concept of Revolution and Strategy and Tactics of Guerrilla Warfare.

4. Economic Aspects of Military Power:
(a) Economic theories of defence.
(b) War potential of nation – states and its technique of resource mobilization in times of war.
(c) Post-war Economy and Re-construction.
(d) Armed forces trade and Donor – Recipient behavior.

5. World Wars:
(a) Weapons, Doctrines and Tactics.
(b) Causes of World War-I
(c) Revolution in Arms and technical advances in Land, Sea and Air Warfare.
(d) Technological developments during the inter-war period (1918-1939)
(e) Allied Strategy during World War-I
(f) Introduction of Hi-tech Weapons and Revolution in Delivery Systems during First & Second World Wars.

SECTION-II

6. Past World War-II, Conventional, Nuclear Weapons and Doctrines:
(a) Introduction of Mass Destruction – Conventional, Nuclear, Biological and Chemical
(b) Theories of Nuclear Warfare – Preventive War, Pre – emptive attack, Massive Retaliation, Counter force, Flexible Respon, MAD and MAS.
(c) Concept and theory of Conventional Deterrence

7. Arms Control and Disarmament:
(a) Concepts, Objectives, Conditions and Elements.
(b) Approaches.
(c) Effects on economic development
(d) Revolution in Military Affairs:
(a) Emergence of New Technologies.
(b) Revolution in Small Arms and Low Intensity Conflicts.
(c) Emergence of new tactics and use of improvised Explosive Devices (IEDs) and its impact.

9. Conflict Resolution:
(a) Conflict: Origin, Type and Structure.
(b) Conventional and Nuclear Weapons: objective of New Technologies.
(c) Techniques of Conflict Building Measures.
(d) Instruments of International Peace: Peace Making, Peace Keeping and Peace Building.

10. Peace Thinkers:
(b) Jawaharal Nehru – on National Security, Development and Non – alignment.

DEFEANCE STUDIES:

PAPER-II National Security

SECTION-A

1. Introduction:
(a) Key Concepts of Nation, State and Nation State
(b) Theories of Origin of State
(c) Properties, objectives and approaches of National Security.


4. National Power:
   a. Conceptual framework of National Power
   b. The impression of Power as a concept
   c. Power: Integration – Nation
   d. Tangible and Intangible Elements of National Power
   e. Foundations and Limitations of National Power

5. Threat Spectrum:
   a. Concept of Threats and Challenges.
   c. Threat Perception (Internal and External)
   d. Threat Assessment and Threat Analyses

6. Alternate Models of Security:
   a. Balance of Power
   b. Balance of Fear
   c. Collective Defence
   d. Collective Security
   e. Non-alignment

7. Security Management:
   a. Concept, Components and Formulation of Security Defence Policies and doctrines and their Limitation
   b. National Values, National Interest and Strategic Culture.
   c. Crisis / Emergency Management of critical infrastructure, vulnerability analyses and protection.
   d. Disaster Management – Concept & Significance, Natural and Man-made disasters and National Disaster Management Policy.

8. Security Concerns:
   a. Traditional: Territorial Integrity and Disputes
   b. Non-traditional: (i) Governance (ii) Insurgency (iii) Terrorism
   c. Sources of Social Instability: (i) Economic Vulnerability (ii) Religious Fundamentalism (iii) Secularism, Nationalism
   d. Ethnic and Linguistic Parochialism
   e. Violation of Humans Rights

9. Arms Proliferation:
   a. Arms proliferation as a constraint to National, Regional and International Security
   b. Proliferation of Small Arms and Light Weapons in Southern Asia
   c. Proliferation of Nuclear Weapons

SECTION B

10. India’s Quest for Security:
   a. Historical Legacy, Geo-political and Geo-strategic considerations
   c. India’s Security Concerns vis-a-vis Pakistan and China (till date)

11. India’s National Security Problems:
   a. India in the world strategic arena – contemporary trends; Challenges to India’s Security in extended neighbourhood.
   b. Pakistan’s conventional, nuclear and missile programmes and their impact on India’s security
   c. India-China boundary dispute: positions and polemics, efforts for the settlement of the boundary dispute, framework of Co-Operative Security between India and China.
   d. India and the strategic and other interests with Bangladesh, Nepal, Bhutan, Myanmar, Sri Lanka, Maldives and Afghanistan.
   e. Role of extra-regional powers in the post – cold war South Asian and Asia-Pacific Strategic Milieu and India’s considerations
   f. Need for confidence and security building measures for India and its South Asian neighbors
   g. South Asian Association for Regional Cooperation as a model of Regional Security

12. Science, Technology and India’s Security:
   a. India’s Scientific and Technological base for National Defence.
   b. Need for India’s Integrated Science Policy
   c. India’s defence industrialization and achievements
   d. Progress on India’s Research and Development (R & D) and technological development for security
   e. Requirement of investment for Defence and role of Corporate Industry; Public-Private Partnership and foreign investment
   f. India’s Space Programme and Achievements

13. India’s Nuclear policy and options:
   a. India’s need for Nuclear Power
   b. India’s Nuclear break throughs and achievements
   c. India’s Nuclear Doctrine
   d. India’s Missile Programme

14. Indian Ocean and India’s Security considerations:
   a. Strategic Environment in and around the Indian Ocean Region
   b. India’s Security problems in relation to the Indian Ocean
   c. India’s Maritime Security and its need for naval power projections.
   d. India’s Coastal Management and Recommendations

15. Internet Security and Cybersecurity:
   a. Low Intensity Conflicts in India with special reference to Jammu and Kashmir and North East Region
   b. Identification of the problems of Internal Security and conditions for the use of Military
   d. Intelligence and its relevance for National Security, use of ICT and recommendations.

16. India’s all security perspectives and Defence preparedness

17. Imperatives of India’s National Security Strategy

17. MANAGEMENT PAPER-I

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

1. Management Concepts and Evolution, Concept and significance of Management, Managerial Fanaticism as science or art; distinction between management and administration; Role and Responsibilities of management; Principle of management; Evolution of management thought: classical school, Neo-classical School, modern management school.

2. Planning and Decision Making; Planning-nature, type, significance and limitations; Plans objectives; policies; procedures; planning premises; Forecasting; Techniques of forecasting and limitation; Decision making – types, process; Rational decision making and its limitations, Concept of bounded rationality.

3. Organization and Organizational Behaviour; Organisation-concept, Types, divisions and levels; Span of management; Authority and responsibility; Authority types, sources; Delegation of authority, principles and obstacles to delegation; Centralisation and decentralization of authority; Organisational behaviour- concept and significance, individual and group behaviour. Organisational Change, resistance to change; conflict management

4. Directing-principles and techniques, Motivation-Maslow, Herzberg, McClelland, McGregor, Contingency theories: MBO, Leadership, types, Traits of successful leader, various theories of leadership; Communication-Process, Levels and types, barriers to communication, Measures for effective communication, Role of technology in communication.

5. Controlling-Process, Pre-requisites for effective controlling, Methods of controlling, Auditing and non-budgetary methods, Coordination, Concept, Techniques and barriers to Co-ordination.


MANAGEMENT PAPER-II

SECTION I- MARKETING MANAGEMENT

Concept of Marketing, Marketing Mix; Marketing Research; Marketing Environment; Marketing Plan, Market Segmentation; Market Target and Positioning; Product Strategies, Product Life-Cycle; Consumer Behaviour; Brand Management; Sales Promotion, Management of Sales Force, Pricing Decision, Marketing Channel-Retail Management, Internet Marketing, Customer Relationship Management, Rural Marketing in India; International Marketing; Marketing Audit and Control; Ethics in Marketing.

SECTION II- PRODUCTION MANAGEMENT

Meaning and Nature of Production Management; Type of Production Systems; Production Planning and Control, Lean Manufacturing and Flexible Systems; Ranking, Loading and Scheduling for different production system; Site Selection and Plant Location, Plant Layout and Material Handling; Production Design, Inventory Management; Supply Chain Management; Enterprise Resource Planning; Total Quality Management, Six Sigma, PERT and CPM, Waste Management.

SECTION III- FINANCIAL MANAGEMENT

Meaning and Scope, Estimating the firm’s financial requirements; Capital Structure determination; Cost of Capital, Working Capital Management; Capital Market; Regulatory Role of SEBI, Venture Capital, Mutual Fund; Dividend Policy; Net Banking and NPA Management; Corporate Restructuring, Merger and Acquisition; Investment Decision, Risk Analysis, Leasing; Foreign Exchange Market.

SECTION IV- HUMAN RESOURCE MANAGEMENT

Nature of Human Resource Management, Scope of Human Resource Management; Job Analysis and Job Design; Recruitment and Selection; Training and Development; Career Planning; 360 degree Performance Appraisal; Worker’s Participation in Management, ESOPs; Trade Union in India; Safety, Welfare, Strike, Lay-Off, Lock-out and Reconciliation; HR Audit; Flexible Working Condition; Work from Home; Valuntary Retirement Scheme (VRS); Outsourcing.

18. POLITICAL SCIENCE AND INTERNATIONAL RELATIONS: PAPER-I

SECTION A

Political Theory- Definition, Nature and Scope of Political Science, Approaches to the study of Political Science-Traditional, Behavioural, Systems and Marxist State- Definition, Theories of origin and theories related to the functions-Liberal, Individualistic, Socialistic.

Constitution-Meaning, Types and theories.

Soceity- Meaning, kinds and theories

Liberty- Meaning, kinds, and theories

Justice- Meaning, kinds, and Theories; relation between equality and liberty

Democracy- Meaning, types, Theories-Liberal, Socialist and Marxist.

Forms of Government: Democratic & Authoritarian- Unitary and Federal, Parliamentary and Presidential

Political Institutions- Legislature, Executive, and Judiciary.

Political parties and Pressure groups, Electoral Systems.

Politics- Philosophy–

(A) Indian Political Thinkers- Manu, Kautilya, Gandhi, M.N. Roy, Ambedkar
(B) Western Political Thought- Plato, Aristotle, Machiavelli, Hobbes, Locke, Rousseau, Mill, Hegel, Green, Marx, Laski, Gramsci, Hanna Arendt

SECTION B

Indian Government and Politics

Indian Nationalism-Causes for the Rise of Nationalism, Bang Bhang Movement, Non-Congress Movement and Civil Disobedience movement


State Government- Governor, Chief Minister and Council of Ministers, State Legislature, High Court.

Centre-State Relations.

Local Self Government – Municipality, Municipal Corporation, and 74th Amendment, Panchayati Raj and 73rd Amendment.


POLITICAL SCIENCE AND INTERNATIONAL RELATIONS: PAPER-II

SECTION A

International Relations- Meaning, Nature and Scope

Theories of International Relations – Idealists, Realist, Systems and Decision making theories

Factors determining foreign Policy- National Interest and Ideology.
1. Emergence and Development of the Indian Culture and Civilization:
8. Aspect of Indian Village:
Structure and characteristics; Varna and Caste, Dominant and their distribution.
Ethnic and linguistic elements in the Indian population

2. Demographic profile of India: (Paleolithic, Mesolithic and Neolithic-Chalcolithic); Protohistoric (Indus Civilization).
Linguistic and socio-economic characteristics of the Tribal Panchayati Raj and Social change.

5. Caste, Caste mobility, Jajmani system, Tribe-caste continuum.

10.1 Problems of exploitation and deprivation tribal populations.
rehabilitation, New forest policy and tribals. Impact of Urbanization and Industrialization on
10.2 The nature of society: Concept and factors affecting growth and development, methods of growth studies.

10.3 Marriage:
10.4 Kinship:

12. Role of N.G.O. in tribal development.

13. Role of anthropology in tribal and rural development.

22. CIVIL ENGINEERING:

(a) Theory of Structures: Simple structures and stress, Elastic constants, Axially loaded compression members, Shear force and bending moment, Theory of simple bending.
Shear stress distributions across sections, Beams of uniform strength.
Deflection of beams: Macaulay’s method, Mohr’s moment area method, Conjugate beam method, Influence lines for shear force and bending moment at a section of a beam. Casteroil for maximum shear force and bending moment in beams traversed by a system of moving loads. Influence lines for simply supported plane pin hinges, Arches: Three hinged, two hinged and fixed arches, Bihar shortening and temperature effects.

Methods of analysis: Force method and displacement method of analysis of indeterminate beams and rigid frames.

Plastic analysis of beams and frames: Theory of plastic bending, Plastic analysis statistical method, Method of sections.

Unsymmetrical bending: Moment of inertia, position of Neutral axis and Principal axes. Calculation of bending stresses.


Cantilever and Counter-foot type retaining walls.

Water Tanks: Design requirements for rectangular and circular tanks resting on ground.

Prescribed Concrete: Methods of laying of prestressing, anchorings, Analysis and design of sections for flexure based on working stress, loss of prestress. Earthquake Resistant Design of Buildings as per BIS codes.

Introduction to computer aided design of structure

14. Anthropological theories:

(i) Classical evolutionism- Tylor, Morgan and Frazer.
(ii) Functionalism- British, German and American.
(iii) Formalism: Malinowski, Structural functionalism- Radcliffe-Brown.
(iv) Structuralism- Levi-Strauss.

15. Research Methods in Cultural Anthropology:
Observation, Interview, Schedule, Questionnaire, Case history, Case study and mixed methods.

1. Emergence and Development of the Indian Culture and Civilization:

Prehistoric (Paleolithic-Chalcolithic); Protohistoric (Indus Civilization).

2. Demographic profile of India: (Paleolithic, Mesolithic and Neolithic-Chalcolithic); Protohistoric (Indus Civilization).

3. The structure and function of traditional social system: Varna, Kshatriya, Vaishya, Shudra, Sudra.


5. Sacred Complex and Nature- Man-Spirit Complex.

6. Impact of Buddhism, Jainism, Islam and Christianity on Indian society including tribals.

7. Emergence, growth and development of anthropology in India: contribution of early scholars such as A.N. Maclear, Administration of Indian Anthropologists to Tristate-Caste studies.


11. History of Administration of Tribal Areas: Tribal policies, programmes, of tribal development.

12. Role of N.G.O. in tribal development.

13. Role of anthropology in tribal and rural development.
Construction activity, schedules, operations, Quality assurance principles. Basic principle of PERT uses, Cost optimization and resource allocation. Basic principles of Economic analysis and methods. Project Profitability: Basic principles of financial planning, simple toll fixation criterions.

**Surveying:** Common methods and instruments for distance and angle measurement for Civil Engg. works, their use in plane table, traversing, triangulation, triangulation and topographical maps. Basic principles of photogrammetry and remote sensing. Introduction to Geographical information system. (e) Highway Engineering: Principles of roadway alignments, classification and geometrical design, elements and standards for roads. Pavement structure for flexible and rigid pavements, Design principles and methodology. Construction methods and materials for stabilized soil, WBM, Bituminous works and CC roads. Surface and sub-base drainage arrangements for roads, culvert structures. Pavement thickness: Theoretically and empirically.

Traffic surveys and their application in traffic planning. Typical design features for channeled, intersection rotary etc., signal designs, standard traffic signs and markings. (d) Civil Engineering: Permanent way, ballast, chair and fastening points, crossings, different types of turn outs, cross-over, setting out of points, Maintenances of Traffic surveys and their application in traffic planning, Typical design features for Surface and sub-surface drainage arrangements for roads, culvert structures. Typical design features for Pavement structure for flexible and rigid pavements, Design principles and methodology. Construction methods and materials for stabilized soil, WBM, Bituminous works and CC roads. Surface and sub-base drainage arrangements for roads, culvert structures. Pavement thickness: Theoretically and empirically.

Traffic surveys and their application in traffic planning. Typical design features for channeled, intersection rotary etc., signal designs, standard traffic signs and markings. (d) Civil Engineering: Permanent way, ballast, chair and fastening points, crossings, different types of turn outs, cross-over, setting out of points, Maintenances of Traffic surveys and their application in traffic planning, Typical design features for Surface and sub-surface drainage arrangements for roads, culvert structures. Typical design features for Pavement structure for flexible and rigid pavements, Design principles and methodology. Construction methods and materials for stabilized soil, WBM, Bituminous works and CC roads. Surface and sub-base drainage arrangements for roads, culvert structures. Pavement thickness: Theoretically and empirically.

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Traffic surveys and their application in traffic planning. Typical design features for channeled, intersection rotary etc., signal designs, standard traffic signs and markings. (d) Civil Engineering: Permanent way, ballast, chair and fastening points, crossings, different types of turn outs, cross-over, setting out of points, Maintenances of Traffic surveys and their application in traffic planning, Typical design features for Surface and sub-surface drainage arrangements for roads, culvert structures. Typical design features for Pavement structure for flexible and rigid pavements, Design principles and methodology. Construction methods and materials for stabilized soil, WBM, Bituminous works and CC roads. Surface and sub-base drainage arrangements for roads, culvert structures. Pavement thickness: Theoretically and empirically.


(OR)

SECTION-C (Light Current)


25. English Literature

Answers must be written in English.

Section A

Candidates will be required to show adequate knowledge of the following topics and movements.

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

Section B

Texts for detailed study are listed below:

4. Alexander Pope: The Rape of the Lock
5. William Wordsworth: The following poems: "Tintern Abbey", "Three Years She Grew", "Michael" and "Milton, Thou Shouldst be Living at This Hour"
6. Alfred Tennyson: "Ulysses" and "Lotus Eaters"
7. Robert Browning: "My Last Duchess" and "The Lost Leader".
8. James Joyce: "Ulysses" and "Finnegans Wake".
9. TLS Eliot: The following poems: "A Love Song of J. Alfred Prufrock" and "Journey of the Magi".

26. URDU LITERATURE PAPER - FIRST

PART-A

(1) Development of Urdu language. (a) Western Hindi and its dialects mainly khari Boli, Braj, Patwa and Harviya. (b) Persian- Arabic elements in Urdu. (c) Urdu Language from 1600 AD to 1900 AD (d) Different theories of the origin of Urdu language. (2) Development of Urdu Literature in Deccan (b) Two classical Schools of Urdu Poetry-Delhi and Lucknow. (c) Development of Urdu prose up to Ghazil (3) Aligarh movement, Progressive movement and their impact on Urdu Literature. (b) Urdu Literature after independence.

PART-B


URDU LITERATURE PAPER-SECOND

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

PART-A (PROSE)


PART-B (POETRY)


37. ARABIC - PAPER I

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

"Amin e-naqeesh" uroos-e-juma maujooz
Izazat
Silat wa masuuf
Rahiatal wa habsat
Mafiil-e-khamsah
Izaza, Tashibib, Kinayat, Tazad
Husn-e-Taaleb
Bahir-e-Ramati
Bahir-e-Hazaj
Bahir-e-Mutaparib

ARABIC: PAPER II

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

SECTION-A : Poets

1. Imrooz Qaisi: His Mulkahq (Complete)
2. "Qifa Nabki min Zikra Habbin man Was Manzil"
3. Zuhair bin Abu Salma: His Mullahq (complete)
4. "Arin Ummi Aufl Diminutam lam takallami"
5. Al-Khair: The following two elegies from her Diwan
6. Ta azzara Bial Majid (Complete)
7. Uzakuri (Complete)
8. Hasan bin Thabit: The following Qasidah from his Diwan Daffah Daffah. No. I to IV
9. Umar bin Abi Rabiyah: The following four Ghazais from his Diwan:
   (a) Jannah Tawaqafana (Complete)
   (b) Lilat Hindan (complete)
   (c) Ijara (complete)
   (d) Al-Azraqah: The following 4 Qasidah from his Diwan
   (e) in praise of Umar bin Abd al-Aziz (Complete)
   (f) in praise of Zam al-Adim Al bin Hasan (Complete)
   (g) in praise of Abd Al-Aziz Al-Adim Al bin Hasan (Complete)
   (h) in praise of Abd Allah Al-Abidin Al-Adim Al bin Hasan (Complete)

38. URDU LITERATURE PAPER-I

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

SECTION-A : Poets

1. Inayat Husain: His Mulkahq (Complete)
2. Ibnul Maqaffa: His Mullaqah (complete)
3. Zuhair bin Abi Sulma: His Mullaqah (complete)
4. "Amin e-naqeesh" uroos-e-juma maujooz
5. "Izaza, Tashibib, Kinayat, Tazad"
6. "Husn-e-Taaleb"
7. "Bahir-e-Ramati"
8. "Bahir-e-Hazaj"
9. "Bahir-e-Mutaparib"
10. "Uzakuri (Complete)
11. Hasan bin Thabit: The following Qasidah from his Diwan Daffah Daffah. No. I to IV

39. URDU LITERATURE PAPER-SECOND

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

SECTION-A : Poets

1. Inayat Husain: His Mulkahq (Complete)
2. Ibnul Maqaffa: His Mullaqah (complete)
3. Zuhair bin Abi Sulma: His Mullaqah (complete)
4. "Amin e-naqeesh" uroos-e-juma maujooz
5. "Izaza, Tashibib, Kinayat, Tazad"
6. "Husn-e-Taaleb"
7. "Bahir-e-Ramati"
8. "Bahir-e-Hazaj"
9. "Bahir-e-Mutaparib"
10. "Uzakuri (Complete)
11. Hasan bin Thabit: The following Qasidah from his Diwan Daffah Daffah. No. I to IV

40. URDU LITERATURE PAPER-SECOND

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

SECTION-B : Authors

1. Ibnul Maqaffa: "Kallaa wa Dinma" Chapter (Complete) (excluding Muqaddama) "Al-Asad Wa Al-Thau".
2. Ibnul Maqaffa: "Al-Asad Wa Al-Thau".
3. Ibnul Maqaffa: "Kallaa wa Dinma" Chapter (Complete) (excluding Muqaddama) "Al-Asad Wa Al-Thau".
4. Ibnul Maqaffa: "Kallaa wa Dinma" Chapter (Complete) (excluding Muqaddama) "Al-Asad Wa Al-Thau".
Sanskrit languages.

1. The most common changes, Human Vocal Organs with special reference to Sanskrit phonology, Points of Middle Indo-Aryan Languages, Semantics: Trends and Reasons, Phonology, Phonetic Origin and development of language, Classification of languages, Indo-European and Unit-III - 3.


Critical and Biographical questions regarding the poets and their work

Mashhadi Diwani-Bahar (Jughd-i-Jang, Shabahang, Damawandiyeh, Wataniyeh).


(g) Important Poets and Writers

Samarqandi, Jami) (Aufi, Khusrau, Faizi, Urfi, Naziri, Abul

(g) Critical and Biographical questions about the prescribed authors and their works

Hayati (Autobiography complete)

4. AhamdAmin:

iv) Al-ghani wa al - Faqir

iii) Fi sabit Al - lhsan

ii) Al-Bauz wa al lnsan

i) Al-sidq wa al - kizb

4. Accountancy

Nature, scope and objectives of Financial Management; Capital Budgeting decisions importance, process, limitations, methods-payback period, net present value, internal rate of return and average rate of return. 3.

1. Accounting


2. Royalty-types, Accounting treatment for different royalties.

3. Purchases-5, Stem-concept and features, Accounting process in the books of hire purchaser and vendor. Hire purchase Vs installment payment system.

4. Branch Accounting- dependent, independent and foreign branches; Accounting treatment branch account, final account, stock and debtors systems, wholesale price basis.

5. Problems of amalgamation and reconstruction (AD-14), Accounting of holding companies, Cash flow statement (AS-39)


Part II: Financial Management

1. Nature, scope and objectives of Financial Management; Capital Budgeting decisions importance, process, limitations, methods-payback period, net present value, internal rate of return and average rate of return. 3.

Working capital management-classification, dangers of inadequate working capital, approaches to estimation of working capital requirement, tools of cash, inventory and receivables management.

2. Royalty-types, Accounting treatment for different royalties.

3. Purchases-5, Stem-concept and features, Accounting process in the books of hire purchaser and vendor. Hire purchase Vs installment payment system.

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5. Problems of amalgamation and reconstruction (AD-14), Accounting of holding companies, Cash flow statement (AS-39)
II. Evolution of Indian Administration:

I. I. Indian Administration:

- Major Characteristics of Mauryan, Mughal and British Periods.

II. Constitutional Setting:

- Parliamentary Democracy; Federalism; Secularism.

III. Political Executive at the Union Level:

- Chief Executive and his/her functions; Line, Staff and central and State governments.

XIII. Administration of Law and Order:

- Parliamentary Control; Role of the Finance Ministry.

VII. Financial Administration:

- Concepts of Budget, Preparation, enactment and execution of the Budget; Performance Budgeting, Zero Base Budgeting, Accounts and Audit.

VIII. Accountability and Control:

- Concepts of Accountability and control; Control over Administration; Legislative, Executive, Judicial and Citizen control.

IX. Administrative Reforms:

- Concepts and processes, O & M, Work study and its techniques, problems and prospects.

X. Administrative Law:

- Concepts and significance, Theories of public, public policy and public administration.

PAPER- I

INDIAN ADMINISTRATION

I. Evolution of Indian Administration:

Major Characteristics of Mauryan, Mughal
and British Periods.

II. Constitutional Setting:

Parliamentary Democracy; Federalism; Secularism.

III. Political Executive at the Union Level:

Chief Executive and his/her functions; Line, Staff
and central and State governments.

IV. Administration of Law and Order:

Central Secretariat; Cabinet secretariat; Ministries and Departments, Boards and Commissions; Field Organizations.

V. Central State Relations:

Legislative, Administrative and Financial.

VI. Public Services:

All India, Central and State Services. Union and State Public Service Commissions; Training of Civil Servants.

VII. Machinery for Planning:

Plan formulation at the national level; NIT Aayog, National Development Council. Planning Machinery at the State and District levels.

VIII. Sectoral Undertakings:

Forms, Top-level Managements, control and
Problems.

IX. Control over 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, Chief Secretary, Secretariat, Directors.

XII. District Administration:

Role and importance, District Magistrate / Collector, Land Revenue, Law and Order and Developmental functions, District Rural Development Agency. Special Programmes of Rural Areas.

XIII. Local Administration:

Panchayati Raj and Urban Local Government, Features, forms and problems, Autonomy of Local Bodies.

XIV. Administration for Welfare:

Administration for the welfare of weaker sections with particular reference to Scheduled Castes, Scheduled Tribes; Programme for the welfare of Women.

XV. Issue Areas in Indian Administration:

Relationship between political and permanent bureaucracy; Generalists and Specialists in Administration; Integrity in Administration; People’s Participation in Administration, Redressal of Citizen’s Grievances; Lok Pal and Lok Ayuktas; Administration Reforms in India.

33. AGRICULTURAL ENGINEERING

PAPER- II

(a) Thermodynamics and Heat Engines:

- concept of energy, temperature and heat; equations; laws of thermodynamics, pure substances and their properties, entropy. Rankine, air standard Otto, diesel and jet engines; indicator diagrams.

- sources and status of power in India; farm power and agricultural productivity relationship; construction and operation features of IC engines, various types of carburetors, ignition, cooling, lubrication, valves and valve timing; special features of Diesel engines; Tractors and their classification, power transmission systems and devices, repair and maintenance; Tractor testing and tractor executives; their economics and suitability, energy in agriculture.

- design, construction, operation, repair and maintenance of tillage tools, implements and equipment viz. Mould board and disk ploughs; hoe, harrow and cultivators; harrowing machines; water meters, sprayers and dusters; harvesters; threshers and combines; soil and crop factors influencing machine performance and energy requirement; selection of farm machines, economics of agricultural mechanization;

- thermal properties of materials and steady state and transient heat conduction, natural and forced convection; boiling, condensation, thermal radiation, heat exchange; heat exchangers; heat and mass transfer analogy. Fick’s laws of diffusion, psychrometrics; analysis of heat and mass transfer processes; instrument and measurement systems.

- protected cultivation- green house concepts, structures and instruments; unit operations in post harvest processing (cleaning, grading, packaging, storage, refrigeration, pasteurization etc.); processing of cereals, pulses, oilseeds, fruits & vegetables, animal feed, spices, dairy products, meat etc. design of processing equipment and processing systems; Milking Machines.

- changes in stored products during storage; storage of food grains and their products, perishables (vegetable fruits, dairy product, meat, eggs); storage system- airtight ventilated, refrigerated, modified atmospheric and controlled atmosphere; storages; packaging; conveyors; design and management of storage and handling systems.

- fluid properties, units and dimensions; surface tension and capillarity, equation of continuity, Bemoul equation, laminar and turbulent flow, steady and unsteady, flow of fluids in pipes and open channels, design of open channels for non erosive and non settling velocities, most economical cross section, measurement of irrigation water and other water measuring devices viz. Wirs, notches, orifices and flumes.

- linear measurements; survey methods and devices used; principle of levelling; differential and profile levelling; contouring and characteristics of contours; land levelling and grading; earth work estimation; earth moving machineries.

- Precipitation, measurement systems. Point rainfall analysis, frequency analysis; agricultural watershed and its management. The design and management in agri-horti-acquaculture system, mechanics of water and wind erosion; Rational method of prediction of peak runoff; concept of unit hydrograph and instantaneous hydrograph; factors affecting erosion and run off; water erosion control measures- contour cultivation, strip cropping, terracing, including afforestation and features; design of gully control structures- temporary and permanent; stream bank erosion; flood routing, flood amelioration by upstream watershed management; wind erosion control measures and sand dune stabilization.

- design and construction and performance characteristics; selection, installation, servicing and maintenance of different pumps (reciprocating, centrifugal, gear, turbine, submersible, propeller, jet); hydraulic ram; renewable and non-renewable power sources and their characteristics; solar and photovoltaic systems.

- water and soil plant relationship; basic soil physical properties influencing soil water relationships; forms and occurrence of soil water; methods and devices for soil moisture measurement; water requirement of crops; irrigation scheduling; irrigation methods viz. flood, border, furrow, sprinkler and drip irrigation, their efficiencies; design of irrigation efficiency; water conveyance and control; design of canals, Lacey and Kennedy’s theories.

- drainage engineering; drainage needs and its benefits; Darcy’s Law, hydraulic conductivity; drainage coefficient; drainage methods, surface drainage (drainage of flat and sloping lands); design of open ditches their alignment and construction; design and layout of subsurface drains; design and spacing of drains and drainage outlets; installation of drains and drainage wells; drainage of soil affected areas.

- building materials and their properties; farmstead planning, factor affecting location of farmstead; design of dairy barns, poultry housing, Planning and Design of rural houses, farm roads, village drainage; waste disposal and sanitary structures; cost estimates; rural electrification; integrated rural energy planning and development.

43. MEDICAL SCIENCE

PAPER- I

I. Human Anatomy:

- gross anatomy, applied anatomy, blood supply and lymphatic drainage of tongue, thyroid, mammary gland, stomach, liver, prostate, gonads, uterus, Heart and lungs.

- Applied anatomy including and blood and nerve supply of upper and lower limbs and joints of shoulder, hip and knee.

- Applied anatomy of diaphragm, perineum and inguinal region.

- Applied anatomy of kidney, urinary bladder, ureter tubes and vas deferens.

- Entymology: Placenta and placental barrier. Development of heart, gut, kidney, uterus, ovary, tests and their common congenital abnormalities.

- Central and peripheral autonomic nervous system; Gross and clinical anatomy of central and peripheral nervous system; Neural pathways and lesions of cutaneous sensations, hearing and vision; Cranial nerves, distribution and clinical significance; Components of autonomic nervous system, Internal capsule and cerebral cortes.

2. HUMAN PHYSIOLOGY

Blood

- IMMUNITY, THROMBOCYTOPENIA

- CVS, CARDIC CYCLE

- RESPIRATION-OBSTRUCTIVE DISEASES, ACID BASE BALANCE

- KIDNEY, MICTURITION REFLEX

- OPTIC ULCER, LIVER FAILURE, JAUNDE (OBSTRUCTIVE, HEPATIC, HEMOLYTIC)

- ACUTE PANCREITIS

- ENDOCRINE – GOITER, OSTEOMAHA, MASTER GLAND

- CNS: CEREBRAL STROKE, PARKINSON'S DISEASE, HEMPLEGIA/PALEPLAGIA

- SPECIAL SENSES—NIGHT BLINDNESS, CATRAXT, MYOPIA, HYPERMETROPIA, AMBLYOPIA

- REPRODUCTION – PREGNANCY TESTS, LACTATION, AMENORROHIA, STERILITY

- IN MALE & FEMALE, OVIULATIO, SPERM COUNT

- 1. Organ function tests-liver, Kidney, thyroid

- 2. Protein synthesis.

- 3. Vitamins and minerals.

- 4. Polymerase chain reaction (PCR)

- 5. Enzymes & Biomarkers


- 7. 5 DNA Replication

- 8. RNA Transcription

- 9. DNA Repair Mechanism

- 10. Protein Profile

- 11. Nutrition


- 13. Free Radical & Antioxidants

- 4. Pathology:


- 5. Microbiology:

- Humoral and cell mediated immunity, Koch's postulates

6. Pharmacology:
   - Drug Nomenclature
   - Adverse Drug Reactions
   - Drug Act & Drug Schedules
   - Drug Clinical Trial
   - Drug Life
   - Drug Advertisement
   - Drug Addiction

7. Forensic Medicine and Toxicology:
   - Medical Ethics and Law, Medico legal aspect of pregnancy, delivery and abortion; Sexual offences, Forensic examination of injuries and wounds; Examination of blood and seminal print stains; poisoning, sedative overdose, hanging, drowning, burns, DNA and finger print studies.
   - Medical Science- Paper –II

1. General Medicine:
   B) Aetiology, Clinical features, diagnosis and principals of management of: Ischemic Heart Disease, Hypertension, Diabetes Mellitus, Hypothyroidism, Hypermallidopy, Epilepsy, Bronchial Asthma, Acne, Obstructive Lung Disease (COPD), Pneumonia, Viral Hepatitis, Cirrhosis of Liver, Peptic Ulcer Disease, Pneumonia, Occupational Lung disease.
   D) Medical Emergencies: Heat stroke, Drowning, Carbon monoxide poisoning, Organophosphorus poisoning, Aluminium phosphoid poisoning.
   E) Anxiety, Psychosis, Schizophrenia, Dementia
   F) Medical-legal aspect of Homicide, Alcoholism
   G) Investigative Procedures in Medicine: Ultrasonography, CT Scan, MRI, Echocardiography, Endoscopy, Bone Marrow aspiration, CSF examination, Complete Blood Count.

2. Pediatrics:
   - Immunization, Baby friendly hospital, Breast feeding, congenital cyanotic heart disease, respiratory distress syndrome, broncho-pneumonia, Neonatal hyperbilirubinemia, Kernicterus. IMNCI classification and management, PEM grading and management, ARI and Pneumonia, Diphtheria of under five years children and their management.

3. Dermatology:
   Psoriasis, scabies, eczema, vitiligo, Steven John’s syndrome and T EN, Lichen Planus, Leprosy, Bacterial viral and fungal infections of skin.

4. General Surgery:
   - Clinical features, causes, diagnosis and principles of management of ceptal palate, harelip. Laryngeal tumor, oral and esophageal tumors.
   - Perforated peripheral arteries, varicose veins, Tumours of Thyroid, Adrenal Glands, Breast, Abscess, cancer, fibroadenoma and adenosis Bleeding peptic ulcer, tuberculosis of bowel, ulcerative colitis, cancer stomach.
   - Renal mass, Cancer Prostate, Benign Prostatic Hyperplasia (BPH), Haemorrhoids, Stones of Gall bladder, Kidney, Ureter and Uterine Body.
   - Management of surgical conditions of Rectum, Anus and Anal canal, Gall bladder and Bile ducts.
   - Portal hypertension, liver abscesses, peritonitis, Peri Ampullary Carcinoma Fractures of spine, Coll’s fracture and bone tumors.

5. Obstetrics and Gynaecology including Family Planning:
   - Fertilization and Implantation, Development, Function and Abnormalities of ovary.
   - Diagnosis of pregnancy, Antenatal care.
   - Labour management, complications of 3rd stage, Antepartum and postpartum hemorrhage, resuscitation of the newborn, Management of abnormal lie and difficult labour, Management of small for date, Fetal growth restriction or premature newborn.
   - Diagnosis and management of Anemia, Pre-eclampsia and Eclampsia of pregnancy, Management of Rh-Negative, Diabetes with pregnancy, multiple pregnancy, Birth injuries.
   - Management of Abortion, Ectopic pregnancy.
   - Intra-uterine devices, pills, tubectomy and vasectomy, Medical termination of pregnancy including legal aspects.
   - Vaginal discharge, pelvic pain, infertility, Abnormal uterine bleeding (AUB), Fibroid and prolapsed of uterus.
   - Management of Post- menopausal Syndrome.
   - Cancer cervix, Carcinoma body of uterus and ovary.

6. Community Medicine (Preventive & Social Medicine)
   - Concepts of health and disease
   - Principles, methods, approach and measurement of Epidemiology
   - Food and nutrition security, Nutritional Diseases / disorders & National Nutritional Programmes.
   - Components of environment, pollution related diseases, and Total Sanitary Campaign, Management of Hospital and Industrial waste, Nosocomial Infections.
   - Health Information System, Basics of Medical Statistics, Demography and Information, education & communication
   - Health management and administration: Techniques, Tools, Programme implementation and Evaluation
   - Critical appraisal of Health Care Delivery System
   - Objectives, Components, Goals and Status of Reproductive and child Health, National health Mission and Sustainable Developments Goals.
   - Objectives, components and critical appraisal of National Health Programmes: i) Communicable Diseases (RNTCP, NVBDCP, AIDS). ii) Non-communicable Diseases (National Programme for Control of Non-communicable Diseases, National Mental Health programmes, Geriatric Mental Health)
   - 10. Occupational Health
   - 11. Disaster Management and Health management in fairs and festivals
   - 12. Policies, acts and legislations related to health

APPENDIX-7

PLAN OF EXAMINATION AND SYLLABUS for Main (Written) Examination of Assistant Conservator of Forests / Range Forest Officer Services Examination

<table>
<thead>
<tr>
<th>S.N.</th>
<th>Question Paper</th>
<th>Time Period</th>
<th>Marks</th>
</tr>
</thead>
<tbody>
<tr>
<td>01</td>
<td>Paper-I General Hindi and Essay (Conventional Type)</td>
<td>3 hours</td>
<td>200</td>
</tr>
<tr>
<td>02</td>
<td>Paper-II General Studies-led Paper (Objective Type)</td>
<td>2 hours</td>
<td>200</td>
</tr>
<tr>
<td>03</td>
<td>Paper-III General Studies-led Paper (Objective Type)</td>
<td>2 hours</td>
<td>200</td>
</tr>
<tr>
<td>04</td>
<td>Paper-IV Optional Subject-I (First)</td>
<td>3 hours</td>
<td>200</td>
</tr>
<tr>
<td>05</td>
<td>Paper-V Optional Subject-I (Second)</td>
<td>3 hours</td>
<td>200</td>
</tr>
<tr>
<td>06</td>
<td>Paper-VI Optional Subject-II (First)</td>
<td>3 hours</td>
<td>200</td>
</tr>
<tr>
<td>07</td>
<td>Paper-VII Optional Subject-II (Second)</td>
<td>3 hours</td>
<td>200</td>
</tr>
<tr>
<td>08</td>
<td>Paper-VIII (Conventional Type)</td>
<td>3 hours</td>
<td>200</td>
</tr>
</tbody>
</table>

Total Marks of all the question papers: 1400

Personality Test (Interview) - 150 Marks

Grand Total - 1400 + 150 = 1550 Marks

Any two subjects to be selected from the following list of the optional subjects:

1. Agriculture
2. Agriculture Engineering
3. Botany
4. Chemistry
5. Chemical Engineering
6. Civil Engineering
7. Forestry
8. Geology
9. Mathematics
10. Mechanical Engineering
11. Physics
12. Statistics
13. Zoology
14. Animal Husbandry and Veterinary Science
15. Horticulture

Provided that the candidates will not be allowed to offer the following combination of subjects:
(a) Agriculture, Agriculture Engineering and Horticulture
(b) Mathematics and Statistics
(c) Chemistry and Chemical Engineering
(d) of the Engineering Subjects viz. Agriculture Engineering, Chemical Engineering, Civil Engineering and mechanical Engineering not more than one subject.

Note- The standard and syllabus of the subjects mentioned above are given in this advertisement under schedule to the appendix-8

APPENDIX-8

General Instructions and Syllabus for Main (Written) Examination of Assistant Conservator of Forest / Range Forest Officer Services Examination

1. All the question papers for the examination will be of conventional (essay) type but general studies will be objective type.
2. All question papers must be answered in Hindi or English. Question papers will be set in Hindi and English.
3. The duration of each of the papers referred to above will be three hours but general studies will be two hours.

Personality Test

The candidate will be interviewed by a board of competent and unbiased observers. Personality test will be 150 Marks.

Schedule

The standard of papers in General Hindi and General Studies will be such as may expected of a Science or Engineering Graduate of an Indian University.

The Scope of the Syllabus for optional subject papers for the examination is broadly of the Honour’s Degree level i.e. available higher than the Bachelor’s Degree and lower than the Master’s Degree. In the case of Engineering subject, the level corresponds to the Bachelor’s Degree. There shall be no practical exam. in any subject.

OPTIONAL SUBJECTS

Total number of questions in the question papers of optional subjects will be eight. All questions will carry equal marks. Each paper will be divided into two parts, viz. Part A and Part B, each part containing four questions. Out of eight questions, five questions are to be attempted. One question in each part will be compulsory. Candidates will be required to answer three more questions out of the remaining six questions, taking at least one question from each part. In this way, at least two questions will be attempted from each part i.e. one compulsory question plus one more.

General Studies, Paper-I

1. History of India - Ancient, Mediaeval, Modern
2. Indian Culture

Contd...
4. World Geography, Geography of India and its natural resources.
5. Current events of national and International Importance.
6. Indian Agriculture, Trade and Commerce.
7. Specific Knowledge of U.P. regarding education, Cultural, Agricultural, Trade and Commerce, the methods of living and Social Customs.

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

General Studies, Paper-II

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

The part relating to Indian polity will include questions on the political system in India and Indian constitution. The Indian economy will cover broad features of economic policy in India. The part relating to role and impact of science and technology in the development of India will test the candidates knowledge and thinking ability in this field. Emphasis will be on the applied aspects.

The part relating to statistical analysis, graphs and diagrams will include exercise to test the candidates ability to draw common sense conclusions from information given in the form of graphical or diagrammatical form and to point out deficiencies limitation or inconsistencies there in.

OPTIONAL SUBJECTS

Total number of questions in the question papers of optional subjects will be eight. All questions will carry equal marks. Each paper will be divided into two parts, viz. Part A and Part B, each part containing four questions. Out of eight questions, five questions are to be attempted. One question in each part will be compulsory. Candidates will be required to answer three more questions out of the remaining six questions, taking at least one question from each part. In this way, at least two questions will be attempted from each Part i.e. one compulsory question plus one more.

AGRICULTURE

PAPER-I

Ecology and its relevance to man, natural resources, their sustainable management and use of the non-renewable and social environment as factors of crop distribution and production. Climatic elements as factors of crop growth. Impact of changing environment on cropping pattern as indicators of environments. Environmental pollution and associated hazards to man.

Cropping pattern in different agro-climatic zones of the country, Impact of high-yielding and short-duration varieties on shifts in cropping pattern. Concepts of multiple cropping, multi-storied, relay and inter-cropping, and their importance in relation to food production. Package of practices for production of important cereals, pulses, oil seeds, fibres, sugar, and short-duration varieties on shifts in cropping pattern. Concepts of multiple cropping, multi-storied, relay and inter-cropping, and their importance in relation to food production.


Photography and Remote Sensing: Basic characteristics of photogenic images, interpretation keys, equipment for interpretation, imagery interpretation for land use, geology, soil and forestry.

Remote sensing-terms and elements of conventional and remote sensing approaches. Types of satellite images, fundamentals of satellite image interpretation, techniques of visual and digital interpretations for soil, water and land use management. Use of GIS in planning and development of watersheds, forests including forest cover, water resources.

AGRICULTURAL ENGINEERING

PAPER-I

Section 'A'


Photography and Remote Sensing: Basic characteristics of photogenic images, interpretation keys, equipment for interpretation, imagery interpretation for land use, geology, soil and forestry.

Remote sensing-terms and elements of conventional and remote sensing approaches. Types of satellite images, fundamentals of satellite image interpretation, techniques of visual and digital interpretations for soil, water and land use management. Use of GIS in planning and development of watersheds, forests including forest cover, water resources.

SECTION B


AGRICULTURAL ENGINEERING

PAPER-II

Section 'A'

1. Farm power and machinery: Agricultural mechanization and its scope. Sources of farm power-animale and electromechanical, Thermodynamics, construction and working of internal combustion engines. Fuel, ignition, lubrication, cooling and governing system of internal combustion engines. Different types of tractors and power tillers. Fuel, ignition, lubrication, cooling and governing system of internal combustion engines. Different types of tractors and power tillers. Different types of farm tractors. Different types of farm tractors. Power transmission, ground drive, types of tractors and power tillers. Different types of farm tractors. Different types of farm tractors. Different types of farm tractors. Different types of farm tractors. Types of satellite images, fundamentals of satellite image interpretation, techniques of visual and digital interpretations for soil, water and land use management. Use of GIS in planning and development of watersheds, forests including forest cover, water resources.


SECTION B


4. Instrumentation and computer applications in Agricultural Engineering:

BOTANY PAPER-I


BOTANY PAPER-II


4. Education of state for real gases, Intermolecular Interactions, liquidification of gases and critical phenomena, Maxwell's distribution of speeds, intermolecular collisions, collisions of the wall and effusion. 5. Thermodynamics and statistical thermodynamics Thermodynamic systems, states and processes, work, heat and internal energy; first law of thermodynamics, work done on the systems and heat absorbed in different types of processes. Internal energy and enthalpy changes in various processes and their temperature dependence. Second law of thermodynamics; entropy as a state function, entropy changes in various processes and their reversibility. Free energy functions; criteria for equilibrium, relation between equilibrium constant and thermodynamic quantities; Nernst heat theorem and third law of thermodynamics. Micro and macro states; canonical ensemble and canonical partition function; electronic, rotational and vibrational partition functions and thermodynamic quantities; chemical equilibrium in ideal gas reactions. 6. Phase equilibrium and solubilities Phase equilibrium in pure substances; Clausius-Clapeyron equation; phase diagram for a pure substance; phase equilibrium in binary systems, partially miscible liquids- upper and lower critical solution temperatures; partial molar quantities, their significance and determination; excess thermodynamic functions and their determination. 7. Electrochemistry- Debye-Huckel law of strong electrolytes and Debye-Huckel limiting law for various equilibrium and transport properties. Galvanic cells, concentration-cell systems, measurement of e.m.f. of cells and application fuel cells and batteries. Processes at electrodes; double layer at the interface; rate of charge transfer, current density, over-potential; electrode reactions, techniques-voltameter, potenpoti- meter, ampero- meter, cyclic-voltammetry, ion selective electrodes and their use. 8. Chemical Kinetics Collisional dependence of rate of reaction; differential and integral rate equations for zero, first and second and fractional order reactions. Rate equations involving reverse, parallel, consecutive and chain reactions; effect of temperature and pressure on rate constant. Study of fast reactions by stop-flow and relaxation methods, Collisions and transition state theories. 9. Photochemistry Absorption of light: decay of excited state by different routes; photochemical reactions; biphotons, flash photolysis, SPR, excitons. Charge transfer, electron transfer, photoelectric effect, over-potential, photochemistry, techniques, voltammetry, potentiometry, polarography, amperometry, cyclic-voltammetry, ion selective electrodes and their use. 10. Biogeochemistry CO2 in the atmosphere, distribution and cycling, role of plants and animals. 11. Bio-inorganichemistry Metal ions in biological systems and their role in ion-transport across the membranes (molecular-mechanism), ionophores, photosynthesis-PSI, PSI; nitrogen fixation; oxygen uptake proteins cytochromes and ferredoxins. 12. Coordination chemistry Electronic configurations; introduction of theories of bonding in transition metal complexes, Valence bond theory, crystal field theory and its modifications; applications of theories in the explanation of magnetism and spectral properties of metal complexes. Coordination compounds in coordination chemistry; coordination compounds; stereoisomers of compounds with 4 and 6 coordination numbers; chiral effect and polynuclear complexes; trans effect and its theories; kinetics of substitution reactions; square-planer complexes; octahedral complexes; (c) Synthesis and structures of metal carbonyls; carbonylation, carboxylation, cation hydrides and metal nitrosyl compounds. 13. General chemistry of 'f' block elements Lanthanides and actinides; separation oxidation states, magnetic and spectral properties; lanthanide contraction. 14. Non-Aqueous Solvents Reaction in liquid NH3, HF, SO2, H2SO4, Failure of solvent system concept, Coordination model of non-aqueous solvents, Some highly acidic media, fluorosulfonic acid and super acids.

CHEMISTRY PAPER-II

1. Delocalized covalent bonding: Aromaticity, anti-aromaticity; annulenes, azulenes, tropolones, kekulene, fulvenes, sydnes. 2. (a) Reaction mechanisms: General mechanisms (both kinetic and non-kinetic) of study of mechanism or organic reactions illustrated by examples-use of isotope cross-over experiment, Intermediate trappping stereochemistry; energy diagrams of simple organic reactions- transition states and intermediates; energy of activation; thermodynamic control and kinetic control of reactions. (b) Reactive Intermediates: Generation, geometry, stability and reactions of carbonium ions, carbamions, free radicals, carbenes, benzynes and nitrenes. (c) Substitution reactions: SN1, SN2, SN1*, SN1, SN2' and SN1 mechanism; electrophilic group participation; electrophilic and nucleophilic reactions of acyclic compound including simple heterocyclic compounds-pyruvate, furan, thiophene, indole. (d) Elimination reactions: E1, E2 and E1cb mechanism; orientation in E2 reactions- Saytloff and Hoffmann; pyrolic syn elimination-acetylate pyrrole, Chuaga and Cope elimination. (e) Addition reactions: Electrophilic addition to C-C and C=C; nucleophilic addition to C=C, C=N, conjugated olefins and carbonyls.
3. Pericyclic reactions: Classification and examples; Woodward-Hoffmann, rules—electrocyclic reactions, cycloaddition reactions [2+2 and 4+2] and sigmatropic shifts [1, 3; 2, 4] and BMO approach.


5. Polymeric Systems
   (a) Physical chemistry of polymers: Polymer solution and their thermodynamic properties, number and weight average molecular weights of polymers, Determination of molecular weights by sedimentation, light scattering, osmotic pressure, viscoelasticity and group analysis methods.

   (b) Preparation and properties of polymers: Oligomers, polyethylene, polystyrene, polyvinyl chloride, Teflon, nylon, terylene, synthetic and natural rubber, Inorganic polymers—phosphonic halohydrides, boron, silicones and silicates.

   (c) Biopolymers: Basic bonding in proteins, DNA and RNA.

   (d) Syntheses of repeat units: 

      - Oxo-, HIO₄, Cr₂O₇²⁻, P(IV)O₆⁻, SeO₂, NBS, B₂H₆, Na-Liquid.

6. Synthetic uses of reagents: Principles of spectroscopy and applications in structure elucidation
   (a) Rotational spectra: Diatomic molecules; isotopic substitution and rotational constants.
   (b) Vibrational spectra: Diatomic molecules, linear triatomic molecules, specific frequencies of functional groups in polyatomic molecules.
   (c) Electronic spectra: Single and triplet states, n–π* and π–π* transitions; application to fluorescent doubled bonds and conjugated carbonyls—Woodward Fieser rules.
   (d) Nuclear magnetic resonance: Isocoumarin and anisocoumarin protons; chemical shift and coupling constant; Application of H NMR to simple organic molecules.
   (e) Mass spectra: Parent peak, peak of daughter peak, metastable peak, fragmentation of simple organic molecules a cleavage, Mc-Latterry arrangement.
   (f) Electron spin resonance: Inorganic complexes and free radicals.

CHEMICAL ENGINEERING

PAPER-I Section A

a) Fluid and Particle Dynamics
   Viscosity of fluids, Laminar and turbulent flows, Equation of continuity and Navier-Stokes equation- Bernoulli's theory. Flow rates. Fluid drag and pressure drop due to friction and Reynolds Number and friction factor—effect of pipe roughness. Economic pipe diameter. Pressure losses, head, stream line, stagnation point, friction factor, shape of pipe, friction factor and the value of pressure drop, friction factor and the value of pressure drop.

b) Mass Transfer

CIVIL ENGINEERING

PART-B

SECTION-B

a) Material and Energy Balances
   Material and energy balance calculations in processes with recycle/bypass/purge. Combustion of solid/liquid/gaseous fuels, stoichiometric relationships and excess air requirements. Adiabatic flame temperature.


c) Chemical Reaction Engineering

Importance of interphase and intraparticle mass transfer on performance. Effective-nessfactor: Isothermal and non isothermal reactors and reactor stability.

b) Natural organic products-Wood and wood-based chemicals, pulp and paper, Agro- industrial, sugar, Edible oils extraction (including tree based seeds), Soaps and detergents, Essential oils- Biomass gasification (including biogas), Coal and coal chemistry, Petroleum and Natural gas—Petroleum refining (Atmospheric and thermal processes), Chemical industries—Polystyrene (LDPE/HDPE/LDPE), Polyvinyl Chloride, Polystyrene, Ammonia manufacture, Cement and lime industries, Paints and varnishes. Glass and ceramics Fermentation-alcohol and beer industries.


f) Process Engineering Economics

ENVIRONMENTAL ENGINEERING


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Linear Algebra:
Vector space, linear dependence and independence, subspaces, bases, dimensions.
Finite dimensional vector spaces. Matrices, Cayley-Hamilton theorem, eigen-values and eigen-vectors, matrix and linear transformation, determinant and column reduction, matrix equivalence, congruences and similarity, reduction to canonical form, rank, orthogonal, symmetrical, skew symmetrical, unitary, hermitian, skew-hermitian forms- their eigen values and orthogonal and unitary reduction of quadratic and hermitian forms, position definite quadratic forms.

Calculus:
Real numbers, limits, continuity, differentiability, mean value theorems, Taylor's theorem with remainder, indeterminate forms, maxima and minima, asymptotes. Functions of several variables: continuity, differentiability, partial derivatives, maxima and minima, Lagrange's method of multipliers, Jacobian, Riemann's definition of definite integrals, indefinite integrals, finite and improper integrals, beta and gamma functions. Double and triple integrals (evaluation techniques only). Areas, surfaces and volumes, centre of gravity.

Analytical Geometry:
Cartesian and polar coordinates in two and three dimensions, second degree equations in one and two dimensions; reduction to canonical forms, straight lines, shortest distance between two skew lines, plane, sphere, cone, cylinder, paraboloid, ellipsoid, hyperboloid of one and two sheets and their properties.

Ordinary Differential Equations:
Formulation of differential equation, order and degree, equations of first order and first degree, integrating factor, equations of first order but not of first degree, Clairaut's equation singular solution. Higher order linear equations with constant coefficients, complementary function and particular integral, general solution, Euler-Cauchy equation.

Vector Analysis:
Scalar and vector fields, triple products, differentiation of vector function of a scalar variable, gradient, divergence and curl in Cartesian, cylindrical and spherical coordinates in two and three dimensions, second degree equations in one and two dimensions; reduction to canonical forms, straight lines, shortest distance between two skew lines, plane, sphere, cone, cylinder, paraboloid, ellipsoid, hyperboloid of one and two sheets and their properties.

Partial differential equations:

Numerical Analysis and Computer programming:

Developing simple programs in Basic for problems involving techniques covered in the numerical analysis.

Ordinary and Partial Differential Equations:

4. Manufacturing Science

5. MANUFACTURING MANAGEMENT

4. Elements of Programming

MECHANICAL ENGINEERING

1. THERMODYNAMICS:
Basic concept, Open and closed systems. Applications of Thermo-dynamic Laws., Gas equation, Cleaveyn equation, Availability and Irreversibility and T-d relations.

2. I.C. Engines:

3. HEAT TRANSFER, REFRIGERATION AND AIR CONDITIONING:

4. TURBO-MACHINES AND POWER PLANTS:
Continuity, momentum and Energy equations, Adiabatic and isentropic flow, fanno lines, isenthalpic lines, Theory and design of axial flow turbines and compressors, Flow through turbo-machine, turbo-baule, cascade, centrifugal compressor. Dimensional analysis and
morphogenesis and morphophon; fate maps of gastrulae in frog and chick, organogenesis of eye and heart, placentation in mammals.

(b) Role of cytoplasm in and genetic control of development; cell lineage; causation of metamorphosis in frog and insects; paedogenesis and neoteny; growth, degrowth and cell death; ageing; blastogenesis; regeneration; teratogenesis; neoplasia.

(c) Insensitivity of placentia; in vitro fertilization; embryo transfer, cloning.

(b) Baier's law; evo-devo concept.

Animal Husbhandry and Vet. Science

Paper I

Section A

Livestock industry -its scope and potential.

Human population in relation to wild life.

Significance of wild life.

Animal Genetics and Breeding

Animal Genetics: Mendelian inheritance, Expression of genes, linkage and crossing over.

Sex influenced and sex linked characters. Chromosomal aberration and gene structure.

DNA as genetic material, recombinant DNA technology, mutation Quantitative vs Qualitative traits. Forces changing gene frequency.

Animal Breeding: Breeding systems-inbreeding, out breeding, up grading, hybridization.

Cross breeding and out crossing system, selection and their merits. Genetic improvement of cattle, buffaloes, sheep, goat, swine, horses, Poultry and wild animals.

Adaptation to the environment

Thermal balance in animal- direct and indirect effects of weather on animals. Loss of water from body, Growth rate and body weight. Photo sensitive disorder.

Section B

Animal diseases:

Immunity and vaccination: Principles and method of immunization of animals against specific diseases.

Herd immunity, disease free zone, disease zero concept.


Materials and methods for collection and samples for veterinary investigation.

Extension- Principles of extension, different methods adopted to educate the farmers under different conditions.

Generation of technology- Its transfer and feed back. Problems and constraints in transfer of technology.Animal husbandry programmes for rural development.

Animal Husbhandry and Vet. Science

Paper II

Section A

A- Animal Nutrition:

General nutritional considerations, Energy and Protein nutrition. Mineral and vitamin nutrition, Hormones and additives. Evaluation of nutritional value of feeds. Ruminant and non-ruminant nutrition of animals. Meeting nutritional requirement of various classes of animals. Digestion, metabolism and absorption of nutrients in different types of animals grazing habit and food intake.

B- Animal Physiology

Physiological mechanisms and livestock product, Growth rate & animals production. Nervous and hormonal controlling mechanism, Physiology of Reproduction. Lactation and egg laying. Physiology of digestive system of various classes of animals including wild animals. Semen evaluation, preservation & artificial insemination in various classes of animals.

Section B

A-Livestock production & Management:

General care and management of livestock - Cattle, buffalo, Goats, Sheep, Pigs and Poultry. General care and management of wild animals. Feeding and management of livestock and wild animals and under drought, Flood and other natural disaster.

Classification, grading and marketing of livestock and their products.

Milk and milk products-

Milk-Collection, transportation of raw milk, quality testing and grading of raw milk, milk pasteurisation, standardization, & Homogenization. Reconstituted and recombined milk.

Milk Product technology- Production, Processing, Storage, distribution and marketing of milk products such as butter, Ghee, Khoya, Chhana, Cheese, condensed and dried milk, ice-cream, yoghurt, Dahi and Shrikhand and their testing and grading, SS specification, legal standards, quality control and nutritive properties of various milk products.

Milk by product technology- whey products, butter milk, Lactose, and casein.

Horticulture “Fruit and Plantation Crops”

Paper I

Section A

Definition of horticulture and its branches. Importance and scope of fruits and plantation crops in India. Area and production of different fruit crops. Geographic Classification of fruit crops. Nutritional garden. Planning and establishment of orchard.


Nursery management. Methods of training and pruning. Use of Phyтомone in fruit production.

Section B

Package of practices for the cultivation of major fruits- Mango, Banana, Citrus, Grape, Guava, Litchi and Papaya and Minor Fruits- Pineapple, pomegranate, Bael, Aonla, Ber,


Horticulture “Vegetables and Ornamental crops”

Paper II

Section A


Environmental Science

Paper First

Part A

Basics of Environmental Science, Definition meaning and Scope. Importance of the study of Environmental Science. Environmental Segments: Geosphere, lithosphere, Hydrosphere, atmosphere and biosphere- their spread, composition and inter-relationships.

Environmental and ecological principles: Ecological terminology and definitions, level of organization, habitat and niche, individual, species, population. Community, biome and ecosystem organization.

Ecological Succession: Hydrarch and xerarch, concept of climax and seral communities


Part B

Natural resources:- water-its sources, surface and ground water, global distribution and uses of water, water crisis and conservation strategies.

Soil and land uses of India and its uses, conservation strategies and integrated land use planning.

Minerals and matters- their uses and mining operations.

Forest resources of India, forest cover, community and social forestry, afforestation programmes, forest conservation Act and national forest conservation strategy.


Wildlife sanctuaries and national parks in India. Wildlife conservation Act, concept of biosphere reserves.

Renewable and non renewable sources of energy and its optimization.

Environmental Science

Paper Second

Part A

Environmental disruptions, soil erosion, deforestation, drought, flood, fire and desertification- processes, causal factors and their mitigative measures.

Environmental pollution: Air pollution-sources, effects on plants, animal, man and monuments and their Control measures. Air quality standards.

Water pollution, types and major sources of water pollutants, effects of water pollutants on physico-chemical and biological properties of water bodies, process and control of eutrophication, water born diseases with special reference to water pollution.

Types and major sources of soil pollutants, effects of soil pollutants on fertility and biological properties of soil.

Major sources of noise pollution, effects of noise on human health. Anthropogenic and other biotic activities grazing, burning and mining etc. and their impact on environment and agriculture, effect of industrialization on environment.

Introduction to global environmental problems viz: acid rain, ozone depletion, green house gases. Global warming and climatic changes.

Solid waste disposal and its effects on surrounding environment and management waste management in domestic, industrial and urban areas, energy generation from wastes.

Part B

Introduction and scope of environmental management, environmental ethics and dharmic concept.

Basic concepts of sustainable development, industrial ecology and recycling industry.


National and international Environmental conservation strategies and organizations.

Population and Environment, concept of carrying capacity and population regulation.

Natural Disasters: causes and effects of cyclone, tornadoes, earthquake, avalanches, and slides and volcanoes, disaster warning, mitigation, preparedness and management.

Environmental education and awareness, concept and practice of restoration ecology.

Current Environmental issues and priorities in India for environmental management.