MAIN EXAMINATION
SYLLABI FOR COMPULSORY SUBJECTS

GENERAL STUDIES

PAPER – I

1. History of Modern India and Indian culture
The History of Modern India will cover history of the Country from about the middle of nineteenth century and would also include questions on important personalities who shaped the freedom movement and social reforms. The part relating to Indian culture will cover all aspects of Indian culture from the ancient to modern times.
2. Geography of India
In this part, questions will be on the physical, economic and social geography of India.
3. Indian Polity
This part will include questions on the Constitution of India, Political system, Indian Administrative system and related matters.
4. Current National issues
This part is intended to test the Candidate's awareness of current national issues.
5. International Affairs & Institutions
This part will include questions on important events in world affairs and on international institutions.
6. Indian Economy
In this part, questions will be on the planning and economic development in India, economic & trade issues, Foreign Trade, the role and functions of I.M.F., World bank, ADB, W.T.O. etc..
7. Developments in the field of Science & Technology, Communi-cation and Space
In this part, questions will test the candidate's awareness of the developments in the field of Science & Technology, Communication and space and also basic ideas of computers.
8. India and the World
This part is intended to test candidate's awareness of India's relationship with the world in various spheres, such as the following :
Role of India in the context of world.
Foreign Affairs, External security and related matters, Nuclear Policy.
9. Games & Sports
Questions will assess the awareness of candidates in respect of games and sports at international and national level. It will also have questions pertaining to different awards and personalities in the context of India.
10. Indian Agriculture
Attempt will be made to assess the general awareness of candidates in respect of crops, white revolution, green revolution, agriculture production and their impact on development of rural economy.

11.   Scheduled Caste & Scheduled Tribe (Prevention of Atrocities) 1989 and the Protection of Civil Rights Act, 1955 (No. 22 of 1955)

12.   The Protection of Human Rights Act, 1993.

GENERAL STUDIES
PAPER – II
Part - I
General Introduction of Madhya Pradesh
1. Geography
General Introduction of Madhya Pradesh, area, topography and structure, physical and geographic areas and climate.
2. Natural Resources of Madhya Pradesh
Mineral Wealth.
Forest Wealth and Wild Life.
Agriculture and Live stock, Regional distribution of crops, planned development of Agriculture, Green Revolution, Development of Live stock.
Water Resources - Development of Irrigation and Irrigation projects.
3. Human Resources
Population, Population Density, Urban and Rural population, Literacy and Labours.
4. Energy Resources
Questions will attempt to assess the general awareness of condidates about the conventional and non-conventional sources of energy and their uses in human life.
5. Industries
Attempt will be made to assess the general awareness of candidates about the types and size of industries and their impact on state economy.

<h1 style="text-align:center">6. Environment</h1>

Questions will be related to environment and its protection, pollution, natural climates and their impact on quality of human life.

7. Planning and Evaluation

Attempt will be to assess the general awareness of candidates about different aspect of five year plans till date, various programmes of urban and rural development, economic planning and its evaluation and status of Madhya Pradesh in the context of Country.

8. Administrative Structure of Madhya Pradesh

Questions will be related to general knowledge of candidates about administrative units - Division, District, Tehsil and Development-Blocks; their relationship and administrative structure.

9. Rural and Urban Administrative Structure

Questions will be pertaining to the general knowledge of candidate about organization and administrative structure of Pachayati Raj, Municipality and Municipal corporation.

10. Games and Sports

Attempt will be made to assess the awareness of candidates related to organization, management and facilities for different games and sports. The questions will also be related to different State awards, and personalities and contribution of Government and non Government agencies.

<p style="text-align:center">Part – II</p>
<p style="text-align:center">Culture, Literature, Music, Dance, Arts and History of Madhya Pradesh</p>

1. Culture

The questions will be related to nature, types their salient features and impact on human life.

2. Literature

    (1) Ancient - Kalidas, Bharthari, Bhavbhuti, Vanabhatta.
    (2) Medieval - Keshav, Padmakar, Bhushan.
    (3) Modern - Pandit Makhanlal Chaturvedi, Subhadra Kumari Chauhan, Gajanan Madhav Muktibodh, Balkrishna Sharma "Navin", Bhavani Prasad Mishra, Harishankar Parsai, Sharad Joshi, Mulla Ramoozi, Shiv-Mangal Singh, Suman and Nanddulare Vajpai.
    (4) Folk Literature / Dialects of Madhya Pradesh. Isuri, Singaji..

3. Music & Dance Tradition

    (1) Music Tradition - Tansen, Ustad Allauddin Khan, Ustad Hafiz Ali Khan, Pandit Krishna Rao, Shankar Pandit, Rajabhaiya Poonchwale, Ustad Amir Khan, Kumar Gandharva, Maharaj Chakradhar Singh Pandit Kartik Ram.
    (2) Dance tradition - Major styles of folk music, major folk dances.

4. Arts

Questions of general nature will be related to characteristics of Rock painting, folk panting, modern painting school and important painters. It will also have questions related to major folk and other theatres.

5. Major Scheduled Tribes

It will assess the general awareness of candidates related to names, characteristics, habitats, major fairs and festivals and cultural structure of major scheduled tribes. It will also have questions related to different programmes of State Government for the upliftment of Scheduled Tribes.

6. Programmes of State Government in the field of Culture

The questions will attempt to assess general knowledge of the candidate related to literasy academics and institutions. The questions will also be related to different Music and Fine Arts Schools and Cultural festivals. There will be questions awards given by the state for the significant contribution in the filed of literature, music and fine arts.

7. Archaeological Heritage

The questions of general knowledge will be related to significance and characteristics of major historical, archaeological and tourist places.

8. Historical perspective of Madhya Pradesh

The questions will be related to creation of M.P. and important dynesties and rules of M.P., It will also have questions related to contribution of M.P. in freedom movement.

<p style="text-align:center">AGRICULTURE   (CODE NO. 01)</p>
<p style="text-align:center">PAPER - I</p>

    There will be two parts
    PART I , Compulsory for all the candidates.
    PART II, There will be two optional sections (A & B) Candidate will have to answer all the questions from the opted - one section.

<p style="text-align:center">PART - I</p>

1. Elementary Agronomy

Classification of weeds and herbicides. Associated losses dueto infestation of weeds. Weed management through cultural, chemical, biological and integrated approach. Tillage and crop production. Water use efficiency in relation to crop production. Criteria for scheduling irrigation. Concepts of multiple cropping, multi-storey, relay and intercropping and their importance.

2. General Horticulture

Orchard planning (Soils, Climate, Nutrition, Training, Pruning, Flowering and fruiting problems and bearing habits), Bonsai. Nursery management and propagation methods. Types of vegetable

gardening; Physiological disorders in vegetables and fruits. Principles and methods of preservation of important fruits and vegetables and processing techniques. Landscape, Floriculture including raising of ornamental plants. Design and layout of gardens.

3. Basic genetics
Chromosome organization and functions - Mitotic and meiotic cell division. Reproduction and fertilization - Mendel's experiments and laws of inheritance. Gene interaction, Linkage and crossing over, Chromosomal aberration. Cytoplasmic inheritance. Qualitative and quantities traits. Nilsson-Ehle's experiment. Structure and replication of genetic material. Gene expression. Central dogma. gene transcription and translation. Genetic code. Operon model. Gene mutation.

4. Crop improvement
Center of Crop diversity, mode of reproduction, variability in plants, Germsplasm Male sterility and self incompatibility. Heterosis and inbreeding depression, Breeding methods for crop improvement

5. Plant protection
Classification and symptoms of plant diseases, Principles of plant disease control including (exclusion, eradication, immunization and protection) Classification of pesticides and formulations. Agents and basic steps of biological control. Integrated diseases and insect pest management. Principle methods of control of stored grain pest and storage pests. Methods of rodent control. Spray equipments, their selection and maintenance. Safety precautionary measures during pesticide usage. Bee keeping (apiculture) and mushroom cultivation. Legal control - plant quarantine and insecticidal act.

6. Basic agro-forestry
Silvi-culture and agro-forestry, Classification of agro-forestry system; Waste land and watershed development through agro-forestry

7. Elements of crop physiology
Absorption and translocation of water and nutrients. Transpiration and water economy. Photosynthesis and respiration. Growth analysis and its importance. Photo-periodism and vernailisation. Growth hormones, senescence and post-harvest physiology (seed dormancy, storage physiology and fruit ripening)

8. Organic farming
Defination of organic Farming, Components and its role in sustainable Agriculture Bio-fertilizers, production and use; Role of *neem* Products in crop protection. Role of microorganisms in agriculture

9. Dry land farming
Dry land agriculture for sustaining agricultural production. Soil and Water management with special reference to dry land agriculture.

PART - II
There will be two optional sections (A & B) Candidate will have to answer all the questions from the opted section.

SECTION - A
Will be based on production & protection of the following main crops:

Field crop groups		
Cereals	:	Wheat, rice, maize and sorghum
Pulses Crops	:	Pigeon pea ,chick pea, Urid and Mung
Oilseeds Crops	:	Soybean, groundnut, and rapeseed/mustard
Cash crops	:	Cotton and sugarcane

SECTION - B
Will be based on production & protection of the following horticultural crops :

Horticultural crop groups		
Fruits	:	Mango, citrus , banana and papaya
Vegetable crops	:	Potato, onion, cucurbits, tomato, okra and peas
Cole crops	:	Cauliflower and cabbage
Leafy vegetables	:	Spinach,
Flowers	:	Roses, merry gold, chrysanthemum, aster, gaillardia and gladiolus
Spices	:	garlic, chillis, fenugreek, coriander

PAPER - II

1. Seed technology
Seed technology : definition and importance. Varieties, Seed germination and dormancy. Planting value. Seed and variety deterioration. DUS and VCU test. Physical and genetic purity. Seed health. Seed legislation and certification; Classes of seeds; basic priniciples of Seed production and processing

2. Agricultural biotechnology
Methods and application of plant tissue culture; D.N.A. basedmarker gene cloning and tools for recombinant DNA technology

3. Agricultural economics and farm management
Agriculture marketing and its problems; Marketing costs, Profit margins and efficiencies. Cooperative marketing in India. EXIM policies and farm commodities for export. Barriers of export in context to WTO. Farm management, types and systems of farming and factors affecting them.

4. Agricultural extension education
Rural society and institutions. Definitions, characteristics and importance of social stratification and culture. Agricultural extension- its importance; Importance and methods of extension training and evaluation. Importance of rural development programmes in India in post-independence period. Communication and diffusion of agricultural innovations. Role of KVKs in dissemination of agricultural technologies. Role and functions of ATMA

5. Agricultural statistics
Measures of central tendency and dispersion. Correlation and regression. Graphs and diagrams

6. Computer application in agriculture
Types and classification of computers. Data operating systems. Library function. Data management.

7. Soil Science and Microbiology
Processes and factors of soil formation. Soil Taxonomic classification. Physico-chemical properties of soils. Soil fertility and fertilizers. Integrated nutrient management. Problem soils and their management. Essential plant nutrients, their distribution, functions and cycling in soils. Microbial processes involved in recycling of plant nutrients. Symbiotic and non-symbiotic nitrogen fixation. Soil organic matter and nutrient cycling. Soil survey, conservation and land use planning. Processes and factors of erosion and runoff and their management.

8. Biodiversity and natural resource conservation
Natural resources (Forest and water), their management and conservation. Environmental pollution (air, water, soil and nuclear) and associated hazards to crops. Solid waste management. Utility of plant genetic resources in crop improvement. Germplasm collection and conservation.

9. Food science and food biochemistry
Biochemistry of carbohydrates and proteins. Types and properties of amino acids. Types of vitamins and their sources. Classification and nature of enzymes. Factors affecting activities of enzymes. Metabolism. Chemistry of natural products (natural antibiotics and plant hormones)

10. Farm management
Farm management planning and budgeting. Role of farming systems in sustainable agriculture. Significance of farm mechanization in agricultural production

ANIMAL HUSBANDARY AND VETERINARY SCIENCE (CODE NO. 02)
PAPER - I

1. Animal Nutrition
Metabolism of carbohydrates, proteins and fats, Requirements for maintenance, growth and production of milk, meat ,work, eggs and wool.

Mineral and trace elements. Metabolism, source and role of minerals and trace elements, their requirements for growth and production, deficiency syndromes.

Vitamins, their sources, requirements, role in metabolism and deficiency syndromes.

Feeding standards and measures of feed energy. Limitations of different feeding systems. Feeding practices in livestock in normal and drought conditions.

Feed additives in the ration of livestock and poultry; antibiotics and hormonal compounds and other growth stimulators their uses and abuse.

Preservation of feed.

Feeding infants and growing. Importance of colostrums.

Feeding and care of expectant and nursing mothers.

2. Genetics and Animal Breeding
Probability applied to Mendelian inheritance. Hardy Weinberg law, Poly morphism. Inheritance of quantitative traits. Casual components of variation. Biometrical models and covariance between relatives. The theory of path coefficient applied to genetic analysis. Heritability, repeatability Estimation of additive, non additive and environmental variance. Genetic and environmental correlations. Mating systems, inbreeding, out breeding. Measurement of inbreeding, Aid to selections, Breeding for threshold traits. Method of selection , Selection index, evolution of genetic gain, correlated response in selection. Reciprocal. Recurrent selection. Hybridization. Choice of effective breeding plan. Importance of breeding records in equines and wild animals. stud books in wild animals and their utility in capitive breeding programme.

Application of computer for statistical analysis in animal farms and veterinary hospitals and epidemiology.

3. 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.

Biochemistry of semen, Care, sterilization and storage of equipments used for artificial insemination.

Selection, care, training and maintenance of breeding bull for A.I.

4. Livestock production and Management

Comparison of diary farming in India with advanced countries. Dairying under mixed farming and as a specialized farming, economic dairy farming, starting of a dairy farm. Capital and land requirement organization 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.

Wild and zoo animal management

Management of pack animal

Management of laboratory animals & fish production.

5. Milk Technology

Organization of rural milk procurement, collection and transport of raw milk. Quality testing and grading raw milk. Grades of whole milk, skimmed milk and cream.

Defects in processing, packing, storing, distribution and marketing of milk and milk products and their remedial measures.

Nutritive properties of pasteurized, standardized, toned, double toned, sterilized, homogenized, reconstituted, recombined and flavoured milk.

Preparation of cultured milks. Cultures and their management. Vitamin D, acidified and other special milks, Legal standards and sanitation requirements for clean and safe milk and for the milk plant equipments.

Methods of preparation of butter, ghee, khoa, lassi, curd, ice cream and cheese.

6. Hygiene

Veterinary Hygiene with respect to water, air and habitation.

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

By-products from slaughter houses and their economic utilization.

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

Sanitation of animal houses. Source of air pollution in animal houses and its effect on animal health and production.

7. Extension

Extension Education: evolution of extension education in India: classification of extension, teaching methods, audiovisual aids, their classification. Role of animals in the economy, health, socio-psychology of rural, semi urban and urban society (role of farm stock, companion animals, sports animals etc.)

Different methods adopted to educate farmers under rural conditions. Utilization of fallen animals for profit extension education, etc.

Design trysen : Different possibilities and method to provide self employment to educated youth under rural condition.

Cross breeding as a method of upgrading the local cattle.

ANIMAL HUSBANDARY AND VETERINARY SCIENCE (Code No. 02)

PAPER-II

1. Anatomy

Anatomy of ox and fowl. Histological technique freezing, paraffin embedding etc. Common histological stain. Preparation and straining of blood films. Mammalian Histology.

Structure and function of cell and cytoplasmic constituents: Structure of nucleus, plasma membrane, mitochondria, golgi bodies, endoplasmic reticulum and ribasomes. Cell division: Mitosis and Miosis.

Systemic embryology- stage wise study of embryo/ fetus of chicks, cattle, buffalo, sheep, goat and cat.

2. Physiology

Prenatal and post natal growth. Hormonal control of development of udder and milk . Environmental factors affecting reproduction in males and females. methods of ameliorating environmental stress.

Physiological relations and their regulations: mechanism of adaptation, environmental factors and regulatory mechanisms involved in animal behavior. Methods of controlling climatic stress.

Physiology of circulation, respiration excretions, digestions and reproduction.

Shock, its mechanism, classification of shock. Fluid and electrolyte balance. Hypoxia role of respiration in acid base mechanism. Respiration in poultry.

3. Pharmacology

Pharmacology of drugs acting on gastrointestinal, cardio-vascular, urinary, respiratory, nervous, genital systems and endocrines. Therapeutic agents against bacteria, protozoa fungi, parasites and

insects, including their mechanism of action. Common toxic compounds and plants their effects and treatment.
Use of anticancer agent in animals, pharmacological and therapeutic efficacy of indigenous drugs
4. Diseases
Common livestock and poultry diseases caused by bacteria, fungi protozoa, viruses and parasites pertaining to their causal agents, epidemiology, symptoms diagnostic methods, treatment and prevention. Important zoonotic diseases . Toxicity caused by agrochemicals and environmental toxicity. Methods of collection and dispatch of material for laboratory diagnosis.
Principles of immunity and immunization:
Principles of epidemiology, public health aspects of food products of animal origin (meat. egg. milk and fish) their inspection and marketing.
5. Surgery
Anaesthesia in animals.
Common surgical affections of different systems of the body. Diseases of locomotion system with special reference to soundness, health identification, principles of radiology.
Electrotherapy in veterinary practice.
Familiarisation with fluoroscopic examination and ultrasonography
6. Jurisprudence
Jurisprudence in veterinary practice. Common offences towards animals. Common adulteration practices regarding milk and milk products and meat and their detection.
  Laws relating to offences affecting public health.
  Laws relating to adulteration of drugs
  Evidence procedure in court
  Legal duties of veterinarian
  Code of conduct and ethics for veterinarian.

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ZOOLOGY (CODE NO. 03)
PAPER - I
PART - I
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Structure, general organization and Biology of nonchordata and chordata, ecology ethology, economic zoology and Laboratory methods.
1. Non-chordata and chordata
(1) Classfication and relationship of various phyla upto sub-classes.
(2) Protozoa - Structure , locomotion, nutrition, reproduction; and life history of *Paramaecium*, *Monocystis*, *Plasmodium*, *Trypnosoma* and *Amoeba.*
(3) Porifera - Stucture, histology, Skeleton, canal system and reproduction in *sycon*
(4) Coelenterata - Polymorphism, defensive structures and their mechanism; coral reefs and their formation; metagenesis; general features and life history of *Obelia* and *Aurelia.*
(5) Platyhelminthes - Parasitic adaptation; general features and life history of *Fasciola* and *Taenia* and their relation to man.
(6) Nemathelminthes - General features, life history and parasitic adaptation of Ascaris; Nemathelminths in relation to man.
(7) Annelida - Coelom and metamerism; general features and life history of Neanthes, Pheretima and Hirudinaria.
(8) Arthropoda - External features, organ systems and life histry of prawn, scorpion and cockroach. Mouth parts in insects (cockroach, mosquito, housefly, honey bee and butterfly); metamorphosis in insects and its hormonal regulation; social organization in insects (termites and honey bees).
(9) Mollusca - Feeding, respiration, locomotion, general features and life history of Unio & Pila. Torsion and detorsion in gastropods.
(10) Echinodermata - General features, Feeding, respiration, water vascular system and locomotion of *Asterias.*
(11)   Protochordata - Origin of chordates; general features and life history of Herdamania and Branchiostoma.
(12) Pisces - Scales, respiration, locomotion, migration. Structure and Affinities of Dipnoi.
(13) Amphibia - Parental care, neoteny & paedogenesis.
(14) Reptilia - Poisonous and non poisonous snakes of M.P. - Biting mechanism of snakes.
(15) Aves - Flight adaptation and migration.
  Mammalia - Structural peculiarities and phyllogenetic relation of profotheria and methatheria
(16) Comparative functional anatomy of following systems of vertebrates-integument and its derivatives, endoskeleton (limbs and girdles only), digestive system, respiratory system, circulatory system (heart and aortic arches only) urino-genital system, brain and sense organs (eye and ear only).

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PART - II
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1. Ecology
(1) Biosphere - Biogeochemical cycles, green-houses effect, ozone layer and its impact; ecological succession.

(2)   Population, characteristics, population dynamics, population stabilization.
(3)   Wild life of India its conservations. Biosphere reserves.
           Environmental biodegradation; pollution and its impact on biosphere and its prevention.

2. Ethology
(1)   Behaviour - Learning, instinct, habituation, conditioning, imprinting.
(2)   Role of hormones in drive; role of pheromones in alarm spreading; social behaviour in insects and primates; courtship (Drosophila, 3-spine stickleback and birds).
           Biological clock and circadian rhythms.

3. Economic Zoology
(1)   Apiculture, sericulture, lac culture, carp culture, pearl culture, prawn culture.
(2)   Major infectious and communicable diseases (small pox, plague, malaria, tuberculosis, cholera and AIDS) their vectors, pathogens and prevention.
           Insects and diseases in relation to man.

4. Laboratory techniques
(1)   Study of pH meter
(2)   Chromatography-(paper and thin layer)
(3)   Microtomy
(4)   Preparation of fixatives, stains and reagents
(5)   Museum keeping & preservation
(6)   Skeleton preparation and taxidermy.

ZOOLOGY (CODE NO. 03)
PAPER - II
Cell Biololgy, genetics, evolution, systematics, biochemistry, physiology and embryology
PART - I

1. Cell Biology
(1)   Structure and function of cell and its organelles(nucleus, plasma membrane, mitochondria, Golgi bodies, endoplasmic reticulum, ribosomes and Lysosomes), cell division (mitosis and meiosis), cell cycle.
(2)   Watson-Crick model of DNA, replication of DNA,
(3)   Protein synthesis.
(4)   Cell fusion.

2. Genetics and biotechnology
(1)   Genetic code.
(2)   Sex chromosomes and sex determination in Drosophilla, and man.
(3)   Mendel's laws of inheritance, recombination, linkage, and crossing over, multiple alleles, inheritance of blood groups.
(4)   Mutations and mutagenesis : radiation and chemical.
(5)   Cloning technology, plasmids and cosmids as vectors, transgenics, transposons, DNA sequence cloning and whole animal cloning (Principles and methodology).
(6)   Regulation and gene expression in pro-and eu-karyotes.
(7)   Congenital diseases in man.
(7)   DNA finger-printing.

3. Evolution and systematics
(1)   Origin of life
(2)   Lamarck and his works.
(3)   Darwin and his works.
(4)   Sources and nature of organic variation.
(5)   Natural selection.
(6)   Isolation.
(7)   Concept of species and sub-species, principles of classification, zoological nomenclature and international code , cladistics.
(8)   Fossils,
(9)   Geological eras.
(10)   Distribution of animals, zoogeographical realms of the world.

PART - II

1. Biochemistry
(1)   Structure and role of carbohydrates, fats, lipids, proteins, aminoacids, nucleic acids.
(2)   Glycolysis and Krebs cycle, oxidation and reduction, oxidative phosphorylation; energy conservation and release, ATP, cyclic AMP-its structure and role.
(3)   Hormone and their function.
(4)   Enzymes: types and mechanisms of action and co-enzymes.
(5)   Immunoglobulin and immunity.

2. Physiology (with reference to mammals)
(1)   Composition and constitutents of blood; its coagulation, factors and mechanism of coagulation; thermo regulation. Blood group and Rh factor in man.
(2)   Oxygen and carbon dioxide transport; haemoglobin : constitutents and its role in regulation, of gaseous transport.
(3)   Nutritive requirements; role of salivary glands, liver, pancreas and intestinal glands in digestion and absorption.
(4)   Excretory products; nephron and regulation of urine formation; osmoregulation.
(5)   Types of muscles, mechanism of contraction of skeletal muscles.
(6   Neuron, nerve impulse-its conduction and synaptic transmission; neurotransmitters.
(7)   Vision, hearing and olfaction in man.
(8)   Mechanism of hormone action.
(9)   Physiology of reproduction, role of hormones in reproduction.
3. Embryology
(1)   Gametogenesis, fertilization, types of eggs, cleavage, development up to gastrulation in Branchiostoma, frog and chick, Metamorphosis in frog, formation and fate of extra embryonic membranes in chick and mammals. Types and functions of placenta in mammals;
(2)   Paedogenesis and neoteny.
(3)   Growth, regeneration and aging.
(4)   In vitro fertilization; embryo transfer, cloning.

BOTANY   (CODE NO. 04)
PAPER - I
MICROBIOLOGY, PATHOLOGY, PLANT GROUPS, MORPHOLOGY
ANATOMY TAXONOMY AND EMBRYOLOGY OF ANGIOSPERMS

1. Microbiology
Structure, classification, reproduction and economic importance of Virus, phytoplasma (mycoplasma), bacteria and cyanobacteria . Microbes in industry and agriculture.
2. Plant Pathology
Knowledge of plant diseases caused by fungi, modes of infection and methods of control.
3. Plant Diversity
Structure, reproduction, life history, classification and economic importance of algae, fungi, bryophytes pteridophytes and gymnosperms.
4. Angiosperms
Tissue and tissue systems. Morphology and anatomy of root, stem and leaf. Developmental aspect and anomalous primary and secondary structures. Morphology of flower, structure of anther and ovule, microsporogenesis and megasporogenesis, fertilization and embryo development. Seed development.
5. Taxonomy
Priniciples of nomenclature and classification of angiosperms. Modern trends in taxonomy. A general account of the following families : Ranunculaceae, Brassicaceae, Malvaceae, Rutaceae, Fabaceae (Leguminosae), Apiaceae, Apocynaceae, Asclepiadaceae, Solanaceae, Lamiaceae, Euphorbiaceae, Liliaceae and Poaceae. Botanical gardens.

BOTANY   (CODE NO. 04)
PAPER- II
Cell Biology, Genetics and Evolution, Plant Physiology, Ecology and Economic Botany

1. Cell Biology
Cell as unit of structure & function. Prokaryotic and eukerayotic cells. Ultra structure and functions of plasma membrane, endoplasmic reticulum, mitochondria, ribosomes chloroplasts and nucleus. Chromosomes : Structure, chemical nature and behaviour during mitosis and meiosis. Special types of chromosomes.
2. Genetics and Evolution
Mendelism, concept of gene, structure and types of DNA and RNA, genetic code, protein synthesis and regulation. Theories of organic evolution and evidences.
3. Plant Physiology
Absorption and conduction of water. Transpiration, Mineral nutrition. Photosynthesis, Respiration, Photorespiration, Enzymes, Nitrogen metabolism and fermentation. Growth, plant hormones and their functions. Photoperiodism. Seed dormancy and germination.
4. Ecology
Scope of Ecology, ecological factors, structure, function and dynamics of Ecosystem. Plant communities and succession. Applied aspects of ecology including conservation, control of pollution and management of natural resources. Endangered plants, endemism and red data book. Global warming, acid rains and ozone layer depletion.
5. Economic Botany
Plants as sources of food, fodder, fibers, spices, beverages, medicines and timber.

CHEMISTRY (CODE NO. 05)
PAPER - I

1. Symmetry

Symmetry elements and symmetry operations. Recognition of symmetry point group and symmetry elements in AB_2 and AB_3 molecules.

2. Atomic structure

Idea of de Broglie matter waves. Heisenberg's uncertainity principle, Schrodinger wave equation (time independent). Significance of Ψ and Ψ^2, particle in one-dimensional box, quantum numbers, radial and angular wave functions, shapes of s. p, d and orbitals, Aufbau principle, Hund's multiplicity rule, Pauli exclusion principle. Effective nuclear charge.

3. Chemical bonding

Ionic bond, percent ionic character from dipole moment and electronegativity difference, characteristics of ionic compounds, factors affecting stability of ionic compounds, lattice energy, Born-Haber cycle; covalent bond and its general characteristics, polarities of bonds in molecules and their dipole moments. Valency bond theory, concept of resonance and resonance energy. Molecular orbital theory (LCAO method); bonding in homonuclear and heteronuclear molecules: H2+, H2 to Ne_2, NO, CO. The concept of hybridization, character of bonds, bond angles and bond length. Hydrogen bonding and van der Waals forces. Metallic bonding.

4. Solid State

Forms of solids, law of constancy of interfacial angles, crystal systems and crystal classes (crystallographic groups). Designation of crystal faces, lattice structures and unit cell. Laws of rational indices. Bragg's law. X-ray diffraction by crystals. Close packing, radious ratio rules, calculation of some limiting radius ratio values. Structures of NaCl, CsCl, and KCl. crystal Imperfections in crystals. Elementary study of liquid crystals.

5. 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; calorimetry, energy and enthalpy changes in various processes and their temperature dependence.

Second law of thermodynamics; entropy as a state function, entropy changes in various process, entropy–reversibility and irreversibility, Free energy functions; criteria for equilibrium, relation between equilibrium constant and thermodynamic quantities; Nernst heat theorem and third law of thermodynamics.

    Thermodynamics derivations of -
    Gibbs-Helmholtz equation,
    law of mass action and
    Clapeyron-Clausius equations.

6. Electrochemistry

    Conductivity and its applications to determine -
    Dissociation constant of weak electrolyte
    Solubility product of sparingly soluble salts
    Conductrometric titration.

Debye-Huckel theory of strong electrolytes.

Galvanic cells, concentration cells; electrochemical series, measure-ment of e.m.f. of cells, fuel cells and batteries.

Processes at electrodes; double layer at the interface of metal and solvent; rate of charge transfer, current density; overpotential.

7. Chemical kinetics

Concentration dependence of rate of reaction; defferential and integral rate equations for zeroth, first, and second order of reactions. Effect of temperature and pressure on rate constant. Collisions and transition state theories.

8. Photochemistry

Absorption of light; decay of excited state by different routes; photochemical reactions between hydrogen and halogens and their quantum yields.

9. Surface phenomena and catalysis

Absorption from gases and solutions on solid adsorbents, Freundlich and Langmuir adsorption isotherm; determination of surface area, characteristics and mechanism of reaction on heterogeneous catalysts.

10. Bio-inorganic chemistry

Essential and trace elements in biological processes, metalloporphyrins with special reference to haemoglobin and myoglobin. nitrogen fixation, oxygen-uptake proteins, cytochromes and ferredoxins. Biological role of alkali and alkaline earth metal ions.

11. Coordination chemistry

    (1)   Introduction to bonding theories in transition metal complexes: Valency bond theory, crystal field theory, Ligand field theory and molecular orbital theory.

    (2)   Magnetic properties of transition metal complexes: Magnetic moment (spin only and with L-S coupling), orbital contribution to magnetic moment.

(3) Electronic spectra of transition metal complexes: Spectroscopic ground and excited states, types of electronic transitions, selection rules for d-d transitions. Spectrochemical series. Orgel-energy level diagram for d^1 to d^9 states.

(4) Isomerism in coordination compounds. IUPAC nomenclature of coordination compounds; stereochemistry of complexes with 4, 5 and 6 coordination numbers; chelate effect and polynuclear complexes; trans effect and its theories; thermodynamic and kinetic stability of complexes.

(5) Organometallic chemistry: Synthesis, structure and bonding in metal carbonyl complexes, metal olefin complexes and metal alkyne complexes. Oxidative addition reactions.

12. General chemistry of inner transition elements

Lanthanides and actinides: Occurrence, separation, oxidation states and magnetic properties; lanthanide contraction.

CHEMISTRY (CODE NO. 05)
PAPER - II

1. Reaction mechanisms
General methods (both kinetic and non-kinetic) of study of mechanism of organic reactions illustrated by examples–use of isotopes, intermediate trapping, stereochemistry; energy diagrams of simple organic reactions–transition states and intermediates; energy of activation; thermodynamic control and kinetic control of reactions.
2. Reactive intermediates
Generation, geometry, stability and reactions of carbonium ions, carbanions, free radicals, carbenes and benzynes.
3. Name reactions
Aldol condensation, Claisen condensation, Perkin reaction, Knoevenagel reaction, Wittig reaction, Wolff-Kishner reduction, Cannizzaro reaction and von Richter reaction; benzoin condensation; Fischer indole synthesis, Skraup synthesis, Sandmeyer reaction, Reimer-Tiemann reaction and Reformatsky reaction.
4. Synthetic polymers
Addition or chain growth polymerization free radical vinyl polymerization, ionic vinyl polymerization, Ziegler-Natta polymerization, viryl polymerization Condensation or step growth polymerization. Polyesters, polyamides, phenol-formaldehyde resins, urea-formaldehyde resins, epoxy resins.
5. Photochemistry
Photochemical reactions of simple organic compounds, excited and ground states, singlet and triplet states, Jablonski diagram. Fluorescence and phosphorescence. Quantum yield and energy transfer process.
6. Organic spectroscopy
Problems pertaining to the structure elucidation of simple organic compounds using UV-visible, IR and NMR spectroscopy.
7. Heterocyclic compounds
Molecular orbital picture and aromatic characteristic of pyrrole, furane, thiophene and pyridene. Methods of synthesis and chemical reactions with particular emphasis on the mechanism of electrophilic substitution. Comparison of basicity of pyridene, piperidene and pyrrole. Preparation and reactions of indole, quinoline and iosquiniline.
8. Stereochemistry of carbon compounds
Elements of symmetry, chiral and achiral compounds. Fischer projection formulae; optical isomerism of lactic and tartaric acids, enantiomerism and diastereoisomerism; configuration (relative and absolute); conformations of ethane and n-butane, and cyclohexane. D, L-and R, S-notations of compounds containing chiral centres; projection formulae-Fischer, Newman and Sawhorse of compounds containing two adjacent chiral centres; meso and dl-isomers, erythro and threo isomers; racemization nd resolution; geometrical isomers; E and Z notations.
9. Organometallic compounds
Preparation and synthetic uses of Grignard reagents, alkyl lithium compounds.
10. Active methylene compounds
Diethyl malonate and ethyl acetoacetate-applications in organic synthesis; tautomerism (keto-enol).
11. Analytical chemistry
Errors in quantitative analysis, classification of errors, minimization of errors, precision and accuracy, significance of figures, co-precipitation and post-precipitation, optimum conditions for precipitation, choice of indicators in the acid –base titration, theories of indicators, principle of EDTA titration. Numerical questions on Quantitative estimation of pyrolusite, iodometry, silver coin, acid-base titration, redox titration.

PHYSICS (CODE NO. 06)
PAPER - I

1. Mechanics and Relativity

Conservative force field and potential energy, Gravitational potential, Motion under central force, Kepler's Law, Centre of mass and laboratory coordinate system. Coriolis force and its application's, Conservation of linear and angular momentum, Inertial and non inertial Frams, Michelson - Morley experiment and its implications. Galilian transformation, Lorentz transformation, length contraction, time dilation, velocity addition theorem. Variation of mass with velocity, mass energy equivalence, particle with zero rest mass.

2. Thermal & Statistical Physics

Maxwell's relations and their applications. Cooling by Adiabatic demagnetization. Einstein & Debye theory of specific heat of solids, concept of phonons. Statistical basis of thermodynamics, constrains, accessible and inaccessible states, distribution of particles with a given total energy into a discrete set of energy states. Probability and entropy, Boltzmann entropy relation, Mexwellian Distribution of Speeds and velocities .Doppler's broadening of spectral lines.

3. Optics

Michelson interferometer. Fabry perot interferometer Holography and its simple applications. Diffraction grating, Concave grating and its different mountings. Double refraction, optical rotation and rotation of plane of polarization.

4. Electricity and Electronics

AC circuits, complex numbers and their applications in solving AC circuit problems. Transmission of electric power, Magnetic force on moving Charge, Biot Sevart law, Ampears Law, Theory of diodes, Types of diodes and their applications. Characteristics of transistors, h parameters, bias stability, thermal runaway. FET: JFET and MOSFET, their construction, working and uses.

5. Sound and Acoustics

Speed of transverse waves in a uniform string. Speed of longitudinal waves in a fluid. Energy density and energy transmission in waves. Diffraction of sound. Principle of sonar system, ranging. Noise and music, intensity and loudness and their units, transducers and their characteristics. Recording and reproduction of sound. Acoustics of halls, reverberation period, Sabine formula.

PHYSICS (CODE NO. 06)
PAPER - II

1.Quantum Mechanics

De-Broglies Hypothesis, Heisenberg uncertainty relation for p and x, its extension to energy and time, consequences of uncertainty relation., gamma ray microscope, particle in a box.

Schrodinger's equation, postulatory basis of quantum mechanics, operators, expectation values, transition probabilities, application to a particle in one and three dimensional boxes, harmonic oscillator.

2. Atomic Spectra

Hydrogen atom, natural occurrence of n, l and m quantum numbers, the related physical quantities, comparision with Bohr's theory.

Spectra of hydrogen, deutron and alkali atoms, spectral terms, doublet fine structure, screening constants for alkali spectra for s, p d and f states, selection rules, singlet and triplet fine structure in alkaline earth spectra, L-S coupling and J-J coupling, fine strcture of hydrogen atom.

3. Molecular Spectra and Spectroscopy

Discrete set of electronic energies of molecules, quantization of vibrational and rotational energies, determination of inter nuclear distance, pure rotational and rotation - vibration spectra. Dissociation limits for the ground and other electronic states, transition rules for pure vibration and electronic vibration spectra. Raman effect. Stokes and antistokes lines, complementry character of Raman and infrared spectra, experiemental arrangement for Raman spectroscopy. Fluorescence & phosphorescence.

4. Solid State Physics

Lattices : Lattice types, lattice planes. Common crystal structures Laue's theory of X-ray diffraction, Bragg's Law, electrons in periodic potential; nearly free electron model (qualitative), energy bands, energy gap, metals, semiconductors, insulators, density of states, Fermi energy, Fermi velocity. Mobility of electrons and holes, Hall effect and Hall coefficient.

5. Nuclear Physics

Basic nuclear properties, general concepts of nuclear forces, working of nuclear detectors, G-M counter, proportional and scintillation counters, cloud chamber, spark chambers. Nuclear reactions, Q-value of nuclear reactions, nuclear fission and nuclear fusion (concepts), energy production in stars. Compound nucleus, direct reactions (concepts). Shell model, liquid drop model.

MATHEMATICS (CODE NO. 07)
PAPER - I

1. Abstract Algebra

Group, Subgroup, cyclic group and their properties. Order of Elements of group Coset decomposition, Lagrange's theorem. Normal subgroup, Quotient Group, Homomorphism, Isomorphism, Automorphism of Groups. Permutation, Permutation Groups, Cayley's Theorem. Cauchy's Theorem and Sylow's Theorem for finite abelian and non abelian groups.

Ring Theory - Rings, Subrings, Ideals and quotient rings, Homomorphism & Isomorphism of rings, Integral domain, characterstic of an element. Polynomial rings, Field Polynomials over the rational fields. Unique factorization theorem.

2. Linear Algebra

Definition and examples of vector spaces, subspace, sum and direct sum of subspaces - Linear dependence and independence and their bases properties. Bases, Existence theorem for bases. Finite dimensional vector space. Dimension of a vector space. Dimension of sum of spaces. Quotient space and its dimension. Linear transformations and their representation as a matrix. The Algebra of Transformation. Rank Nullity Theorem. Eigen values and Eigen vectors of a linear transformation : Diagonalization of a matrix. Inner product space, Orthogonal vectors, orthogonal compliments. Orthonormal sets and bases. Bessel Inequality for finite dimensional space. Gram Schmidt's orthogonalization process.

3. Differential Calculus

Convergence of sequence and series, limit & continuity of function. Differentiability. Successive differentiation, Leibnitze's theorem. Applications of derivative, Tangent and normal, Asymptotes, Singular points, curve tracing. Mean value Theorem. Taylor's Theorem. Expansion in Taylor's and Maclaurin series. Maxima & minima of function of one variable.

4. Integral Calculus

Integration of rational, irrational and transcedental functions. Reduction formula. Definite integrals. Rectification quadrature, volume and surface of solid of revolution. Double & triple Integrals. Beta & Gamma functions, Change of order of Integration of double integral. Improper integrals and their convergence.

5. Differential Equation

Ordinary differential Equation of first order and higher degree. Homogeneous equation of first degree. Integrating factor. Linear Differential Equation with constant coefficients , Complementary functions and particular integrals. Linear Differential Equation with variable coefficients. Singular solutions linear Differential Equation and Equation reducible to linear form. Exact differential equation.method of variations of parameter. Simultaneous linear diffrerential equations.

6. Vector Calculus

Differentiation of vector function ,Gradient, divergence & curl in Cartesian, cylindrical & spherical coordinate , Higher order derivatives. Vector integration, Gauss's, Green's & stoke's Theorem, and their applications.

7. Analytical Geometry

Cartesian and polar coordinates in two and three dimensions. Second degree equations in two and three dimensions, Reduction to canonical forms. Straight lines, Shortest distance between two skew lines, plane, Sphere, Cone, Cylinder, Paraboloid, Ellipsoid, Hyperboloids of one and two sheets and their properties.

8. Statistics

Measures of central tendency:- mean, mode, median, measures of dispersion, range, inter quartile range, mean deviation, standard deviation skewness and kurtosis.

Probability - Events, sample space, probability of an event, addition and multiplication Theorem, Baye's Theorem.

Theoritical Distributions - Binomial, Poisson, Normal distributions and their properties & use. Method of least square, curve fitting, correlation & regression. Partial & multiple correlation (up to three variables)

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MATHEMATICS (CODE NO. 07)
PAPER - II

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1. Real Analysis & Metric Space

Riemann Integral, Integrability of continuous and monotonic functions. The fundamental theorem on Integral calculus. Mean value theorem of Integral calculus. Partial derivatives and differentiability of real valued functions of two variables. Schewarz & Young's theorem, Implicit function theorem. Definition and example of metric spaces. Neighbourhood , Limit points, interior points, open and closed sets. Closure and interior , Boundary points. Subspace of a metric space. Cauchy's sequence, completeness. Cantor intersection Theorem. Contraction principle. Real number as a complete ordered field, Dense subsets Baire category Theorem, Seperable, first countable and second countable space.

2. Complex Analysis

Continuity and differentiability of complex function.

Analytic function, Cauchy - Riemann Equations, Cauchy's Theorem, Cauchy's Integral formula, Power series, Taylor's series, Laurent's series. Singularities, Cauchy's Residue Theorem, Cotour Integration, Conformal mapping, Bilinear transformations.

3. Advance Calculus

Functions of several variables, Limit, continuity and differentiability of function of two variables. Partial derivative, Change of variables, Euler's Theorem on homogenous functions. Taylor's Theorem for function of two variables. Maxima & minima and saddle point of function of two variable, Lagrange's method of multipliers. Indeterminate form.

4. Partial Differential Equations

Curve and surfaces in three dimensions, formulation of partial differential equations. solutions of equation of the type $dx/P = dy/Q = dz/R$. orthogonal trajectories. Paraffian Differential equation, partial differential equation of first order, solution by Cauchy's method. Charpit method of solution. Linear partial differential equation of second order with constant coefficient.

5. Linear Programming

Linear programming problem, basic solution, basic feasible solution & optional solutions, graphical method & simplex method of solution. Duality, Transportation and assignment problems. Travelling sales man problems.

6. Numerical Analysis

Numerical methods, solution of algebraic and transcendental equation of one variable by bisection, Regula-Falsi and Newton Raphson method. Solution of linear Equations by Gausian Elimination and Gauss Jordan (direct) method. Gauss seidel (Iterative). Method, Newtons (forward & backward) & Lagrange method of interpolation.

Numerical Integration : Simpson's one third rule. Gausion qudrature formula. Numerical solution of ordinary differential equations. Euler & Runge. Kutta Methods.

7. Boolean Algebra

Lattices and Algebraic structure. Duality Distributive and complementary lattice. Boolean lattices and Boolean algebras. Boolean functions & expressions. Propositional calculus. Design and implementation of Digital networks, switching circuits. graph, Paths & circuits, shortest paths - Eulerian paths & circuits. Application of graph for bridge problem, utility problem.

8. Mechanics

Statics - Analytical conditions of Equilibrium of coplanar forces. virtual works, catenary. Forces in three dimensions Poinsots Central axis. Stable & unstable equilibrium.

Dynamics - Velocities & acceleration along radial & transverse directions and along tangential and normal direction. Simple .Harmonic motions - Elastic strings.

Motion on smooth & rough plane curves. Motion in a resisting medium. Motion of a particle of varying mass.

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STATISTICS (CODE NO. 08)

PAPER – I

PART - I

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1. Descriptive Statistics

Types of data - Concepts of a Statistical population and sample from a population ; qualitative and quantitative data ; nominal and ordinal data ; cross sectional and time series data; discrete and continuous data; frequency and non-frequency data. different types of scales – nominal, ordinal , ratio and interval. Collection and Scrutiny of data ; Primary data – designing a questionnaire and a schedule; checking their consistency. Secondary data – its major sources including some government publications. Complete enumeration, controlled experiments, observational studies and sample survery. Scrutiny of data for internal consistency and detection of errors of recording. Ideas of cross-validation. Presentation of Data ; construction of tables with one or more factors of classification. Diagrammatic and graphical representation of grouped data. Frequency distributions, cumulative frequency distributions and their graphical representation, histogram, frequency polygon and ogives. Stem and leaf chart. Box plot. Analysis of Quantitative Data; Univariate data- Concepts of central tendency, dispersion and relative dispersion, skewness and kurtosis and their measures Sheppard's corrections for moments for grouped data (without derivations). Bivariate Data ; Scatter diagram. Product moment correlation coefficient and its properties. coefficient of determination. Correlation ratio. Concepts of error in regression. Principle of least squares. Fitting of linear regression and related results. fitting of curves reducible to polynomials by transformation. Rank correlation - Spearman's and Kendall's measures. Multivariate data; Multiple regression, multiple correlation and partial correlation in three variables, their measures and related results. Analysis of Categorical Data; Consistency of categorical data. Independence and association of attributes. Various measures of association for two-way and three-way classified data.

2. Probability Theory

Important Concepts in Probability - Definition of probability – classical and relative frequency approach to probability, Richard von Mises, Cramer and Kolmogorov's approaches to probability, merits and demerits of these approaches . Random Experiment : Trial, sample point and sample space, definition of an event, operation of events, mutually exclusive and exhaustive events. Discrete sample space, properties of probability based on axiomatic approach, conditional probability, independence of events, Bayes theorem and its applications. Random Variables ; Definition of discrete random variables, probability mass function, idea of continuous random variable and its properties – moments, measures of location , dispersion, skewness and kurtosis, moment generating function, their properties and uses. Standard univariate discrete distributions and their properties : Discrete Uniform, Binomial, Poisson, Hypergeometric, Negative Binomial and Geometric distributions. Continuous univariate distributions- Uniform, normal , Cauchy, Laplace, Exponential, Chi-square, Gamma and Beta distributions. Bivariate normal distribution (including marginal and conditional

distributions) Chebyshev's inequality and applications, Statements and applications of weak law of large numbers and central limit theorems (Lindeberg Leby, Liaponouv and De-Moiver's)

PART - II

1. Statistical Methods

Sampling from a distribution ; Definition of a random sample, simulating random sample from standard distributions (Uniform, Exponential & Normal) . Concept of derived distribtutions of functions of random variables. Concept of a statistic and its sampling distribution . Point estimate of a parameter, Concept of bias and standard error of an estimate, Standard errors of sample mean and sample proportion, Sampling distributions of sum of binomial and Poisson distributions. Sampling distribution of mean of normal distribution.

Independence of sample mean and variance in random sampling from a normal distribution (without derivation), Statistical Tests and interval Estimation ; Null and alternative hypotheses, Types of errors, p-values . Statement of chi-square, t, and F statistics. Testing for the mean and variance of univariate normal distribution, testing of equality of two means and testing of equality of two variances of two univariate normal distributions.

Related confidence intervals. Testing for the significance of sample correlation coefficient in sampling from bivariate normal distribution and for the equality of means and equality of variances in sampling from bivariate normal distribution. Large sample tests. Use of central limit theorem for testing and its applications to interval estimation of a single mean, a single proportion, difference of two means and two proportions. Fisher's Z-transformation and its uses . Pearson's chi-square test for goodness of fit. Contingency table and test of independence in a contingency table. Definition of order statistics and their distributions (Without derivations), Non-parametric tests; Sign test for univariate and bivariate distributions, Wilcoxon-Mann-Whitney test, Run test, Median test, and Spearman's rank correlation coefficient test.

Statistics (CODE NO. 08)
PAPER - II
PART - I

1. Sample Surveys

Sample Surveys. Concepts of population and sample., need for sampling. Census and sample survey, basic concepts in sampling , organizational aspects of survey sampling, sample selection and sample size . Some basic sampling methods- simple random samplig (SRS) with and without replacement. Stratified random sampling. systematic sampling, ratio and regression methods of estimation under SRS. Non sampling errors, acquaintance with the working (questionnaires, sampling design, methods followed in field investigation, principal findings etc.) of NSSO, and other agencies undertaking sample surveys.

2. Design of Experiments

Analysis of variance for one way and two-way classifications (with one observation per cell) . Need for design of experiments, fundamental principles of design, basic designs – C.R.D., R.B.D. ,L.S.D. and their analysis. Factorial designs – 2^n ($n \leq 4$) designs, illustrations, main effects and interaction effects and confounding in 2^3 design.

PART - II

1. Measurement of mortality and life table

Crude death rate, infant mortality rates, death rate by casuse, standardized death rate, complete life table-its main features, mortality rate and probability of dying, use of survival tables. Measurement of fertility : crude birth rate, general fertility rate, total fertility rate, gross reproduction rate, net reproduction rate.

2. Economic Statistics

Index number-its definition, applications of index numbers, price relatives and quantity or volume relatives of index numbers, use of averages, simple aggregative and weighted aggregative methods, Laspeyre's Paache's and Fisher's index numbers, time and factor reversal tests of index numbers. Consumer Price Index.

3. Time Series Analysis

Economic time series, its different components. Illustrations , additive and multiplicative models, detemination of trend, growth curves, analysis of seasonal fluctuations, construction of seasonal indices.

4. Statistical Quality Control

Importance of statistical methods in industrial research and practice, specification of items and lot qualities corresponding to visual gauging, count and measurements, types of inspection, detemination of tolerance limits. General theory of control charts, causes of variation in quality, control limits, sub-grouping, summary of out-of control criteria, charts for attributes, np-chart, p-chart, c-chart, U-chart. Charts for variables ; $\bar{X}$ and R charts, design of $\bar{X}$ and R Charts versus p-charts, process capability studies. Principle of acceptance sampling - problems of lot acceptance, stipulation of good and bad lots, producer's and consumers risks, single and double sampling plans, their OC functions, concepts of AQL, LTPD, AOQL, average amount of inspection and ASN functions, rectifying inspection plans, Sampling inspection plans, Indian Standards Tables Part I (including applications).

1. Structural Analysis

Determinate and Indeterminate Structures, Degrees of Freedom. Static and Kinematic indeterminacy, Principle of Superposition, Virtual Work, Energy theorem, Deflection of Trusses, Redundant Frames. Analysis of Determinate and Indeterminate Arches, their influence lines.

Rolling loads, influence lines for Determinate Beams and Pin-jointed Frames. Mullar Breslau's Principle and influence lines for Indeterminate Beams and Frames.

Slope Deflection, Moment Distribution and Kani's methods. Column Analogy, Energy Methods for analysis of indeterminate beams and frames. approximate methods for analysis of Rigid Frames.

Matrix Methods of analysis, Stiffness and Flexibility Matrices of Beams. Frames & Trusses, Elements of Plastic analysis.

2. Structral Design

(1)   Steel Design
Factors of Safety and Load Factors.

Rivetted and Welded connections of Members, Design of Tension, Compression and Flexural members, built-up beams and Plate Girder Slab and Guesseted Bases for Columns, Design of Roof Trusses. Purling and Coverings, Structural Steel tubes and their connections Industrial and Multi-Storyed Buildings Water tank and supporting tower's design. Plastic Design of Continuous Beams & Frames.

(2) R.C. Design
Working Stress and Limit State methods for design of Rectangular, T and L Beams, Slabs and Columns.

Isolated and Combined footings, Raft Foundations.

Overhead, Resting on ground and Underground Water Tanks.

Design of Bunkers and Silos.

Methods and Systems of Prestressing, Anchorages. Losses in Prestress, Design of Prestressed Concrete Beams.

3   Construction Planning and Management

Detailed estimates, specifications, analysis and rates of various works in civil engineering .

Construction activity , work break down structures , scheduling through CPM and PERT analysis , cost optimization through network construction, Float times, Bar charts , Project control and super-vision , cost reduction measures,

Cost analysis and resource allocation ,

Fundamentals of engineering economics , methods of appraisal , present work, annual costs , benefit cost analysis, Types of tenders and contract conditions .

4.   Environmenal Engineering

Water Demand – Per capita Demand, Population Estimation methods

Water Quality Criteria for various uses viz. Domestic & Non-Domestic,   Irrigation effects & significance of important parameters and permissible concentration as per relevant standards.

Transmission of Water- relative merits & demerits of various pipes viz C.I. G.I. Mild Steel.

A.C. Pressure Pipes. Corrosion of Pipes-types & Methods of control System of distribution & layouts of distribution.

Unit Processes & Operations for Water Treatment viz, Objectives and Design   criteria of Sedimentation, Coagulation, Flocculation, Chemical Sedimentation. Filtration (slow sand & rapid sand), Disinfection, Softening.

Quantity & Characterization of Domestic Sewage-significance of B.O.D., C.O.D., D.O. ,Solids. T.O.C. , N.O.D.

Effluent Standards, River Standards.

Sewage System-Design of Sewer & Storm Sewer, Sewage Pumps.

Design of Screens, Grit Chamber.

Design of Primary Sedimentation tank.

Design of Biological Treatment Units viz Trickling filters, Activated Sludge Treatment and Secondary Sedimentation tank.

Waste Stabilization Ponds- Aerobic, Anaerobic & Facultative Ponds, design criteria and principles.

Sludge Treatment- Digestion & Sludge Disposal.

Septic Tanks-design criteria & working

Self Purification of Streams- oxygen sag curve.

Types of Pollution-Sources & effects of various pollution viz., Water, Air, Land & Noise, Relevant standards.

Rural Sanitation, Solid Waste- collection & disposal.

CIVIL ENGINEERING   (CODE NO. 09)
PAPER - II

1. Water Resources Engineering

Water Resources in the Globe, Available Fresh Water. Need for Optimum use of Available water, Schemes for Drinking, Irrigation, Hydro Power, Multipurpose Schemes.

Irrigation - Necessity, Scope, Benefits & Effects.

Methods & Systems of Irrigation, their efficiencies. Water Distribuion & Scheduling techniques.

Crop Water Requirements, Evapotranspiration, Consumptive Use, Duty, Delta, Base Period their relation, Crop Rotation, Quality of Irrigation Water.

Hydrology - Hydrological Cycle, Precipitation – Types, Measurement, Raingauge Network, Analysis of Precipitation Data, Dependability Analysis, Unit Hydrograph, Summation & Synthetic Hydrographs, Design Flood by UH & Frequency Studies.

Ground Water - Class & Availability of Soil Moisture. Aquifers- Confined & Unconfined. Open & Tube Wells, Radial Flow in Wells, Depuit's Theory. Darey's Law, Seepage Analysis using Flow Nets. Yield of Wells, determination.

Storage Scheme - Reservoir Planning, Capacity, Yield, Life. Gravity & Earthen Dams. Forces Acing, Modes of Failure, Stability Criteria, Design. Galleries. Shafts. Joints in Gravity Dams. Foundation Treatment.

Spillways, Types, Design of Ogee & Syphon Spillways. Energy Dissipating Devices, Design of Stilling Basins.

Diversion Schemes - Structures on Pervious Formations, Bligh's & Khosla's Theory, Hydraulic Jump, Design of Vertical Drop Weir & Barrage.

Distribution System - Canals – Classification, Layout, Alignment, Capacity, Design of Canals. Silt Theories, Canal Regulation Structures. Design of Head & Cross Regulators, Canal Falls, Cross Drainage Works, and Outlets, Escapes.

Water Logging - Causes, Effects, Remedial Measures, Losses in Canals, Canal Lining, Types. Advantages, Conjunctive use of Surface & Ground Water.

River Training - Objective & Methods, Concepts of Hydro Power Projects.

2. Transportation Engineering

Railways - Permanent Way, Sleepers, Rail Fastenings, Ballast, Points and Crossings, different types of Turn Outs.

Stations and Yards, Turn Tables, Signals and Interlocking, Level Crossing.

Maintenance of Track, Super-elevation, Creep of Rails, Ruling Gradients, Track Resistance. Tractive Efforts, Curve Resistance .

Highways & Airports - Principles of Highway Planning, Highway Alignments.

Geometrical design, Cross-section. Camber, Super-elevation. Horizontal and Vertical curves. Classification of Roads.

Design and Construction of Flexible and Rigid pavements for Highway and Airfields.

Evaluation of Pavement Failure and Strengthening, Drainage of Roads.

Traffic Engineering : Traffic Surveys, Highway Capacity, Intersections, Rotary Design Elements, Signs, Signals and Markings.

Selection of Airport Sites, Windrose Diagram & Runway Orientation. Runway and Taxiway Geometric and Lighting.

Bridge Engineering - Selection of Site, Design Data collection, Hydraulic Design, Scour Depth for Bridge Foundation, Economic Span.

Type of Road and Railway Bridges, Design Loads and Forces, Impact Factor, Indian Loading Standards.

Super Structure & Sub Structure, Abutments, Piers, Wing Walls, Return Approaches.

3. Geotechnical Engineering

Index Properties of Soil, Classification of Soils. Clay Minerals.

Capillary Water, Permeability, Factors Affecting Permeability, Lab and field methods. Permeability of stratified soil deposits.

Seepage Pressure, Quick Sand Condition, Flow Net, its properties & uses.

Stess distributioin in soils, Boussinesq's theory. Newmark's Chart.

Consolidation and Settlement : Terzaghi's theory, Consolidation test. Settlement computiation. Time Settlement cureve.

Compaction tests & their significance, factors affecting compaction.

Shear Strength Parameters, Shear Tests, Mohr Coulomb's failure theory, Skempton's Pore Pressure coefficients.

Earth Pressure at rest, Active and Passive Pressures, Rankine's and Coulomb's theory.

Bearing capacity, Terzaghi's analysis, factors affecting Bearing Capacity, Plate Load Test.

Stability of Slopes, Swedish Slip Circle method and Bishop's simplified method. Stability Number.

Sub-surface exploration. Methods, sampling, SPT, DCPT and Static Cone Penetration Test, Electrical Resistivity and Seismic method.

Essential features of Foundation , types, design criteria, Rafts.

Pile Foundation, Types of Piles, Pile Capacity, Pile Load Test. Group Action. Static/Dynamic formulae.

Elements of Machine Foundation, Natural frequency, Amplification and Resonance.

Ground Improvement Techniques, Sand Drains, Soil Stabilization, Geotextiles.

PAPER - I

1. Circuit theory

Circuit Components, Network graphs, KCL, KVL, Circuit analysis methods: Nodal analysis, mesh analysis, basic network theorems; transient analysis : RL, RC and RLC Circuits; sinusoidal steady state analysis, resonance, Quality factor, balanced three phase circuit analysis. Frequency domain analysis Laplace's transform, Fourier series (trigonometric & exponential). two port networks and their various parameters; Poles and Zeros driving point & transfer function. Passive filter design theory.

2. Electro Magnetic field Theory and Materials

Electrostatic and Magneto static field Laplace's and Poisson's equations, Boundary value problems and solutions; Maxwell's equation, Electromagnetic wave propagation : Reflection and refraction of plane waves. Poynting vector, wave propagation through dielectrics and conductors. Electrical/electronic behaviour of materials : conductivity; free-electrons and band-theory; intrinsic and extrinsic semi-conductor, p-n junction; solar cells, super-conductivity. Dielectric behaviour of materials : polarization phenomena; piezo-electric phenomena. Magnetic material:, superconductivity.

3. Measurement and Instrumentation

Error analysis, Measurement of current, voltage, power, energy, power factor, resistance, inductance, capacitance and frequency Analysis of Bridges. Electronic measuring instruments: Multimeter, CRO, digital volt meter, frequency counter, Q-meter. transducers, measurements of non-electrical quantities by electrical methods, measurement of displacement, temperature, velocity, pressure, Signal conditioning, Date acquisition system.

4. Analog and Digital Electronics

Characteristics and equivalent Circuits (for small & large signals) of Diode, BJT, JFET and MOSFET Clipping, clamping and rectifier circuits, Biasing and bias stability. Amplifiers : single and multi-stage, differential, operational, feedback and power. Analysis of amplifiers; frequency-response of amplifiers. OPAMP circuits. Filters; sinusoidal oscillators : criterion for oscillation; single-transistor and OPAMP configurations. Function generators and wave-shaping circuits. Power supplies.

Boolean Algebra, Boolean function minimization. Logic gates, Combinatorial Circuits : arithmetic circuits, code converters. multiplexers and decoders, sequential circuit : latches and flip flops, Counters, Shift registers, Comparators, timers, multivibrators, Sample and hold circuits, ADCs and DACs. Semiconductor memories, logic implementation using programmable devices (ROM, PLA etc.)

5. Power Electronics

Semiconductor power devices: diode, transistor, SCR, triac, GTO, MOSFET & IGBT, triggering circuits. Phase Control rectifiers. bridge converters : fully Controlled and half Controlled, principles of choppers and inverters.

6. Signals and Systems

Representation and continuous time and discrete time signals and systems; Linear ime Invariant systems; Convolution, impulse response; time domain analysis of LTI systems based on convolution and differential equations, Fourier transform, Laplace transform, Z transform, transferfunction, sampling of signals, DFT, FFT, processing of analog signals through discrete time systems.

ELECTRICAL ENGINEERING (CODE NO. 10)
PAPER - II
PART -I

1. Control System

Fundamental of control systems, block diagram algebra, Signal flow graph and Mason's gain formulae, Linear Time Invariant Systems; Time domain and frequency response. Proportional, PI and PID Control strategies. Stability analysis; Routh Hurwitz Criterion, Nyquist criterion, Design of lead-lag compensators. State Space models, Controllability and observability. Principles of discrete Control systems.

2. Microprocessors and Microcomputers

8 bit microprocessor 8085 : Architecture, CPU, module design, memory interfacing and I/O, interrupts, PPI 8255.

PART -II
Heavy Currents

1. Electromechanical energy Conversion

Principles of electromechanical energy conversion, Torque and emf in rotating machines, characteristics and performance analysis of DC machines and their starting and speed control. Transformers: Principles of operation and analysis, regulation, Three phase transformer, Three phase induction machines, and sychronous machines: Their characteristics and performance analysis, speed control. Special machines : Stepper motors, Brushless DC motors, switched reluctance motors, permanent magnet motors, Single phased induction motor (FHP motors) : Performance and analysis;

2. Industrial Drives & Utilisation

Basic Concepts of speed control of dc and ac motor drives. Applications of Variable speed drives V/f control, Quadrant operation of drives, Concept of Cycloconverts & Dual Converts fed AC & DC drive. Rating & characteristic of traction motors, dielectric & induction heating.

3. Power Systems Analysis and control

Performance evaluation of overhead transmission lines and cables, fundamentals of active and reactive power transfer, voltage control and power factor correction, per unit representation, Bus admittance and impedance matrices, Load flow study, Economic operation of power system, Symmetrical components, Analysis of symmetrical and unsymmetrical faults, concept of stability, swing curve and equal area criterion, static VAR systems, basic concepts of HVDC transmission, series and shunt compensation, FACTS. speed control of generators, tie line control and frequency control.

4. Switch gear and protection

Principle of over current, differential and distance protection, concept of solid state relays and circuit brakers various protection scheme for transmission lines, generator and transformer. Protection against surges.

PART - III
Light Current

1. Analog communication

Random variables - continuous, discrete, probability density functions, statistical averages, random signals, and noise, noise equivalent bandwidth, signal transmission with noise, signal to noise ratio, amplitude modulation, DSB, DSB-SC and SSB, modulators and demodulators, phase and frequency modulation, PM and FM signals, narrowband FM, generation and detection of FM and PM.

2. Digital communication

Pulse code modulation (PCM), differential pulse code modulation (DPCM), Delta modulation (DM), Digital modulation and demodulation schemes : Amplitude phase and frequency, keying schemes, (ASK, PSK, FSK), Error control coding, error detection and correction, linear block codes, convolution codes.

3. Satellite Communication, Radar and T

Satellite communication, general overview and technical characteristics earth station equipments, satellite link design, CNR of satellite systems, Radar : basic principles, pulsed systems : CW Doppler radar, FMCW radar, Phase array radar, television systems and standards, colour TV transmission and receiver systems.

4. Microwaves & Antenna

Electromagnetic radiation, Propagation of waves - ground waves, sky wave, space wave, tropospheric scatter propagation. Extraterrestrial communications. Antenna : Various types, gain, resistance, band-width, beam width and polarization, effect of ground. Antenna coupling; high frequency antennas; microwave antennas; special purpose antennas. Microwave Services : Klystron, magnetron, TWT, gun diodes, Impatt, Bipolar and FETs, Microwave integrated circuits. Microwave measurements.

5. Fiber Optic Systems

Multiplexing - Time division multiplexing, frequency division multiplexing, optical properties of materials, refractive index absorption and emission of light, optical fibers lasers and optoelectronic materials, fiber optic links.

MECHANICAL ENGINEERING   (CODE NO. 11)
PAPER - I

Note : Use of Design Data Book is permitted.

1. Engineering Mechanics and Mechanics of Solids

Free body Diagram and Equilibrium; Trusses and Frames; Stress and Strains in Two Dimension; Mohr's Construction; Beams – Bending Moment and Shear Force Diagram; Bending and Shear Stress Distribution; Torsion of Shafts; Thin and Thick Walled Pressure Vessels; Euler's Theory of Column. Leaf and Helical springs.

2. Theory of Machines

Displacement, Velocity and Acceleration of Plane Mechanisms (Maximum 6 Links), Kliens' Construction; Law of Gearing, Gear Tooth Profile, Epicyclic Gear Trains; Motion Analysis of Cam and Followers; Balancing of Rotating Masses, Reciprocating Masses – Hammer Blow, Tractive Effort and Swaying Couple; Power Transmission by Belt Drive; Analysis of Simple Band, Block, Band and Block Brakes; Dynamometers; Free Vibrating of Single Degree of Freedom Systems; Whirling of Shafts; Gyroscopic Stability of Shaft, Ship and Aeroplane.

3. Design of Machine Elements

Design Concepts; Theories of Failure; Design for Static and Dynamic Loading, Design of Bolted, Rivetted and Welded Joints; Design of Shaft and Coupling.

4. Production Engineering

Merchant's Force Analysis, Tool Life and Tool Wear; Cutting fluids, Machinability and Machining Economics; Principles of Non-Traditional Machining Processes – EDM, ECM, USM & Laser; Principles of Design of Jigs and Fixtures; Limits, Fits and Tolerances; Comparators ,Gauge Design; Measurement of Surface Roughness; Interferometry; Acceptance Test of Machine Tools.

5. Production Management

Production Planning and Control; Forecasting Models; Aggregate Production Planning; Material Requirement Planning; Inventory Control – ABC Analysis, EOQ Model; Linear Programming – Simplex Method, Transportation & Assignment Model; Simple Queuing Models; PERT & CPM; Quality Control in Manufacturing, Control Charts for Variables & Attributes.

MECHANICAL ENGINEERING (CODE NO. 11)
PAPER - II

Note : Use of Steam Table and Psychometric Chart are permitted.

1. Thermodynamics

Steady Flow Energy Equation; Entropy and Irreversibility; Availability and Available Energy; Detailed Analysis of Thermodynamic Cycles and their Limitations.

2. Fluid Mechanics and Machines

Continuity, Momentum and Energy Equations; Flow net; Turbulent Flow through Pipes; Velocity Distribution in Laminar and Turbulent Flow; Dimensional Analysis; Boundary Layer on a Flat Plate; Adiabatic and Isontropic Flow of Compressible Fluids; Classification of Hydraulic Turbines and Pumps; Specific Speed; Impulse and Reaction Turbines; Velocity Diagrams.

3. Heat Transfer, Refrigeration and Air Conditioning

Critical Thickness of Insulation; Conduction through Walls and Pipes; Heat Transfer from Fins; Dimensionless Numbers; Free and Forced Convection; Heat Exchange by Radiation between black and Gray Surfaces; Electrical Analogy; Heat Exchanger Classification; Effectiveness; LMTD and NTU Methods; Fouling Factor.

Vapour Compression and Vapour Absorption Systems and their Cycle Analysis; Nomenclature, Properties and Characteristics of Important Refrigerants; Ozone Friendly Refrigerants; Human Comfort and ASHRAE Comfort Charts; Estimation of Air-Conditioning Loads.

4. Energy Conversion Systems

Theories of Combustion in Compression Ignition and Spark Ignition Engines; Abnormal Combustion; Carburetion and Fuel Injection; Emissions from Engine and their Control; Modern Trends in IC Engines; Classification of Steam Turbines, Specific Speed, Velocity Triangles; Open and Closed Cycle Gas Turbine Plants; Nuclear Power Plants; Renewable Energy Sources.

5. Computer Aided Engineering

Introduction to CAD, 2D and 3D Drawing Concepts; Computer Aided Manufacturing – NC and CNC Machines, Methods of Part Programming; Elements of Robotics and Automated Material Handling System; FMS and Expert System.

COMMERCE AND ACCOUNTANCY (CODE NO. 12)
PAPER - I
Accounting , Auditing, Income Tax and Statistics

1. Company Accounts

Problems on amalgamations (absorption and reconstruction) and liquidation of joint stock companies. Analysis and interpretation of published Accounts. Valuation of shares and Goodwill.

2. Cost & Management Accounts:

Techniques of cost control and cost reduction. Process Costing. Cost volume profit relationship and Decision making, Budgetary control and standard costing.

3. Auditing

Programming of audit work. Valuation & verification of Assets and Liabilities. Audit of a limited company, Powers, duties & liabilities of company auditor. Auditor's Report Audit of Computerised A/C & use of Computers in the Audit of A/c

4. Income Tax

Provisions of Income Tax Act - pertaining to assessment of individuals. Exempted Income & deductions from Gross Total income. Computation of Taxable Income & Tax liability.

5. Statistics

Definition, scope & importance. Measurements of Central tendency, Dispersion, Skew ness Correlation and Index Number.

COMMERCE AND ACCOUNTANCY (CODE NO. 12)
PAPER - II
Business Management & Finance

1. Concept of Modern Management

Scope & principles. Management as a "change agent" Functions of management - Planning, Organisation, Staffing, Direction, co-ordination & control. Decision-making- concept, Process & techniques, Social responsibilities of management.

2. Human Resources & Industrial Relations

Recruitment, selection, induction and training systems. Wage payment, Motivation, Communication & Leadership styles, Causes of Industrial dispute & its settlement.

3. Marketing and Sales Management

Modern concept of marketing, Functions and process of marketing, Marketing - Mix Marketing, Research, Methods of Sales - Promotion, Advertisement and large scale retailing.

4. Business Finance

Objectives, Concept of maximization of wealth, Source of finance - Short term, Medium term and Long term; Capital structure, Working capital, cost of capital. Optimum Dividend Policy.

5. Financial Institutions & Indian Capital market

Monetary & Credit Policies of Reserve Bank of India. Principal constituents of Indian capital market. Role of stock exchanges and their main functions, Mutual funds : Evolution & expansion, Problem of Direct Foreign Investment in Indian Business and Industries. Disinvestment of Govt. holdings in Public sector undertakings in India.

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ECONOMICS (CODE NO. 13)
PAPER - I

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1. Economic activities and circular flow of income, nature of Micro and Macro economics. Basic problems of the economy, concept and measurement of National Income.
2. Consumer behaviour - Law of demand, Elasticity of demand, Utility analysis and indifference curves technique.
3. Producer's behaviour - Production function, Laws of Returns. Returns of Scale. Cost curves.
4. Price Theory - Price determination under different market conditions, pricing of factors of production.
5. Keynesian Theory of employment and model of income determination.
6. Banking - Objectives and instruments of credit control. Monetary and credit policies in a planned developing economy.
7. Types and principles of taxation, Principles of public expenditure, Objectives and instruments of Fiscal Policy, Centre - state financial relations.
8. International Trade - Theories of International Trade, Trade Liberalization and W.T.O. , Role of foreign capital in economic development, determination of exchange rates, balance of payments.
9. International Monetary Institutions - I.B.R.D., I.M.F. and Asian Development Bank.
10. Environmental implications of development - Renewable and non renewable resources, Pollution - land, water, air and de-forestation.

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ECONOMICS (CODE NO. 13)
PAPER - II
Indian Economy

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1. Basic charatistics of Indian economy. Human and natural resources, Structure of Indian Economy and composition of India's National Income, problems of urban and rural economy.
2. Agricultural Development - Agricultural Policy, land reforms, green revolution and its aftermath, programmes of rural development.
3. Industrial Development- Industrial policy, public and private sector- privatization of public sector. Problems of Industrial development in India. Policies of infrastructure development in India.
4. Economic Reforms and social justice in India, Regulation of capital market, foreign currency market and foreign investment.
5. Fiscal and monetary policy in India - objectives and recent budgetary trends, Reserve Bank of India and monetary policy. Financial sector reforms and Banking.
6. Recent trends in India's foreign trade and balance of payments. Currency convertibility on current and capital account. Impact of W.T.O. on Indian Economy.
7. Indian Planning - objectives and strategies, achievements and failures of Indian Planning, Problems of Indian planning.
8. Study of Madhya Pradesh Economy - Natural resources, Human resources, Possibilities & Problems of Agricultural and Industrial development, State domestic product, Resource mobilization.

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HISTORY (Code No. 14)
PAPER - I
INDIAN HISTORY
PART - I

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1. Study sources of Ancient Indian History. Ancient Indian Traditions of Historical writing
2. Prehistoric Cultures in India. - Lower Paleolithic, Mesolithic and new Paleolithic.
3. Harappen Civilization – Origin, Extent , Urban Planning, Nature of Political and Ecnomic Organization, Urban decline.
4. Vedic and Later Vedic civilization – Literature, Society, Polity, Economy, Culture and religion . Social Development- Varna, Jati, Sanskar, Purushartha Ashrama.
5. Rise of Territorial States - (Republican States and Mahajanpadas) Rise of Religious movement in North India. Doctrines and social Dimension of Buddhism and Jainism.

6. The Mauryan Empire - State, administration Economy. Ashoka's Dhamma its Nature and Propagation, and architecture.
7. Post Mauryan Period - Shungas, Sathavahanas, and Kushanas. Post Mauryan – Social, cultural development- with special reference to the kushanas and Sathavahanas, Gandhar and Mathura Art and architecture.Sangam Age- Literature, Society and Culture.
8. Gupta Empire - administration , Economy, Changing pattern of urban development, architecture, art, literature and science.
9. Post Gupta Times (up to 750 A.D.) – Pallavas, Chaluakyas and Vardhan, Politiocal History of Nothern and Peninsular India, Samanta (Feudal) system and Changes in political structure- Economy, Social Structure, culture, religion .
10. India 700 A.D.-1200 A.D. – Rise of Rajputas, Major Rajput dynasties- Gurjars- Pratiharas, Palas, Paramars Chandelas Chauhans and their administration . Indian feudalism. South : Rastrakutas, Cholas- administration and economy, art and architecture, Bhakti movement in South.
11. Invasion of Arabs, Gaznavi and Ghoris and their Impacts.

PART - II

1. Sources of Medieval Indian History , Traditions of Historical writing
2. India under Delhi Sultanate – Qutubuddin Aibak, Iltutmish, Razia and Balban. Khilji-Imperialism- Alauddin Khilji Conquests and reforms.
3. Muhammed-Bin-Tughluq's major Projects; Firoza Tughluq's reforms, Taimur's Invasion and its impact. Decline of Delhi Sultanate. Rise of Provincial dynasties Lodis, Gujarat, Malwa, Bengal, Kashmir, Bahmanis and the Vijaynagar Empire.
4. Economy, Society , Culture and arts in the 13th and 14th century. Religious movement, Bhakti Movement, Sufi Movement, Administration during Sultanate Period.
5. Foundation of Mughal Empire- Babur, Humayun, Shershah Suri- Conquests and administration.
6. Akbar Era - Imperial Policy, religious and Rajput Policy. Akbar as a national monarch . Jagir and Mansabdari System of Akbar. Mughal empire in the 17th Century, Major Religious Policies and administration of Jahangir, Shahjahan and Auragnjeb.
7. Decline of Mughal empire. Rise of Marathas, Shivaji's Conquests and administration.
8. Mughal administration and Policies - Social, religious and economic life, literature, architecture, painting, music, science and technology .
9. Rise and Expansion of the Maratha under the Peshwas. Third Battle of Panipat – Causes, Result and impact.

HISTORY   (CODE NO. 14)
PAPER - II   (Modern history)
PART - I
Modern Indian history

1. Sources of Modern Indian History, approaches of Modern Historical Writing
2. British – French conflict – Karnataka war Establishment of British Power and Expansion in Bengal – Battle of Plassey & Buxar, Dual alliance of Clive .
3. British administration in Bengal – Warren Hastings, Regulation Act, 1773 Pits India act, 1784. Corn Wallis – administration & Permanent land settlement. Economic effect of the British rule-Raiyatwari, Mahalwari, Zamindari, Damage to handicrafts, Commercialization of agriculture, Drain of wealth.
4. British – Maratha , British – Mysore relations, Subsidiary alliance of Wellesley – Maharaja Ranjitsingh and British – Sikh relations .
5. Establishment of supremacy of Lord Hastings and British rule in the 19th century. Reforms of Bantik, Dal Hausie's Doctrines of Lapse and reforms.
6. The Freedom Movement of 1857 – Nature, Causes & Result. Proclamation of Victoria, Government of India act, 1858, India Act,1861.
7. Renaissance in the 19th Century and social, religious – movement. RajaRam Mohan Roy (Brahma – Samaj), Swami Dayanand Saraswati (Aarya – Samaj) Anne Basent (Theosophical Society), Development of Education, Press . Transport and Communication.
8. Primary Stage of Indian Nationalism - Social Background, Peasants and Tribal revolt in the initial stage of Indian Nationalism Establishment of Indian National congress – Moderatephase and Extremists.
9. Administration of Curzon and Partition of Bengal, formation of Muslim league, 1909 Act. Revolutionary Movement – Home rule Movement, Act of 1919.
10. Gandhian Era- Oppositiion and Non Co-operation movement, Swarajya Dal Simon commission, Lahore Congress, Civil Disobedience Movement, Round table Conference, Government of India act of 1935 and Provincial autonomy, Quit India Movement.
11. Cripps mission, Shimla Conference, Cabinet misssion, Subhash Chandra Bose (Indian National Army) communal politics and partition of India. Independence of India, Integration of Indian States in the Union. Salient features of the Indian constitution.

12. Contribution of Madhya Pradesh in National Movement .
13. Nehru Era – Economic development of India, Foreign policy, Policy of non-alignment, conflict with China on Border dispute. Indo – Pak war & Tashkant Treaty.
14. Indo-Pak War 1971 and rise of Bangla Desh

PART - II
Modern History of the World

1. Industrial and Agricultural revolution, American war of Independence.
2. French revolution - Nepolian era (1799-1815), Vienna Congress, Concert of Europe.
3. American civil war, Liberalization in England, Politics of Democracy, 1815-1850 Parliamentary reforms Free trade, Chartist movement.
4. Rise of Nationalism in 19th century Unification of Germany and Italy.
5. 1871 to 1914 - Home and foreign policy of Germany Third republic of France - Foreign & Home Policy.
6. Eastern question in 19th and 20th Century -Crimian war, Berlin congress, Young Turk movement and Balkan wars.
7. First World war, Treaty of Versally, League of Nations.
   1901 to 1924 Russia - Revolution of 1905, Revolution of 1917 and establishment of communism and its economic policy under the leadership of Lenin.
8. World politics between the two World wars - Naziisms, Hitlers home and Foreign policy, Fassistism - Mussoloni's home and foreign policy, Dictatorship in Japan.
9. China - Revolution of 1911, Revolution of 1949, Communism system of government and administration (Mao-se-Tung). Imperialism in Japan - Magic restoration and Modernisation of Japan, Rise of Arab Nationalism.
10. Second world war - Effects, United Nations.
11. Policy of Non-allignment and the Third World, United Nations and World peace, Regional Tension-Pelistine, Cuba, Vietnam.

Geography (Code No. 15)
PAPER - I
PART - I

Physical Geography
1. Geomorphology
   (1) Origin of the Earth- Theories regarding the origin of the earth.
   (2) Earth's crust- Origin of rocks, their types, Interior of the earth, Theories regarding the origin of continents and mountains, Agents of denudation- Weathering and Erosion, Work of running water, underground water, glacier, wind and oceanic waves. Earthquakes, Volcanoes and their world distribution.
   (3) Landforms- Mountains, Plateaus and Plains-types and their world distribution

2. Climatology
   (1) Atmosphere: Structure and composition of atmosphere, Vertical distribution of atmospheric layers and their characteristics.
   (2) Temperature: Horizontal distribution of temperature.
   (3) Pressure and wind system: Pressure belts of the globe, Types of winds and their distribution, local winds, jet stream, Air masses and Fronts, Cyclones and Anticyclones and their related weather.
   (4) Humidity, Condensation and Precipitation: Measurement of humidity in the air, Types of condensation and precipitation, Distribution of precipitation over the globe.
   (5) Classification of Climates: The general classification of world climate by Koppen and Thornthwaite.

3. Oceanography:
   (1) Relief features of the ocean beds, Origin of continental shelf, continental slope and basims , ocean deeps and ocean canyons.
   (2) Temperature and salinity of oceans- causes and regional variations.
   (3) Oceanic movements: Waves, Currents and Tide.
   (4) Marine deposits and Coral reefs: Source, types and distribution of marine deposits, Origin of coral reefs, important coral reefs of the world.

PART - II
Geographical Concepts, Human and Economic Geography

1. New Trends in Geography
   Concept of distance, space, region, regionalization and regionalism, Environmental sustainability.

2. Human Geography
   (1)   Population- growth, density and distribution in the world, Population problems of the developed and developing countries.
   (2)   Settlements: origin, types and pattern of rural settlements, Process of urbanization, Morphology and functional classification of towns.
3. Economic Geography
   (1)   Geography of primary production: Agriculture-wheat, rice, sugarcane, tea, coffee, cotton, rubber. livestock and fisheries.
   (2)   Minerals: world production and distribution of iron ore, manganese, tin,   and bauxite.
   (3)   Power Resources; world distribution of coal, petroleum, and hydroelectricity.
   (4)   Industries: Iron and steel, Cotton textile and Petro chemical industry, Major industrial regions of the world.
   (5)   Transport and Communication: Major land, sea and air routes of the world, Changes in the world economy in the context of globalization.

GEOGRAPHY   (CODE NO. 15)
PAPER - II
Geography of India with special reference to Madhya Pradesh

1. Physical Aspects
Geological history of Indian sub-continent, Physiographic divisions and drainage system, Physical divisions of Madhya Pradesh.
2. Climate
Temperature and pressure conditions, Origin and mechanism of Indian monsoon, Distribution of rainfall, Climatic regions, Distribution of rainfall and water scarcity areas of Madhya Pradesh.
3. Soils and Natural Vegetation
Soil types and their distribution, Forest types and their distribution. Problems of soil erosion in Madhya Pradesh, Forest resources of Madhya Pradesh.
4. Population and Settlements
Growth, density and distribution of population, Population policies of India. Tribes of Madhya Pradesh, Process of urbanization in India, Problems of Indian cities.
5. Economic Aspects
   (1)   Agriculture - Major crops- their distribution and changing pattern. Contemporary issues of agricultural sector- Impact of green revolution,Market economy and globalization and its impact on agriculture pattern and   changing trends in M.P.
   (2)   Minerals and Power Resources - Distribution and production of Iron ore, Manganese, Bauxite, Mica, Coal, Petroleum and Hydroelectricity
   (3)   Industries - Factors of localization and distribution of Iron and Steel, Cotton textile, Sugar and Cement industries . Emerging industrial areas of Madhya Pradesh.
   (4)   Trade and Transport - Indian road and rail transport network. Changing pattern of Indian international trade.
   (5)   Regional Development and Planning - Concept of regional imbalance and regional planning. Problems and planning of hill areas, drought prone areas and flood prone areas. Narmada valley development in Madhya Pradesh.

Geology (Code No. 16)
PAPER – I
General Geology and Geodynamics, Geomorphology, Structural Geology Stratigraphy and Palaeontology

1.General Geology & Geodynamics
The solar system, meteorites, origin and interior of the earth. Radioactivity and age of the earth. Volcanoes: Causes and products, volcanic belts. Earthquakes : causes, effects, earthquakes belts, seismicity of India. Intensity and magnitude, seismographs. Island arcs, deep sea trenches and mid-oceanic ridges. Continental drift: evidences and mechanics; sea floor spreading, plate tectonics, Isostasy, orogeny and epeirorogeny.
2. Geomorphology and Remote Sensing
Basic concepts of geomorphology. Weathering and mass wasting. Landforms, slopes and drainage. Geomorphic cycle and their interpretation. Morphology and its relation to structures and lithology. Elementary idea about applications of geomorphology. Geomorphology of Indian subcontinent.
Applications of remote sensing in geology.
3. Structural Geology
Fold, fault - their morphology, classification, recognition and effect on outcrops. joints : classification and importance. Unconformities : types, recognition and significance. Definition and classification of foliation and lineation and their relation to major structures. Recognition of top and bottom of beds. Concept of rock deformation. Tectonic framework of India. Geological maps : structural & lithological symbols and map reading.

4. Stratigraphy

Geological time scale, Principles of stratigraphy, stratigraphic classification and nomenclature. Stratigraphic correlation. Detail study of various geological formations of Indian - subcontinent. Brief study of climates and igneous activities in Indian sub-continent during geological past. Permo - Triassic boundary problem.

5. Palaeontology

Fossilization, Mode of preservation and uses of fossils, Morphology and geological history of Rugose coral, Groptolite, Trilobite, Brachiopoda, Mollusca : Lamellibranchia, Gastrophoda, Cephalopoda, Echinoidea. Basic idea about micropaleontology. Brief study of vertebrate paleontology. Gondwana plant fossils. Applications of palaeontological data in palaeoecology, stratigraphy and palaeogeograhic studies.

GEOLOGY (CODE NO. 16)
PAPER – II

1. Mineralogy

Classification of crystals into seven systems. Study of forms of normal classes. International system of crystallographic notations. Twinning in crystals. Polarizing microscope. Isotropism and Anisotropism, Pleochroism, extinction, Double refraction, becke effect, interference colors, twinning, Classification of silicates. Isomorphism, Polymorphism and Pseudomorphism, solid solution. Physical, chemical and optical properities of feldspar, Pyroxenes, Amphiboles, Micas, Garnets, Olivine, Felspathoids, Quartz, Calcite, Kynite, andalusite, sillimanite and staurolite.

2. Igneous and Metamorphic Petrology

Generation and crystallization of magma. Crystallization of unicomponent (SiO_2), binary (albite - anorthite and diopside - anorthite) and ternary (diopside - albite - anorthite) component silicate system. Bowen's reaction series. Magmatic differentiation and assimilation. Forms and structures of igneous rocks. Textures and microstructures of igneous rocks. Classification of igneous rocks. Petrography and petrogenesis of granite, syenite, diorite, basic and ultra basic groups, charnockite, anorthosite and alkaline rocks, carbonatites.

Metamorphism. Kinds and agents of metamorphism. Metamorphic grades and zones. Textures, structures and classification of metamorphic rocks. Metamorphic facies. Metamorphism of argillaceous and arenaceous sediments and impure limestone. Retrograde metamorphism and metasomatism. Petrography of Schist, Gneiss, Marble, Quartzite, Slate, Phyllites, Amphibolites, Khondalite, Gondite.

3. Sedimentology

Process of formation of sedimentary rocks. Diagenesis and lithification. Textures and structures and their significance. Classification of sedimentary rocks, clastic and non clastic rocks. Heavy minerals and their significance. Concept of sedimentary facies. Petrography of conglomerates, breccia, sandstone, limestone, shale.

4. Economic Geology

Ore, Ore minerals and gangue, tenor of ore, classification of ore deposits,. Process of formation of mineral deposits. Description of metallic and non metallic mineral deposits of India with reference to their mode of occurrence, mineralogical characters, geographic distribution and economic uses : Iron, Manganese, Chromium, Copper, Lead - Zinc, Aluminum, Gold, Uranium, Thorinium, Mica, Magnesite, Talc, Baryte, Asbestos, Kyanite, Diamond, Corundum, Beryl, Fluorite, Apatite, Gypsum, Non Metals related to refractory, fertilizer, cement, gemstone industry and important building stones. Deposits of coal, oil and natural gas in India. Marine minerals resources. Principles of mineral economics, strategic, critical and essential minerals. Existing national mineral policy.

5. Hydrogeology, Engineering Geology and Mining Geology

Hydrologic cycle, occurrence of ground water and hydrological properties of rocks. Groundwater provinces of India. Concept of Watershed management. Quality of groundwater.

Geological conditions for construction of Dams and tunnels. Environmental considerations in the location and construction of large dams, reservoirs and tunnels.

Mineral exploration: Surface and sub-surface exploration methods. Elementary idea about Gravity, Electrical, Magnetic, Airborne and seismic methods of exploration. Elementary idea about mining, beneficiation and conservation.

POLITICAL SCIENCE AND INTERNATIONAL RELATIONS (CODE NO. 17)
PAPER – I

PART - I

Political Theory

1. Indian Political Thinkers
Manu, Kautilya, MN Roy, Gokhle, Tilak, Gandhi,Nehru, Ambedkar and Periyar.
2. Western Political Thinkers
Plato, Aristotle, Machiavelli, Hobbes, Locke, Roussean, JS Mill, Green, Hegel, Marx and Lenin.
3. Approaches to the Study of Political Theory
Historical, Normative and Empirical.

4. Political Ideologies

Liberalism, Socialism, Marxism, Fascism Anarchism and Gandhyism,

5. Concepts

Sovereignty (Monistic and Pluralise) Liberty, Justice, Equality, Power, Legitimacy, Authority and Political Obligation.

6. Democracy

Theories of Democracy (Classical, Elitist and Contemporary)

7. Behavioural Movement

Behaviouralism and Post – Behaurouralism ,Decline of Ideology Debate.

8. Developmentalism

Concept of Political Development, Approaches to Political Development (Gabriel Almond, David Apter, Lucian W. Pye, and Samuel P. Huntington).

9. Modern Concepts

Systems theory, Structural-Functionalism, Political Culture, Political Socialization and Political Modernization.

10.Contemporary Theories

Post modernism, Feminism (Liberal, Marxist, Radical), Environmentalism.

PART - II
Government & Politics of India

1. Indian Freedom Movement

First War of Indian Independence 1857 Liberal – Extremist and Revolutionary movement, Non Co-operation, Civil Disobedience, Quit India Movement, Role of Women in freedom struggle.

2. History of Constitutional Development

Morley – Minto Reforms 1909 Montagv – Chelmsford Reforms 1919 Simon Commission, Govt. of India Act 1935 Cripps Mission, Cabninet Mission Plan, Indian Independence Act, 1947.

3. Salient features of the Indian Constitution

The preamble, Fundamental rights & Duties, Directive principles, Federalism, Parliamentary system, Constitutional amending procedures, Judicial review.

4. The Executive

Theory & Practice, President, Prime Minister and the Council of Ministers, Governor, Chief Minister and the State Council of Ministers., The Bureaucracy.

5. The Legislature

Role and function of the Parliament & Parliamentary Committee, Lok Sabha & Rajya Sabha, State Legislative Council.

6. The Supreme Court and the High Courts, Judical Activism, Public interest litigation (PIL)

7. Statutory Institutions / Commissions

UPSC, Election Commission, Comptroller and Auditor General, Backward Classes Commission, National Commission for Women, National Human Rights Commission, Minorities Commission.

8. Party System

Ideology of Political Parties, Fragmentation & regionalisation of political parties, Pressure groups, Patterns of coalition politics, Electoral behavior, Politics in Madhya Pradesh.

9. Class, Caste, Ethnicity and gender issues in Indian Politics, Politics of Regionalism, Naxalites Movement, Communalism, Backward class and Dalit movement.

10. Grassroots democracy

Pachayati Raj and municipal government, significance of 73rd and 74th amendments, grass root movement and Women's Empowerment, Organization and functions of panchayati Raj System in Madhya Pradesh.

INDIA AND INTERNATIONAL RELATIONS (Code No. 17)
PAPER – II
PART - I
International Relations

1- Determinants of Foreign Policy - Domestic Compulsions, Geopolitics, Economic and Emerging Global order.
2- Theories of International Politics - System, Realist, Idealist, Decision making, Game Theory and Marxist.
3- Concepts of International Politics - Power, National Interest, Balance of Power, National Security and Collective Security.
4- Cold War and Post, Cold war, Disarmament and Arm's control.
5- Non - Aligned Movement - Concept, Relevance in Contemporary Global order, South - South-Dialogue and North - South Dialogue.
6- International Organisation - U.N. and its specialized agencies (ICL, ILO and UNICEF) Restructuring of the U.N.
7- Regional Organization - EU, SAARC, ASEAN & APEC.
8- Foreign Policy of Major Powers - U.S.A., Russia & China.

9-   Contemporary Global Concerns - Democracy, Human Rights, Globalization and Environment.
10-   Major Issue of World Politics -   Oil diplomacy and Iraqu, Afghanistan-Crisis, Major issue of International Politics after collapse of Soviet Union, International Terrorism

PART - II
India and the World

1.   Determinants and characteristics of Indian Foreign policy, Continuity and Change.
2.   India's relation with neighbors Pakistan, China, Bangladesh, Shrilanka and Nepal.
3.   India's relation with USA, and Russia.
4.   India and SAARC.
5.   India and the Non - Aligned movement.
6.   India's Nuclear Policy - N.P.T. and C.T.B.T.
7.   India and the United Nation with special reference to Peace and Security, Disarmament and Human Rights.
8.   India and the Emerging International Economic order - Inter National Agencies, WTO, IMF & IBRD
9.   India's approaches to Major international issues - Globalization, Cross Border Terrorism, Environment.
10.   India and The Third World - Emergence as a Global Order.

PUBLIC ADMINISTRATION   (CODE NO. 18)
PAPER – I
PART - I

Administrative Theory
1.   Meaning, Scope and Significance of Public Administration, Public and Private administration, Wilson's vision of Public admini-strations, Evolution of the discipline and its present status.
2.   New Public Administration concept of New Public Management, Good Governance, Concept and application, Ethics and Administration.
3.   Scientific Management - (Taylor and the Scientific management movement) Classical Theory (Fayol, Urwick, Gulick and others) Bureaucrative Theory (Marxist view, Weber's model and its critique) Post Weberian developments.
4.   Behavioural approach to Organizational Analysis, Participative Management (Mc Gregor, Likert and Others) The Systems Approach, Open and Closed systems, Structural Functional Approach and Marxist Approach.
5.   Hierarcy, Span of Control, Unity of command, Line and Staff agencies.
6.   Formal and Informal Organization, Centralization and Decentralization, Departments, Boards and Commissions, Public Corporation and Independent Regulatory Commission.
7.   Decision making theory with special reference to Herbett Simon, Theories of Leadership, Communication, Morale, Motivation (Maslow and Herzberg).
8.   Concepts of Accountability and Control, Legislative Executive and Judicial control over Administration.
9.   Citizen and Administration, People's participation, Right to Information Act 2005, Administrative Corruption, Machinery for redressal of Citizen's grievances, Citizens Charter.
10.   Meaning and significance of Delegated Legislation, Types, advantages, limitations, Safeguards, Administrative Tribunals, Llimitations and Methods of ensuring effectiveness.

PART - II

1.   Meaning of Administrative Reforms. Process and obstacles Techniques of administrative reforms, O & M, Information technology (I.T.).
2.   Management-meaning, Nature and significance, Tasks of management, POSDCORB. M.B.O. Tools of management and Test of Good Management.
3.   Meaning, nature and scope of Comparative Public Administrtion, Bureaucracy and Ecology.
4.   Origin and purpose of Development Administration, Rigg's Prasmatic - Sala model, Bureaucracy and Development, Changing profile of Development Administration.
5.   Concepts of Leadership, Authority and Influence, Chief Executive and its role in Organisation. Concept of Bureaucracy, Weberian model and its relevance, Recruitment, Training, Promotion, Employer - Employee relations.
6.   Grievances redressal mechanism, Integrity and Code of Conduct, Ombudsman, Lokpal and Lokayukta, Central Vigilance Commission.
7.   Relevance of Policy making in Public Administration, Process of Policy formulation, Problems of implementation, Feedback and Evaluation.
8.   Concept and significance of Financial Administration, Budget process and its role, Performance budgeting, Zero based Budget, Public debt.
9.   Legislative Control - Public Account Committee., Estimate Committee, Public Undertaking Committee, Audit and Accounts, Comptroller and Auditor General of India.
10.   Role of Computers in Public Administration, E governance.

PAPER – II
PART - I
Central, State and Local Administration India

1. Evolution of Indian Administration, Kautilya, Mughal period and British Legacy.
2. Indian Constitution, Development, Preamble and Main Characteristics, Parliamentary Democracy, Federal System and Centre - State Relations.
3. The President, Prime Minister, Council of Ministers, Cabinet and its Committees, P.M.O. Central Secretariat, Ministries and departments.
4. Advisory Bodies, Boards and Commission, National Human Rights Commission, UPSC, National Women Commission, Election Commission and Finance Commission.
5. Administrative Reforms, Reforms since independence, Reports of the Administrative reforms Commissions, Problems of their implementation.
6. Machinery of Planning, Composition and role, Planning Commission, Role of the National Development Council, Process of Plan formulation at Union and State levels, decentralized planning.
7. Role of Central and State Agencies in maintenance of law and order, Criminalisation of politics and administration.
8. Welfare Administration, Machinery for Welfare Administration at the National level. Special organizations for the welfare of the Scheduled Castes and scheduled Tribes, Welfare Schemes for Women and Children, Problems of Child labour.
9. Major issues in Indian Administrations, Problems of Centre State Relations, Values in Public Service and Administrative Culture, Development and Environmental issues. Indian Administration and Globalization.
10. Disaster management in India, Reservation policy in India, Women Empowerment, Role of NGOs in development.

PART - II
State Administration with special reference to Madhya Pradesh

1. Reorganisation of States (1956) - Formation of Madhya Pradesh, Separation of Chhatisgarh.
2. Relationship between Central and State Administration, Basic difference between Central and State Administ ration.
3. Governor, Chief Minister, Council of Ministers.
4. Chief Secretary, His role and functions, State Secretariat and Directorates, State Planning Board.
5. State Civil Services - Organization and functions of Madhya Pradesh Public Service Commission, Recruitment and Training.
6. Legislative and Financial control over Administration in M.P., Estimates Committee, Public Accounts Committees and Committee on Public undertaking.
7. Civil Services Tribunals, Tribal Administration in M.P., Lok Ayukta, Economic Offensive wing, Chief Information Commissioner.
8. District Administration - Role of Collector, Tehsil and Tehsildar, Blocks and B.D.O.'s.
9. Local Administration - Role of local government, Need of Decentralisation, Empowerment of weaker sections, Urban administration - Municipal corporations and Municipal Committees, and Nagar Pachayats in Madhya Pradesh.
10. Panchayati Raj in Madhya Pradesh - Three tier, System of Panchyati Raj Institutions - Zila Panchyat, Janpad Panchayat and Gram Panchayat, Role of Chief Executive Officer in Panchayat Administration. State Control over local administration.

SOCIOLOGY (CODE NO. 19)
PAPER – I

1.Introduction to sociology
Meaning of sociology, the scientific and humanistic orientations to sociological study, Sociology and development, Sociology and professions.
2. Social research
Meaning, Scope and significance of social research, Formulation and importance of Hypothesis, Methods and techniques - Observation, Interview, Schedule and Questionnaire, Sampling, Case study.
3. Types of research
Basic and applied, Descriptive, Exploratory, Explanatory, Experimental.
4. Sociological thinkers
Karl marx, V. Pareto, Tolcott Parsons, Mahrshi Arbindo, Mahtma Gandhi, B.R. Ambedkar.
5. Individual and society
Social intraction, Social system, Culture and personality, Socialisation, Social values, Social Norms, Social Sanctions.
6. Social stratification and mobility
Meaning, Forms and theories, basis of social stratification, Caste, Class and power.

7. Social Institutions
Family, Marriage and Kinship, Social structure, Functions and changing patterns.
8. Economic institutions
Pre industrial and industrial economic system, industrialization and its impact on society, Globalization and liberalization, Socio-economic determinates of development.
9. Political Institutions
Concept of state and bureaucracy, Good governance-Democratic form and Panchayatiraj, Leadership, Political-parties and voting behavior, Criminalization-of polities.
10. Social Change
Concept and theories, factors of social change, Functions and dysfunctions of religion, Modernization and development. role of Education in Social Change.

Sociology   (Code No. 19)
PAPER – II

1. Ideological bases
Traditional Hindu Social organization Dharma, Ashrama, Karma, Purshartha, Socio-cultural dynamics through the ages - impact of Buddhism, Islam and the west, Factors of unity and change.
2. Caste system
Origin of caste system, Culture and structural views, Change and persistence of caste in modern India, Issues of equality and social justice, Emergence of Dalit consciousness.
3. Class structure
Agrarian and industrial class structure, Emergence of middle class, Elite formation in India.
4. Marriage, family and kinship
Marriage among different ethnic groups, Family structural and functional aspect, changing forms, regional variations in kinship system, impact of legislations and socio-economic change on marriage and family, Generation gap.
5. Agrarian social structure
Peasant society and agrarian systems, Social consequences of land reforms and Green Revolution, Emerging Agrarian class structure, Agrarian unrest.
6. Rural-urban social structure
Features and characteristics of rural and urban social structure Urbanism and urbanization, Slums, Environmental Problems, Poverty and indebtness, Urban planning and development.
7. Tribal society
Meaning and characteristics of tribe and scheduled tribe, Contitutional provisions to determine scheduled tribe, Tribal economy, means of livelihood, Tribal movement and development, Bhil, Gonda, Korku.
8. Industry and society
Meaning and characteristics of industrialization, Occupational diversification, Trade- unions and human relations, Economic reforms-Liberalisation, Privatisation, Globalisation.
9. Education
Directive principles of state policy and primary Education, Education, Educational inequality and change, Education and social mobility, Sarva Shikha Abhiyan, Educational problems of disadvantaged groups.
10. Social problem
Alcoholism, Drug-addiction, AIDS, Prostitution, Gender discrimination, Youth unrest, Problems of elderly people, Bonded Labour , Corruption , Child Labour, Dowry.

Criminology & Forensic Science (Code No. 20)
PAPER – I
1- Criminology - Definition and scope
2- Crime trends in India
(with reference to National Crime Records Bureau)
3- Crimes against children
(Nature, extent and legal provisions)
4- Crimes against women
(Nature, extent and legal provisions)
5- Crimes against Scheduled Castes and Scheduled Tribes
(Nature, extent and legal provisions)
6- Pre-classical theories of crime
7- Classical theories of crime - Theories of hedonism and deterrence.
8- Positive theories of crime - Constitutional and morphological theories, psychological and psychoanalytical theories.
9- Sociological theories of crime - Differential Association and Anomie.
10- Radical theories of crime - Labelling theory, etc .
11- Punishment - Definition, theories and types
12- Non-institutional treatment of offenders - Probation, temporary release and parole.
13- Institutional treatment of offenders
14- Prisons in India - organisation, Type and functions
15- Correctional services for jail inmates

16- Juvenile institutional and non- institutional services
17- Victims of crime and victim-compensation
18. 18- Crime prevention planning

<center>CRIMINOLOGY & FORENSIC SCIENCE (CODE NO. 20)</center>
<center>PAPER – II</center>

1. Fingerprints - Patterns and types, development, lifting, preservation and comparison.
2. Foot and foot-wear prints - Importance, gait-pattern, preservation, lifting, casting and comparison
3. Tyre and track marks - Importance, preservation and comparison.
4. Questioned documents - Types and examination, procurement of control samples, alterations, charred documents, class and individual characteristics of hand-writing, typed, printed and photo-stat matters and their comparison, indented writing and its development, disguised writing, seal and rubber stamp.
5. Firearms in criminal activities, classification, components of firearms, smooth-bore and rifled firearms, types and structure of cartridge, preservation and forensic examination of firearm, bullet and shell case. Gunshot residues, estimation of range of firing.
   Tool marks – Type, Identification and Comparative Study
6. Poisons and toxicology - Definition, classification, types of poisoning, visceral samples for toxicological examinations, isolation and clean-up procedures, analysis of opiates, cannabis, dhatura, nux-vomica, ethyl alcohol, barbiturates insecticides, arsenic, mercury, lead and zinc.
7. Composition and analysis of blood , semen , saliva, urine and hair.
8. Composition and analysis of fibre , glass , paint , soil and cement
9. Forensic evidence on clothes , bed linen , curtain & towel
10. Death investigation - Types of death , medico-legal causes, determination of sex & age, post mortem procedure, post mortem changes.
11. Wounds - Types and chacteristics , ante mortem and post mortem wounds.
12. Scientific investigation of un natural deaths (accidental , suicidal and homicidal), sexual offences, arson and explosive cases.
13. D.N.A. Profiling - Structure of D.N.A , D.N.A. as marker , methods of D.N.A. profiling , forensic applications.
14. Polygraphy, narco-analysis and brain mapping as an investigating aids .

<center>PSYCHOLOGY (CODE NO. 21)</center>
<center>PAPER-I</center>
<center>Foundations of psychology</center>

1. Introduction and methods of Psychology
   (1) Psychology as a Science:
   (2) Definitions, relation to other social and natural sciences.
   (3) Methods, Observation, Experiment, Clinical and Case Study, Interview, Questionnaire, Survey and Content analysis.
2. Physiological bases of behaviour
   (1) Receptor, affecter and adjustor system. Genetic bases of behaviour, hormones - their role in physical growth, emotional activity and personality make-up.
   (2) Structure and functions of C.N.S. Autonomic nervous system.
   (3) Sensation - visual, auditory and skin senses: Structure and function.
3. Development of human behaviour
Nature and principles of development. Critical periods of life span development. Socialization - role of family, peers, school, culture and media in socialization. Gender role and self-development. Moral and social development.
4. Attention and perception
Attention - selective attention (models); signal detection and vigilance. Psychophysics - Concept of threshold, method : average error, limits, constant stimuli. Psychometric methods - Ranking, rating & paired comparison. Perception - Definition & concept of perception. Laws of perceptual organization. Perceptual defense. Distance perception - monocular & binocular perception. Factors affecting perception.
5. Learning
Concept and theories of learning (Pavlov, Skinner, Hull, Tolman). The processes of aequisition, extinction, discrimination and generalization. Programmed learning, schedules of reinforcement. Learning through models. Verbal learning - methods & materials, determinants.
6. Memory
Encoding, storage and retrieval. Factors influencing retention and forgetting. Theories of forgetting. STM and LTM, retroactive and proactive inhibition. Reminiscence.
7. Thinking and problem solving
Concept formation processes. Problem solving - approaches : factors affecting creative thinking.

8. Intelligence and creativity

Concept and definition of intelligence. Theories of intelligence (Spearman, Thurstone, Guilford) Measurement of intelligence and aptitude, Concept of I.Q. and multiple intelligence. Measurement of creativity and relationship between creativity and intelligence.

9. Motivation & Emotion

Nature and kinds of motives. Physiological basis of motivation - Hunger & Thurst. Theories of motivation - drive reduction and need hierarchy modal.

Emotion - Types & theories of emotions, physiological correlates and their measurement.

10. Personality

Concept and definition of personality. Theories of personality Freud, Adler, Jung, Sullivan, Allport, Lewin, Erickson. Determinants of personality. Personality assessment - projective tests, personality inventories, situational tests.

11. Social behaviour

Attitudes - Theories of attitude-change and measurement of attitudes. Social perception, impression formation, attribution theory and interpersonal attraction. Group dynamics - conformity, group cohesiveness and leadership.

PSYCHOLOGY (CODE NO. 21)
PAPER - II
Applications of Psychology

1. Psychological Measurement and Individual Differences

Characteristics & construction of Psychological test. Types of Psychological test (Intelligence, Personality, Interest, Aptitude), uses & limitation of psychological test.

2. Educational Psychology

Learning processes in class room. Teacher effectiveness. Motivation for scholastic achievement. Classroom management. Achievement test. Problems of Exceptional children.

3. Organizational and Industrial Psychology

Personnel selection & Training. Job attitudes and job satisfaction. Industrial safety and accidents.

Organizational climate. Organizational leadership. Organizational development. Communication & Decision making.

4. Psychopathology & Clinical Psychology

Mental disorders - Symptoms & causal factors. Diagnostic procedures.

Therapeutic Approaches: Psychodynamic Therapies. Behaviour Therapies. Client Centered Therapy. Cognitive therapies. Biofeedback therapy.

5. Counselling & Community Psychology

Need & principles of guidance & counselling. Counselling approaches (Directive, Non-directive, Rational - Emotive, Behaviour Counselling) Organizing guidance programmes in schools and colleges, Types of intervention in community psychology, primary, secondary & teritary prevention programmes.

6. Health Psychology

Models of health.

Health damaging and health promoting life styles & behavior. Cardio - vascular disease & diabetes.Nature, types, causes and consequences of stress. Coping behaviour and stress management relaxation technique.

7. Other Applications of Psychology

Sports psychology - improving performance of sports. Exercising & physical fitness. Environmental psychology - Effects of noise and pollution, effects of crowding & population density, effect of sensory deprivation.

PHILOSOPHY   (CODE NO. 22)
PAPER – I
Metaphysics and Epistemology

Candidates will be expected to be familiar with the following western and Indian theories of epistemology and Metaphysics.

1. Western
    (1)   Rationalism - Descartes , Spinoza , Leibnitz
    (2)   Empiricism -   Locke, Berkeley, Hume
    (3)   Critical Philosophy – Kant
    (4)   Idealism -   Hegel
    (5)   Realism -   Moore
    (6)   Pragmatism - William James
    (7)   Logical Positivism - A.J. Ayer
    (8)   Existentialism -   kierkegaard and Sartre
    (9)   Theories of Truth - Correspondence, Coherence and   Pragmatic.

2. Indian
- (1) Carvaka - Theory of Knowledge , Materialism
- (2) Jainism - Theory of Syadvada
- (3) Bondage and liberation.
- (4) Buddhism - Pratitya Samputpada, Ksanikvada, Nairatmya vada, Four Noble Truths.
- (5) Samkhya - Prakriti , Purusa , Theory of Causation , Theory of   Evolution
- (6) Yoga - Astanga yoga
- (7) Nyaya - Prama , Pramana, God, Liberation.
- (8) Vaisesika - Categories, theory of Causation
- (9) Mimamsa - Theory of   Knowledge
- (10) Vedanta - Brahman, Isvara, Atman, Jiva, Jagat Maya, Avidya ,   Moksha   (Samkara and Ramanuja)
- (11) Shankar's Anirvachaniya Theory of Error

PHILOSOPHY (CODE NO. 22)

PAPER - II

Socio-Political Philosophy and Philosophy of Religion

1. Socio-Political Phiilosphy
   - (1) Socio-Political values - Equality, justice, liberty and scientific temper.
   - (2) Marriage, family and gender equality.
   - (3) Study of following ideologies:
       Democracy socialism, fascism, communism, terrorism and sarvodaya.
   - (4) Theories of punishment.
2. Philosophy of Religion
   - (1) Religion, science and morality.
   - (2) God, proofs of His existence.
   - (3) Nature of religious experience, reason, revelation and mysticism.
   - (4) Problem of evil.
   - (5) Bondage and liberation.
   - (6) Religious tolerance and secularism.

LAW   (CODE NO. 23)
PAPER - I

1. Constitutional Law of India
   - (1) Preamble to the Constitution.
   - (2) Fundamental Rights.
   - (3) Directive Principles of State Policy.
   - (4) Powers of the President of India and Governor of States.
   - (5) Indian Legislature.
   - (6) Indian Judiciary.
   - (7) Constitutional safeguards to Civil Servants
   - (8) Union and State Public Service Commissions.
   - (9) Amendment of the constitution.
   - (10) Public Interest Litigation.
   - (11) Protective Discrimination.
   - (12) Constitutional Provisions relating to Environment protection.
2. Administrative Law
   - (1) Development of Administrative Law.
   - (2) Delegated Legislation and Judicial and Parliamentary control over it.
   - (3) Principles of Natural Justice.
   - (4) Administrative Adjudication and Administrative Tribunals.
   - (5) Writs - Mandamus, Certiorari, Prohibition, Habeas corpus and Quo-warranto.
   - (6) Ombudsman - Lokpal, Lokayukts and Central Vigilance Commission.
   - (7) Statutory Public Corporations and their control.
3. Land Law of Madhya Pradesh : (M.P. Land Revenue Code,1959)
   - (1) Land and Land Revenue.
   - (2) Revenue officers and their powers.
   - (3) Procedure of Enquiry by Revenue Officer.
   - (4) Survey and Settlement.
   - (5) Assessment of Land Revenue.
   - (6) Record of Rights.
   - (7) Tenure holders - Their rights and obligations.
   - (8) Consolidation of Holdings.

LAW   (CODE NO. 23)
PAPER - II

1. Law of Crimes (Indian Penal Code, 1860)
    (1)   Definition.
    (2)   General Exceptions to criminal liability.
    (3)   Joint and constructive liability (Sections - 34, 141 and 149 I.P.C.)
    (4)   Offences against Public Tranquility.
    (5)   Offences against human body.
    (6)   Offences against property.
    (7)   Defamation.
    (8)   Offences against women (Sections - 292, 304-B, 354, 498-A & 509 IPC)

2. Criminal Procedure Code, 1973
    (1)   Preliminary consideration, extent, applicability, definitions etc..
    (2)   Constitution and Power of Courts.
    (3)   (a)   Police - Power of arrest, Search and seizure of property.
             (b)   Power to investigate.
             (c)   Preventive powers of Police.
    (4)   Duty of Public to assist Police, Magistrate and to give information about certain offences.
    (5)   Rights of the arrested person.

    (6)   Process to compel appearances :
             (a)   Summons
             (b)   Warrant of arrest
             (c)   Proclamation and attachment.
             (d)   Other rules regarding processes.
    (7)   Processes to compel the production of articles, things etc.
    (8)   Consequences of irregulaties of illegaties in search.
    (9)   Jurisdiction of courts in inquiry and trial.
    (10)   Conditions required for initiation of proceedings.
    (11)   Complaints to Magistrates and Commencement of proceedings before Magistrates.
    (12)   Charge.
    (13)   Plea bargaining
    (14)   Different types of trials and procedure thereof.
    (15)   General provisions relating to inquiries and trials.
             (a)   Period of limitation (Chapter XXXVI C.R.P.C.)
             (b)   Autrefois acquict and autrifois convict
             (c)   Principle of estoppels.
             (d)   Compounding of offences
             (e)   Withdrawal from Prosecution.
             (f)   Pardon to accomplice.
             (g)   Legal aid to accused at State expense.
    (16)   Bail and anticipatory bail.
    (17)   Judgment.
    (18)   Appeals
    (19)   Reference, Revision and Review.
    (20)   Lok Adalat and Legal services.
    (21)   Maintenance of Wives, Children and Parents.

3. Law of Torts
    (1)   Negligence and Contributory Negligence.
    (2)   Nuisance.
    (3)   Principles of strict liability.
    (4)   Vicarious liability including state liabilities.
    (5)   Consumer dispute redressal agencies - their powers and functions.
    (6)   Consumer Protection Act, 1986
    (7)   Agencies relating to environmental protection - Powers, Functions and   Remedies.

4. Mercantile Law
    (1)   General Principles of Law of Contract (Section 1 to 75 of the   Indian Contract Act, 1872).
    (2)   Law of Indemnity, Guarantee
    (3)   Law of Bailment, Pledge and Agency.
    (4)   Law of Sale of goods.
    (5)   Law of Partnership.
    (6)   Law Relating to Negotiable Instruments.

HINDI LITERATURE   (CODE NO. 24)

For syllabus of above subject kindly refer Hindi Part

ENGLISH LITERATURE   (CODE NO. 25)
PAPER - I
Elizabethan to Romatic Era

The paper covers the literary period from the Renaissance to the Romantic Movement. The candidates are expected to be acquainted with major literary movements, currents, besides the socio-cultural background of the periods. The course content intends to test the first hand knowledge of the candidates with regard to the major authors and their representative works :

1. Christopher Marlowe - 'Dr. Faustus'
2. William Shakespeare - 'Macbeth'
                              'As You Like It.'
3. Francis Bacon - 'Of Studies', 'Of Truth',
                       'Of Friendship', 'Of Revenge.'
4. John Donne - 'Extasie', 'Anniversarie'
5. John Milton - 'Paradise Lost', Book-I,
6. John Dryden - 'Mac Flecknoe'
7. Alexander Pope - 'Rape of the Lock'.
8. William Wordsworth - 'The Solitary Reaper'
                            'Tintern Abbey'.
9. S.T. Coleridge - 'Rime of the Ancient Mariner'
10. P.B. Shelley - 'To A Skylark'
                       'Ode to the West Wind'
11. Jane Austen - 'Pride and Prejudice'
12. Charles Lamb - 'A Bachelor's Complaint'
                       'Old China,' 'Dream Children'.

ENGLISH LITERATURE   (CODE NO. 25)
PAPER - II
Victorian to Modern Era

The Second paper incorporates various literary trends ranging from the Victorian to the modern era. The candidates are expected to possess first hand knowledge of representative British, American and Indian Writing in English.

1. Tennyson - 'Ulysses', 'Crossing the Bar'
2. Robert Browning - 'My Last Duchess', 'Prospice'
3. Matthew Arnold - 'Dover Beach'
4. Charles Dickens - 'David Copperfield'
5. Thomas Hardy - 'Mayor of Casterbridge'
6. D.G. Rossetti - 'Blossom'
7. George Bernard Shaw - 'Candida', Joan of Arc'
8. Eugene O'Neill - 'Mourning Becomes Electra'
9. Mulk Raj Anand - 'Coolie'
10. A.K. Ramanujan - 'A River'
11. Girish Karnad - 'Hayavadana'
12. Ernest Hemingway - 'A Farewell to Arms'
13. Robert Frost - 'Mending Wall'
                       'Road Not Taken',
14. T.S. Eliot - 'Love Song of Alfred J. Prufrock'

SANSKRIT LITERATURE (CODE NO. 26)
PAPER - I
DRAMA, PROSE AND COMPOSITION

1. Abhijnana - Shakuntalam of Kalidasa.
2. Svapnavasavadattam of Bhasa.
3. Shukanasopadesha from Bana's Kadambari.
4. Translation in Sanskrit.
5. Composition - an essay in Sanskrit.

Questions will be based on detailed textual study of units (i) and (ii).

SANSKRIT LITERATURE   (CODE NO. 26)
PAPER- II
KAVYA, HISTORY OF SANSKRIT LITERATURE AND VYAKARANA

1. Kiratarjuniyam of Bharavi,
2. Nalopakhyanam from Mahabharata,
3. History of Sanskrit Literature.
   - (1)   General study of the following Kavyas:
     Ramayana, Mahabharata, Shrimad - Bhagawata, Buddhacharita, Saundarananda, Raghuvansha, Kumarasambhava, Meghaduta, Ritusamhara, Bhattikavya, Hayagrivavadha, Janakiharana, Kiratarjuniya, Shishupalavadha, Naishadhacharita, Shrikanthacharita, Nalachampu, Rajatarangini, Vikramankadevacharita, and Nitishatak of Bhartrihari.
   - (2)   General study of the dramas of the following authors :
     Bhasa, Ashvaghosha, Kalidasa, Shudraka, Vishakhdatta, Bhavabhuti, Harsha, Bhattanarayana, Murari, Rajashekhara, Shrikrishna Mishra, Jayadeva.
   - (3)   General Study of the works of the following prose writers :
     Bana, Dandi, Subandhu, Vadibhasimha, Dhanapala, Soddhala.
4. Vyakarana
   - (1)   Sandhi,
   - (2)   Samasa,
   - (3)   Karaka
5. (1)   Kridanta Pratyaya -
     Tumun, Tavyat, Aniyar, Yat, Shatri, Shanach, Kta,
     Ktavatu, Namul, Lyut.
   - (2)   Taddita Pratyaya -
      An, in, Matvarthiya, Shyan, Tva, Imanich.
   - (3)   Alankara -
     Upama, Utpreksha, Rupaka, Arthantaranyasa, Svabhavokti, Kavyalinga, Atishayokti, Vibhavana, Visheshokti, Apahnuti, Drishtanta, Nidarshana, Anuprasa, Yamaka.

Questions will be based on detailed textual study of unit (i) and (ii)
URDU LITERATURE (CODE NO. 27)
PAPER - I
Urdu Zaban ki mukhtasar tarikh/Asnaf-e- Nasr aur Ahm nasr nigar.

1. Urdu ki paidaish ke bare m-e-n mukhtalif nazariyat aur uska irtiqua aur Urdu ke qadeem nam (Hindi/ Hindvi/Rekhta/Urdu-e-mualla wagherah.
(Various theories about the origin of urdu language and its development, as well as its original name (Hindi-Hindvi/Rekhta/Urdu-e mualla etc.)
2. "Yadgare ghalib"
(Mukhtasar Edition) Az Hali, Muratteba Daya narain - Nigam)
(Yadare Ghalib" (Abridged edition) by Hali, Edited by Daya Narain Nigam
3. Urdu Afsana aur Drama (Urdu short stories & Drama)
   - (1)   Darjzel afsane aur afsana nigar
     - (a)   Kafan - PremChand
     - (b)   Mahalaxmi ka pul - Krishna Chandra
     - (c)   Lajwanti - Rajendra Singh Bedi
     - (d)   Do Shala - Gilani Bano
   - (2)   (1)   Drama - Dr. Tamkin ki uljhan - Ibrahim Yusuf.
     - (2)   Drama - Anarkali - Imtiyaz Ali Taj
4. Darj zel inshaiy-e Aur inshaiya nigar
   - (1)   Insan kisi hal m-en khush nahin rehta - Md. Husain Azad.
   - (2)   Mirza Zahirdar Baig - Nazeer Ahmed
   - (3)   Chirya Chire ki kahani - Abul kalam Azad
   - (4)   Tassub - Sirsyed Ahmed Khan
   - (5)   Shahzade ka bazar m-en ghisatna - Khwaja Hasan Nizami
5. Ghalib ke khutoot
   - (1)   Banaam Alauddin khan Alai (Suno Alam Dohain)
   - (2)   Banam meer mehdi majrooh (mardalayar terijawab talabi n-e)
   - (3)   Banam Har Gopal - Tuftah (Bhai Mujh men aurtum m-em   nama nigari kahe - ko hai)
Study of Ghalib as a writer of letters in the light of the above "khutoot" (letters)

URDU LITERATURE   (Code No. 27)
PAPER - II

Urdu Shairi ki Aham Asnaf Aur Shairon ka tanquidi Mutalea, aur Unki Chand takhleequat
1. Urdu men ghazal Aur Uski Maqbooliyat ke Asbab. (Ghazal in Urdu and the reason of its
   popularity)
2. Darjzel Ghazlgo Shairon ki Ghazlen Aur Shairon ka Mutalea.
       (1)   Wali (a) yad karna har ghadi Usyar Ka.
       (2) Meer taqui Meer -
         (a)   Munh taka hi karehe jistis ka
         (b)   Ulti hogain Sab tadbiren kuchch na dawa ne kam kiya
         (c)   Hamare age tira jab kasune naam liya"
     (3) Ghalib
        (a)   Yeh na thi hamari quismat ke wisaale yar hota.
        (b)   Phir mujhe didae tar yad aya.
     (4) Momin
        (a)   Gheron pe khul na jai kahin raz dekhna.
        (b)   Asar usko zara nahin hota
     (5)   Hasrat Mohani - Husne Beparwa ko khudbino khud ara   kardiya.
      (6)   Firaq Gorakhpuri -   Nigahe naz ne parde uthai hain kya   kya.
3. "Qaseeda-Aur-Marsiya" ka tanqueedi Mutalea Aur us ke Shairon par Sawalat .
      (1)   Sauda
      (2)   Zauq
      (3)   Anis
      (4)   Dabeer,

4. Masnaviyat Aur darjzel Masnavi Nigaron ka tanquidi Mutalea.
   (1)   Sahrul Bayan - Meer Hasan
   (2)   Gulzare Naseem - Daya Shankar "Naseem"
5. Urdu m-en nazm aur darj zel nazmo-n aur unk-e Shairon ka khusoosi Mutalea.
     (1)   Nazeer akbar abadi
       (a)   Aadmi Nama
       (b)   Holi
     (2)   Pandit Brijnarain Chakbast- Ramayan ka ek Seen
     (3)   Iqbal
       (a)   Taranai Hindi
       (b)   Shoai Ummid
     (4)   Josh Malihabadi -Kisan
     (5)   Faiz Ahmed Faiz - Tanhai
     (6)Jan Nisar Akhtar - yeh Zakhm to apna Hissa Hain

ANTHROPOLOGY   (CODE NO. 28)
PAPER - I

NOTE -
Part - I is compulsory.
Candidates may opt either Part- II (A) or Part - II (B).
Each part (i.e. I and II) carries 150 marks.

PART - I

1. Meaning and scope of Anthropology and its main branches
   (1)   Social-Cultural Anthropology
   (2)   Biological Anthropology.
   (3)   Archeological Anthropology.
   (4)   Linguistic Anthropology.
2. Concept of culture and it attributes
Ethos & Edos, Cultural Integration, Form and Content, Cultural Relativism.
Aspects of culture : Material & non-material.
Meaning of Society, Community, Group and Institution, Culture and Civilization.
3. The field work Tradition in Anthropology, Geneological method, Observation, Case-study, Interview
Schedule and Questionnaire.
4. Organic Evolution
Views and evidences, Theories of Organic Evolution :
Darwinism, Neo-Darwinism, Lamarckism, Neo-Lamarckism, Synthetic Theory.
5. Man's position in the animal kingdom, Physical Characteristics of mammals and primate,
Geographical distribution and chief Physical characteristics of prosimii (Lemuriforms, Lorisiforms and
Torsiforms), Anthropoidea (New world monkeys and old world monkeys), Pongidae (Gibbon, Orang-
Utan, Chimpanzee, Gorilla).

6. Geological Time-scale, The Great lce-Age

Extent, Flora & Fauna, Evidences and Causes of occurrence of the lce Age. Pluvials and inter-pluvials, Methods of dating : Absolute and Relative.

7. Prehistoric cultural hierarchy

General features of Paleo, meso and neolithic cultures of Europe and India (with special reference to Soan, Madrasian and Narmada stratigraphies and tool-traditions) Mesolithic pattern in India. Neolithic Complex and associated problems in India.

8. Proto-Historic hierarchy

Indus valley civilization, Ganges valley civilization (Doaba), Megalithic civilization.

9. Language, Society and Culture - How are they interrelated ?

PART - II (A)

1. Social Institutions

Definition of marriage, Forms of marriage : Monogamy, Polygamy, Endogamy, Exogamy. Marriage payments : Dowry and bride-price, Definition of family, Types of family : Nuclear, Extended, Joint family. Patterns of residence : Uxorilocal, Virilocal and Neolocal, Descent system: matriliny and patriliny. Definition and nature of kinship, Kinship terminology, Kinship usages, Kin-groups : Lineage, Clan, Phratry and Moiety.

2. Primitive Economy

The relationship between primitive economy and natural environment, modes of production, Primitive ways of exchange and distribution: Barter, ceremonial exchange, Reciprocity and Redistribution, Market exchange, Concept of value. Distinctions between primitive economy and modern economy.

3. Political Organization

Primitive law and Political organization, distinctions between state and stateless societies, Leadership, authority and system in stateless society, natural and cultural background of law in primitive and modern societies. Means of social control in primitive societies.

4. Definition and theories of religion

Animism, Animatism, Manaism, Totemism, Durkeim's sociological theory of religion. Taboo, Functions of religion, Shamans and priests, Types of magic, Religion, Magic and science.

5. Concepts and theories

Evolution and socio- cultural evolutionism (L.H. Morgan, E.B. Tylor), Diffusion and diffusionism (German-Austrian) Pattern and pattern based theory of culture (R. Benedict) Function and functionalism (B. Malinowski), Structure- functionalism (A.R. Radcliffe-Brown)

6. Psychological Anthropology

Culture - personality school, Basic personality and modal personality. National character studies.

7. Growth of Anthropology in India

Major contributions of D.N. Majumdar, M.N. Srinivas, S.C. Dube and L.P. Vidyarthi.

PART - II (B)

1. Fossil evidence of Human Evolution

Dryopithecus, Ramapithecus, The hominid members of Australopithecinae, Homo-erectus : Pithecanthropus erectus(Jawa man), Sinanthropus Pekinensis (China man), Homo-Neanderthalensis : Progressive and conservative, Heidelberg man, Homo-sapiens : Cro-Magnon, Chancelade, Grimaldi.

2. Comparative anatomy of Man and Apes, Types of locomotion, The effect of erect posture on the skeleton of man with special reference to skull, Vertebral column, Pelvic girdle and limbs.

3. Human Genetics : aims and scope, Cell

Cell division, Role of mitotic and meiotic cell division, Laws of heredity, Mechanism of heredity, Types of inheritance : autosomal, sex linked, dominant and recessive, chromosomes and genes: normal and abnormal chromosomes, Sex-chromosomal aberrations : Klinefelter, Turner and Down syndrome, Concept of DNA and RNA.

4. Difficulties in studying human genetics, methods of investigation in human genetics: population genetics, biochemical genetics and cytogenetics; twin methods, pedigree method, Inheritance of A, B, O blood groups and PTC, Genetic counselling, cloning.

5. Human growth and development

Definition and scope, Methods of studying human growth : Longitudinal, semi-longitudinal and cross-sectional, Retarded growth, Growth spurt, Ageing, Nutritional requirements for normal growth, Malnutrition, Under-nutrition.

6. Ecology

Definition and scope, Varieties of human ecosystems, Environmental pollution, Biological demography: definition and scope, Demographic profiles: Fertility, Mortality, Morbidity.

7. Definition of race, Genetic concept of race, UNESCO statement of Race, Formation of Racial groups, Criteria for Racial classification: genetic and morphological characters, Major races of the world and their broad subdivisions, Racial elements in Indian population.

PAPER - II

1. Basic concepts
Culture, civilization, Great Tradition, Little tradition, sacred complex, Universalization, parochialization, sanskritization, Westernization, Dominant caste, Folk-society, Jajmani system, Tribe-caste continuum.

2. India's traditional social system
Purusharth Chatushthaya, Varanahramdharma, Hindu social laws pertaining to family and marriage, Social disabilities and the problem of untouchability.

3. Problems of exploitation and deprivation of scheduled tribes, Scheduled castes and other backward classes. Constitutional safeguards for scheduled castes and scheduled tribes.

4. Ethnographic profiles of Indian tribes
Racial, linguistic and socio-economic characteristics. Problems of tribal people : Land alienation, Indebtedness, bonded labour. Food-gathering, Pastoralism, Shifting cultivation, Terrace cultivation and settled agriculture, Forest policy and tribals, Tribal displacement and rehabilitation.

5. The problems of culture contact
Impact of urbanization and industrialization on tribals. Tribal movements. Naxalism and tribals. Impact of the Hinduism, Islam and Christianity on tribes.

6. History of tribal administration and development
Pattern of tribal administration during the British and the post British periods. Plans, policies and strategies of tribal development in post Independence period. The response of tribal people towards government's measures for their development.

7. Youth dormitories, Evaluation of contemporary system of tribal education and measures for improvement in it. Panchayati Raj and tribal development. N.G.Os and tribal welfare. The role of Anthropology in tribal development.

MILITARY SCIENCE (CODE NO. 29)
PAPER - I
ART OF WAR
PART - I
Indian

1. Ancient Period
   - (1) Indo-Greek Art of war with special reference to the Battle of Hydaspus 326 B.C..
   - (2) Mauryan military system as described by Magasthenese.
   - (3) Kautalya's Philosophy of war.
2. Medieval Period: Study of military systems
   - (1) Rajput military system with special reference to the Battle of Tarain (1192 AD).
   - (2) Mughal military system with special reference to the First battle of Panipat (1526-AD).
   - (3) Maratha military system with special reference to the Third Battle of Panipat (1761 AD).
   - (4) Sikh military system with special reference to the Battle of Sobraon (1846AD).
3. Pre-Independence Period
   - (1) Battle of Plasay 1757 AD.
   - (2) 1857 Liberation movement.
   - (3) Re-organisation of Army in India under the CROWN.
4. Post Independence period
   - (1) Sino-Indian war, 1962 causes and lessons-political, strategical and tactical.
   - (2) Indo-Pak war 1965 causes and lessons political, strategical and tactical.
   - (3) Indo-Pak war 1971 causes and lessons political, strategical   and tactical.

PART - II
Western

- (1) Greek and Roman Art of war with reference to the battle of Arbella (331 B.C.) and battle of Cannae (216 B.C.).
- (2) Emergence and decline of cavalry with reference to the battle of Hastings (1066 A.D.) and battle of Crecy (1346 A.D.).
- (3) Impact of Science and Technology on warfare.
- (4) Revolution in tactics
  - (a) War of American Independence (1776-1782 A.D.).
  - (b) French Revolution and Nepoleanic Art of war.

PART - III
Modern

(1)   World War I - Strategy and tactics : Theories of Guillet Doubet and Admiral A.T. Mahan.
(2)   World War-II Strategy and tactics :
        Theories of Maj. Gen J.F.C. Fuller and Capt. B.H. Liddell Hart.
(3)   World War-II -Use of Atom Bomb and its impact.

MILITARY SCIENCE   (CODE NO. 29)
PAPER – II
STRATEGIC STUDIES
PART - I
National Security

1. National Power-Concept and importance.

2. Elements of National power.

3. National security strategies
   (1)   Balance of power,
   (2)   Collective security.
   (3)   Regional defence.
   (4)   Non-alignment.
   (5)   Deterrence.

4. Geo strategical location of India.

5. Internal and External threats to Indian security.

6. Economic liberalisation and National security.

7. India's Nuclear policy.

PART - II
Theory and Practice of War

1.   Definition of war, nature and characteristics of war.
2.   Insurgency and counter-insurgency with special reference to Indian security.
3.   Terrorism: Problems and solutions.
4.   Development of Nuclear weapons and their effect on war.
5.   Space weapons and security.
6.   Chemical and Biological weapons and security.
7.   Problems and prospects of disarmament and arms control.

PART - III
Regional Study

1.   Indian ocean and Indian security.
2.   Role of SAARC in promoting regional cooperation and security.
3.   India's Foreign Policy with special refrence to Indian security.
4.   War and peace time economy.