ANNEXURE- I

POST GRADUATE TEACHER

Syllabus for Recruitment Test:

1. **General Paper-RT (General Awareness and Pedagogy):**

A. **General Awareness**: Questions in this section will aim at testing the candidate's general awareness of the surrounding environment and its implication to the society as expected from an educated person without any specialized study. It will include current affairs, recent developments, day to day pragmatic observations and matters of importance. This section will also include questions pertaining to general awareness related to International, National and North-East India.

B. **Pedagogy**:

- Understanding the Learner - growth, maturation and development, Domains of Development: Physical, Cognitive, Socio-emotional, Moral etc., deviations in development and its implications, Understanding Adolescent behaviour.
- Understanding Teaching Learning - Principles of Learning, Theories - Behaviourism, Cognitivism and Constructivism, Role of teacher, role of learner. Nature of teacher-student relationship, Factors affective learning.
- Teaching strategies & methods, Active learning, Classroom environment, Classroom Communication, Skill components in Teaching.
- Planning instruction – session plan, lesson plan.
- Curriculum & Syllabus, Outcome based curriculum.
- NEP 2020 – implications for school.
- ICT in teaching-learning, Instructional resource.
- Assessment & Evaluation – Formative, Summative, Self-assessment, Peer assessment, Providing & receiving feedback, NRT, CRT, Direct & Indirect assessment, Assessment tools, Constructive alignment.
- Teacher as a mentor, academic leader, counsellor, promoting holistic development of learners.

ANNEXURE- A

POST GRADUATE TEACHER

SUBJECT: AGRICULTURE

PAPER-1

Unit-1: General Agriculture

Agriculture – its importance in the national economy, scope of commercialization of Indian agriculture, sustainable agriculture, components of sustainable agriculture, crop diversification, multiple cropping, multi storey cropping, relay cropping, intercropping, organic farming, crop rotation, mixed cropping, cropping scheme, cropping intensity, types of cropping system, dryland farming - principles and concepts, tillage practices and tilth, shifting cultivation, jhum cultivation.

Unit-2: Agro meteorology

Agro meteorology, climatic and weather elements as factors of crop production, weather forecasting, impact of climate change on cropping pattern, rained agriculture technology, natural disasters like drought, flood, etc. and their mitigation, microclimate, atmospheric pressure, atmospheric temperature, atmospheric humidity, vapor pressure, process of condensation formation of dew, fog, mist, frost, monsoon, clouds - types and their classification, cloud formation, precipitation, cloud seeding, evaporation, transpiration, evapotranspiration, PET, agroclimatic zones, remote sensing, wind and types of wind.

Unit-3: Soil Science and Soil Fertility

Soil its definition and components, Processes and factors of soil formation, soil profile soil types of India and characteristics, problem soils and their reclamation, soil properties, soil texture and structure, Nitrogen fixation, soil productivity and soil health, soil erosion and conservation.

Essential plant nutrients, their functions and deficiency symptoms, manures and fertilizers including straight, complex and mix fertilizers, biofertilizers, compost, Farm Yard Manure, vermicompost and Integrated Nutrient Management (INM) system.

Weathering of rocks and minerals, density and porosity, soil water retention, movement and availability, gaseous exchange-problem and its effect on crop growth, soil reaction-pH, soil acidity and alkalinity, buffering, effect of pH on nutrient availability, electrical conductivity, soil colloids - inorganic and organic, silicate clays, ion exchange, cation and anion exchange capacity, humic substances, hygroscopic water, methods of preparation of bulky and concentrated manures, green manuring and green leaf manuring, soil amendments, criteria of essentiality, mechanisms of nutrient transport to plants, factors affecting nutrient availability to plants, factor influencing nutrient use efficiency (NUE).

Unit-4: Water management, Irrigation and Drainage

Irrigation and drainage, sources of irrigation, scheduling of irrigation based on critical stages of crop growth, soil moisture, time interval and weather parameters, water requirement of crops, water use efficiency, methods of irrigation and drainage, watershed management.

POST GRADUATE TEACHER

(AGRICULTURE)

Unit-5: Plant Protection

Concept of plant disease, insect pest and diseases of field crops, vegetables, fruits and plantation crops, causes and their control measures, principles and methods of plant diseases control measures, biological control of pest and diseases, integrated pest management (IPM) systems integrated disease management (IDM). Storage pest of cereals and pulses, preservation and remedial measures of storage grains, Pesticides and their formulations, plant protection equipment, their care and maintenance, recent trends in pest management, eco-friendly agricultural practices, legal method, harmful effects of pesticides, cultural measures, mechanical and physical measures, biological control measure, chemical control, pest surveillance, forecasting of pest attack, Plant quarantine, varietal control, crop resistance and their examples, male sterile technique, pheromones, attractants & repellants, plant quarantine, phytosanitary certificate.

PAPER II

Unit -1: Genetics and Plant Breeding

Genetics and plant breeding, heredity and variation, Mendel's Laws of inheritance, chromosomal theory of inheritance, heterosis and its exploitation, male sterility and self-incompatibility, principles and methods of plant breeding for self and cross-pollinated crops like plant introduction, domestication, selection, hybridization, mutation and polyploidy breeding, mass selection, pureline, pedigree method, mutagens.

Seed technology, classes of seeds, production, processing and testing of seeds. Role of national and state seed agencies in production, processing and marketing of improved seeds, breeding for abiotic and biotic stresses, release and notification, plant breeders rights and plant variety protection and farmers rights, biotechnological tools, DNA markers, marker assisted selection, structure of DNA – Watson and Crick model, method of DNA replication, DNA replication, protein synthesis, germplasm conservation, DNA markers, Introduction to markers – morphological – biochemical- DNA markers – advantages and disadvantages- marker assisted selection in plant breeding, IPR procedure, intellectual, patenting- plant breeders and farmers rights, genomics and proteomics.

Unit-2: Crop Physiology

Crop physiology and its importance, imbibitions, surface tension, diffusion and osmosis, absorption and translocation of water and minerals, transpiration, enzymes, plant pigments, photosynthesis, aerobic and anaerobic respiration. Growth and development of plants, photoperiodism and vernalization, hormones and plant growth regulators and their functions. Photosynthetic pathways, photolysis of water and photophosphorylation, photorespiration, phosphorylation, growth - growth curve, phases of growth and factors influencing growth, growth analysis, plant growth regulators, hormones, seed germination - physiological and biochemical changes, seed dormancy and breaking methods, senescence and abscission,

POST GRADUATE TEACHER

(AGRICULTURE)

physiology of fruit ripening, turgor pressure, plasmolysis, ascent of sap, transpiration, mechanism of stomatal opening and closing, electron transport system, respiratory quotient.

Unit-3: Agronomy

Weeds, their characteristics, dissemination and association of weeds with crops, principles and methods of weed control, mechanical, cultural, biological and chemical control of weeds, herbicides, integrated weed management system.

Origin, history and cultivation practices of important cereal crops, pulses, oilseeds, fibre crops, sugar and commercials crops grown during Kharif and Rabi seasons with special reference to climate, soil, seed production, cultivars, nutrition, irrigation and other management practices, intercultural operations.

Unit-4: Horticulture

Role of fruits and vegetables in human nutrition, plant propagation, planting techniques, training and pruning, cultivation practices of major fruits, vegetables and flowers, production technology of fruit plants, production technology of vegetable crops, seed production technology of vegetable crops, production technology of spice crops, production technology of medicinal and aromatic crops, protected cultivation of fruits and vegetables. Landscape gardening including raising of ornamental plants and layout and design of landscape gardens, lawns, etc.

Post-harvest handling and marketing problems of fruits, vegetables and flowers. Principles and methods of preservation and processing of fruits and vegetables. Important value-added products from fruits and vegetables. Preparation of jam, jelly, ketchup, pickles, marmalade.

Unit-5: Agricultural

Economics, Farm management and Extention Education Farm management, importance and characteristics, types and systems of farming and factors affecting them, marketing and pricing of agricultural inputs and outputs and their costs, calculation of cost benefit ratio, Kisan Credit Card (KCC), crop insurance, agricultural finance, agricultural credit, RBI, NABARD, ADB, IMF, World Bank, agricultural cooperation, Micro and Macro-economics, AGMARK, agricultural marketing, tariff and non tariff barriers - role of institutions like UNCTAD and GATT – WTO.

Important Agriculture including Horticulture based subsidiary enterprises like nursery, Mushroom production, apiculture, Bio-pesticides, Vermicomposting, etc. and their socio-economic importance.

ANNEXURE- B

POST GRADUATE TEACHER

SUBJECT: BIOLOGY

PAPER I

Unit I: Diversity of Lifeform

Taxonomy and Systematics: Aims and components, Binomial system of nomenclature, classification of living organisms (five kingdom classification, from species to kingdom, and principles of classification within each group), general characters, fundamental taxonomic features and phylogeny of Monera, Protista, Protozoa, Fungi, Viruses, Algae, Bryophytes, Pteridophytes, Gymnosperm, Angiosperm; angiosperm – monocots and dicots; concept of primitive and advanced characters in important angiosperm families; Bentham & Hooker and APG-IV system of plant classification; ICN – principles, major rules and recommendations; field and herbarium methods; Salient features of animals (non-chordates upto phyla level and chordates upto class level); ICZN – principles, fundamental rules and recommendations; Paleontology, types of plant and animal fossils, Index fossils, geological time scale; Phytogeography – phytogeographical regions of the world; endemism, speciation; Centre of origin; Phytogeographical region of India.

Unit II: Structural Organization in Plants and Animals

Morphology, anatomy and histology of angiosperm - roots, stems, leaf, flowers, inflorescence, fruits and seeds types. **Plant tissues** – stomatal types, meristematic and permanent (epidermal, ground and vascular – xylem and phloem), cambial activity; **secondary growth** – normal and anomalous secondary growth, types of woods. **Animal tissues** - histological structure, morphology and anatomy of nervous system and reproductive system of earthworm; morphology and anatomy of nervous system, circulatory system and reproductive system of cockroach, morphology and anatomy of nervous system and reproductive system of apple snail; reproductive system of frog, metamorphosis in amphibians, morphology and anatomy of integumentary system, reproductive system, excretory system of bony fishes.

Unit III: Structural and Functional Organization of Cell

Structure of prokaryotic and eukaryotic cell, cell theory; **Cell divisions** - mitosis and meiosis, cell membrane, cell wall; **Cell organelles** - structures and functions. Plant cells – structure and functions of Nucleus, Chloroplast and Mitochondria, Endoplasmic reticulum, Golgi apparatus, Ribosomes and Lysosomes; difference and similarities between plants and animal cells.

Unit IV: Plant physiology and Biochemistry

Plant - Water relations - imbibition, osmosis, plasmolysis, water potential. Transport of water and solutes across cell membrane, mineral nutrition, functions of macro and micro nutrients and their role, deficiency symptoms. Nitrogen metabolism biological nitrogen fixation; Lipid metabolism; **Photosynthesis:** photochemical reactions, carbon fixation pathways - C3 and C4 and CAM plants. **Respiration:** exchanges of gases; Cellular respiration - glycolysis, Krebs

cycle, electron transport system, respiratory quotient (RQ) and fermentation, physiological response to abiotic stress; sensory photobiology; **Plant growth and movement** – types of plant growth, plant growth regulators and their chemical nature, roles and application in agro-horticulture (auxins, gibberellins, cytokinins, ethylene & ABA), growth indices (differentiation, dedifferentiation & re-differentiation); flowering, tropic and nastic movement, and its significance, endogenous clock and its regulation, floral induction and development; fruit ripening; Molecular mechanism of senescence in plant; vernalization. **Plant metabolites and biosynthesis pathways** - Structure and functions of nucleic acids, carbohydrates, proteins, lipids, alkaloid, terpenoid, polyphenolic compounds and steroids. **Enzymes:** nature, classification and nomenclature. Mechanism of enzyme action, factors effecting enzyme action, vitamins. Karyotype analysis.

Unit V: Animal and Human Physiology

Morphology, anatomy and physiology of digestive system; ingestion, digestion, absorption, assimilation and egestion; Nutrition and digestive disorders - PEM, indigestion, constipation, vomiting, jaundice and diarrhea. **Anatomy** of lung and pulmonary gas exchange, transport of respiratory gases in blood and peripheral tissues, oxyhemoglobin dissociation curve, common respiratory disorders - Asthma, emphysema and occupational respiratory disorders; structure and functions of heart; **Blood** - components and functions, mechanism of blood coagulation, blood groups and Rh factor; disorders of circulatory system - hypertension, coronary artery disease, angina pectoris and heart failure. **Osmo-regulation** in fish, birds and mammals; Anatomy of kidney and excretory systems in fish, birds and mammals; modes of excretion-ammoniotelic, ureotelism; **Human excretory system** - structure and function of nephron and regulation of urine formation, urea formation disorders-uremia, renal failure, renal calculi, nephritis; dialysis and artificial kidney. **Locomotion and movement:** Bones and skeleton of mammal's joints and their types. **Muscles:** types of muscles, mechanism of contraction of skeleton muscles, disorders of muscular and skeletal system. **Nervous system in mammals** – structure and functions of brain and spinal cord, generation and conduction of nerve impulse. Reflex action, structure and function of sense organs (Eye and Ear), endocrine glands and hormones; **Hormonal coordination** - hormones and their function, mechanism of hormone actions. Hormonal imbalance and diseases. **Reproductive system in mammals:** Morphology, anatomy, histology of gonads and physiology of reproduction, spermatogenesis and oogenesis menstrual cycle, hormonal control of menstrual cycle, fertilization, implantation and pregnancy. Development of gonad and reproductive tract, hormonal and non hormonal factors of sex determination, placental hormones, pregnancy test, structural changes in mammary glands of pregnant females, structure of adult mammary gland, change in mammary gland during puberty, galactopoietics, milk let down menopause, senescence, impact of age on reproduction, disorders of sexual differentiation and development, concept of reproductive health; problems and strategies. **Population explosion:** causes and effects, birth control measures, natural method, physical barriers, biochemical, hormonal, immunological, surgical method, IUDS, amniocentesis

female foeticide, MMR, IMR, MTP, STDs, infertility disorders of female, Medical assisted human reproductive technologies, GIFT, IVF, ZIFT, Embryo culture.

PAPER II

Unit I: Sexual Reproduction in Plants

Structural details of angiosperm flower – monoecious and dioecious, inflorescence types, calyx, corolla, androecium and gynoecium types, aestivation types. Development of male and female gametophytes, pollination, double fertilization, types of ovaries, endosperm and its development types and functions, development of seed and fruit, types of fruits, apomixis and polyembryony, self-incompatibility, methods to overcome incompatibility, experimental embryology including pollen storage and test for fertilization, Tissues culture.

Unit II: Genetics, Molecular Biology, Evolution and Adaptation

Mendel's law of inheritance, monohybrid and dihybrid crosses, incomplete dominance and co-dominance, linkage and crossing over, multiple alleles, Mutation, spontaneous & induced mutations, physical and chemical mutagens, molecular basis of gene mutation, extra chromosomal inheritance, chromosomal mutation, chromosome aberrations: changes in chromosomes structure and number, Gene expression, structure of prokaryotic and eukaryotic DNA and RNA; mechanism of DNA replication; replication enzymes, Okazaki fragment. DNA finger printing, Gene mapping, Genetic code, restriction enzyme, nucleotide sequence, comparison of homologies, genetics in modern agriculture, animal breeding and medicine, human behavior, misuse of genetics, stem cells and gene therapy. Bacterial transformation, transduction and conjugation, types of bacteria, structure and morphology. Evolutionary biology - cosmic evolution, experimental evidences for origin of life, Natural Selection, extra terrestrial life, origin and evolution of man, population genetics, genetic variation, polymorphism, gene frequency, Hardy Weinberg's principle, genetic drift, adaptive radiations. Zoogeographic regions and geological time scale.

Unit III: Biology in Human Welfare

Health & Diseases: Pathogens, types of diseases, common diseases in humans, immunity: innate & acquired immunity, passive and active immunity, cells of the immune system and their differentiation, Lymphocytes, structure and functions of antibodies, Antigen-antibody reaction, hormonal immune response, cell mediated immunity, auto-immunity, allergy, immune deficiency disorders. Common diseases in Humans - Typhoid, Pneumonia, Cold, malaria, amaebiasis, ascariasis, elephantiasis, ringworm, causes and prophylaxis ; etiology of HIV; Cancer - types of inflammation, stages of cancer cell growth, molecular mechanism and biochemistry of cancer, drugs and alcohol abuse; addiction of drugs and alcohol, effects of drugs and alcohol, precautions, drugs and alcohol abuse in adolescence, strategies of food production and enhancement, animal husbandry, management of farm animal breeding; strategies and their

types, plants breeding methods for release of new varieties, bio-fortification, single cell protein, Tissue culture; somatic hybridization in human welfare, biogas production, biocontrol agents and biofertilizers.

Unit IV: Biotechnology

Genetic Engineering: tools and techniques, technique of separation and isolation of DNA fragments, cloning, cloning vectors, electrophoresis, bioreactors, processing of its products, tissue engineering, cryopreservation, fusion methods, detection and application of monoclonal antibodies, DNA, Vaccines, Edible technology, application in agriculture, GMO for pest resistance, RNA and ts-RNA technology, application in medicine, genetically engineered products, molecular diagnosis, serum and urine analysis, PCR, ELISA, Transgenic animal and their physiology, biological products and their use for testing safety, vaccine and chemicals and bio-piracy, Human genome project.

Unit V: Ecology, Bio-resources, Wildlife Biology and Community Knowledge System

Ecosystems: Food chains and food web, Ecosystem structure and functions: productivity and decomposition, energy flow and ecological pyramids, concept of Biodiversity, hotspots and megadiverse nations. Wild life sanctuaries and National parks, Indian Wildlife Protection Act; IUCN Redlist Categories and Criteria: Vulnerable, Endangered and Critically Endangered species; Concept of ethnobotany and ethnozoology, community traditional knowledge system, bioresources, IPR and livelihood; Conservation and sustainable utilization of cultivated and wild edible plants, medicinal and aromatic plants, timber yielding species; sericogenic resources (Muga and Eri), animal husbandry, entomophagy, Bee Keeping and fisheries and community livelihood. Concept of climate change, carbon footprint and sequestration.

ANNEXURE- C

POST GRADUATE TEACHER

SUBJECT: ECONOMICS

PAPER- I:

MICRO & MACRO ECONOMICS

1. Introduction

Definition of Economics. Central Problems of an Economy: what? How? For whom to produce? Concept of consumption, Production and Distribution. Production Possibility Frontier and Opportunity Cost. Distinction between Normative and Positive Economics, Planned and Market Economy, Micro and Macro Economics. Inter-dependence of Micro and Macro Economics.

2. Consumer Behaviour and Demand

Meaning and Determination of Equilibrium through Utility and Indifference Curve approach. Meaning & concept of Utility – Average, Marginal and Total Utility. Law of Diminishing, Marginal Utility. Condition of Consumer Equilibrium using Marginal Utility analysis and Law of Substitution its limitations. Implications and practical importance of Utility Analysis. Properties of Indifference Curve. Indifference Curve analysis (Indifference Curve and Indifference Map) and condition of Consumer Equilibrium.

3. Producer Behaviour and Supply

Production Function: Total, Average and Marginal Product. Concept of Isoquant. Short run and long run costs, fixed costs and variable costs, total, average and marginal costs- meaning and relationship. Total, average and marginal revenue. Concept of production – Return to Factor and Return to Scale. Producer's Equilibrium -Meaning and its condition in short run and long run through- (a) total revenue and total cost approach (b) marginal revenue and marginal cost approach. Supply: Determinants of supply, Changes in supply, Movements and shift in supply curve, Price Elasticity of supply and methods of measurement of price elasticity of supply.

4. Simple Application of tools of demand and supply

Scientific tools for analysis of Economic Theory. Induction and deduction method. Some basic concepts. Economic goods, consumption goods, capital goods, final goods & intermediate goods, stock and flows. Gross investment and Depreciation.

5. Forms of Market & Price Determination

Perfect competition: Meaning & Features. Market Equilibrium under perfect competition. Equilibrium price and Quantity. Situations of Excess Demand and Excess supply on market Equilibrium price and Quantity. Imperfect competitive market: monopoly, monopolistic competition, duopoly and Oligopoly.

6. Factor Price Determination

Factor demand: Marginal Productivity Theory of distribution. Total Factor Demand and Factor Supply. Factor price determination. Role of Trade Unions. Competitive advantages of International trade & factor mobility.

7. Structure of Macro economy & National Income Accounting

National Income Accounting: uses and its importance. Circular flow of income. Main sectors in an economy. Flow of income into two, three and four sector economy. Money flow, real flow and deposition flow.

8. National Income and related Aggregates

Concept of Economic Territory: Resident, Non- resident and Normal residents. Concept of GDP, NDP, GNP and NNP at market price and factor cost. Methods of calculating National Income- Produce Method, Income method and expenditure method – Precautions, private income, personal income and personal disposable income real and national GNP, GDP and welfare along with its limitations.

9. Determination of Income and Employment

Say's law of Market. Keynesian Approach – Aggregate Demand and Aggregate supply. Meaning and components of Aggregates Demand Consumption and saving function. Propensity to consume and propensity to save- Average and Marginal propensity to save. Short run fixed price in product market. Equilibrium multiplier and multiplier mechanism. Meaning of full employment and involuntary. Unemployment problem of Excess demand and deficit demand. Measures to correct through Fiscal and Monetary policies.

10. Money and Banking

Barter system and its problems. Evolution of money, meaning and functions of money- Primary, secondary & Development function. Demand for money and its different approaches. Banking-Commercial Banks and Central Bank. Mechanism of Credit Creation. Financial Institutions: NABARD, IDBI, ICICI, Regional Rural Banks. Non-Banking Financial Institutions, insurance & mutual funds etc.

11. Foreign Trade and International Monetary Institutions

Foreign Exchange Rate – Meaning and its determination. Demand and supply of Foreign Exchange. Equilibrium in foreign exchange market. Types of Foreign Exchange Rate. Fixed and variable Foreign Exchange Rate system. Operation of Foreign Exchange Market. Spot and capital accounts. Autonomous and Accommodation items. Factors responsible for disequilibrium in Balance of payments. International Monetary Institutions IMF, IBRD, ADB. Trade Policy, Tariff, Theory of Regional Blocks, customs Union, European Common Market: GATT, WTO.

POST GRADUATE TEACHER

(ECONOMICS)

12. Government Budget and its Economic Implications

Government Budget: Meaning, Objectives and components. Classification of Receipt: Tax Revenue Receipt, Non-Tax Revenue Receipt and capital Receipt. Borrowing and Disinvestments. Classification of Expenditure- Revenue Expenditure and Capital Expenditure, Plan and Non Plan Expenditure, Development and Non- Development Expenditure. Various Measures of government Deficit: Revenue Fiscal and Primary Deficits- Meaning and implications.

PAPER-II: STATISTICS AND INDIAN ECONOMIC DEVELOPMENT

STATISTICS

1. Introduction

Functions of Statistics. Subject matter of Statistics Statistical method and applied Statistics (Descriptive and Scientific). Nature and Scope of Statistic. Distrusts of Statistics. Importance of Statistics in Economics.

Use of Statistical tools in Economic analysis. Stages in Statistical investigation Primary Data and Secondary Data- methods and sources, Questionnaire and schedule. Census and sampling methods: random and non-random sampling. Organization of Data & Statistical Table. Classification and presentation of Data: Graphical and diagrammatic presentation. Simple bar, sub-divided bar, multi bar, broken bar, pie diagram, histogram, polygon, cumulative frequency curve (Ogive).

2. Measures of Central Tendency

Meaning and definition- Kinds of Statistical Averages (Mean, Median and Mode). Arithmetic and Weighted Arithmetic mean. Algebraic properties, advantages and disadvantages of Mean. Median- Meaning, merits and demerits of Median. Partition values - Quartiles, Deciles and Percentiles. Mode – Meaning, merits and demerits of Mode. Methods of calculation of Mode - Grouping method, Mean and Median method.

3. Measures of Dispersion

Meaning and definition. Need and objectives of dispersion. Properties of a good measure of dispersion. Types of dispersion- absolute measures and relative measures. Method of measuring Dispersion- Range, Inter Quartile Range, Quartile Deviation, mean deviation and standard deviation. Merits and limitations of standard deviation. Variance: meaning and its co-efficient. Lorenz curve – meaning and construction techniques.

4. Measures of correlation

Correlation: meaning and importance. Type of correlation: positive and negative correlation. Simple, partial and multiple correlation. Linear and non-linear correlation. Degree of correlation- low correlation, moderate correlation and high correlation. Methods of correlation. Scatter diagram, Karl Pearson's co-efficient of correlation, rank correlation (Spearman's rank difference method).

5. Index Numbers

Meaning and definition. Characteristics of index numbers. Uses of index number. Construction weighted and unweighted index number. Method – Laspeyres's method, Pearson's method, Fisher's Method, Marshall's method, Kelly's method. Time Reversal and Factor Reversal Test.

Indian Economic Development

6. Introduction

A brief introduction of the state of Indian economy on the eve of independence- poor, stagnant, backward economy, depleted economy, dependent economy, semi-feudal economy, and disintegrated economy.

Common development goals of Five-Year plans. Meaning of economic planning. Origin and growth of planning in India. The planning commission and Development council. Main features of economic policies. Achievements and failure of Economic Planning. Main problems and policies of Agriculture, Industry and Foreign trade.

7. Indian Economy in Pre Independence Period

Village Economy - Isolated, self-sufficient and independent unit. Indian economy on the eve of the independence. Indian economy during the British rule. Land tenure system, commercialization of Indian Agriculture and exploitation under the British rule. Brain Drain theory, Laissez Fair Theory - positive and negative aspects. Structural changes - transport and communication.

8. Indian Economy after Independence

Emergence and growth of Indian capitalist enterprise. Open and planned economy.

Agriculture – Nature of Indian agriculture; land tenure system and land reforms; Green revolution – components and its impact on Indian agriculture.

Industry – Meaning, classification and significance of industrialization; role of cottage, small-scale and large-scale industries. Industrial policies from 1951 to 1991.

Foreign Trade – Components of foreign trade; balance of trade and balance of payments; direction and composition of foreign trade; India and world trade organization (WTO).

9. Economic Reforms since 1991

Meaning of Economic Reform: Its need for India. Liberalization features, merits and demerits. Privatization – features, merits and demerits Globalization- features, merits and demerits. Measures and other economic reforms- Taxation, Fiscal and Monetary Policies. Reform arguments against new Economic Policy. An appraisal of LPG Polices.

POST GRADUATE TEACHER

(ECONOMICS)

10. Current Challenges facing Indian Economy

Population – size and growth of India's population. Population explosion- causes and its importance of high birth rate- measures for correction. Causes of slow decline in death rate measures of correction. Theory of Demographic Transition in India. Poverty- meaning, classification (relative and absolute poverty). Causes of poverty in India. Measures adopted by the govt. under poverty alleviation programmes. Unemployment - meaning, classification and main causes of Unemployment in India. Economic and social consequences of Unemployment.

Infrastructure – meaning of social and economic infrastructure- cause and its impact on development economy like India. Social infrastructure- health, education and housing economic infrastructure- power, transport and communication- postal and mass media.

11. Development experience of India

Economic growth and development. Sustainable economic development: meaning and its effect on resources and environment. Causes of environmental degradation and measures for its protection. Migration- causes and its significance. NITI Aayog- role, policies and achievements, SDGs- Achievements of Indian economy.

12. The economy of the North East India with special Reference to Arunachal Pradesh

Basic features. Comparative feature with the Indian economy. Sectoral composition of state income and sectoral contribution to the growth of income with special reference to Arunachal Pradesh. Resources: status of Human resources in the North-East Economy with special reference to Arunachal Pradesh. Opening of the North East Economy and look East' policy of the Government and role of Arunachal Pradesh.

ANNEXURE- D

POST GRADUATE TEACHER

SUBJECT: GEOGRAPHY

PAPER-I

(Principles of Physical Geography)

Uniti-1: GEOMORPHOLOGY

Definition, scope, and development of Geomorphology, Origin and evolution of the Earth, different theories of origin of the Earth, critical analysis of theories, Structure of the Earth's interior, different types of rocks, origin of continents and oceans, isostatic balance, theories of continental drift and plate tectonics, mountain building theories, Geomorphic processes – endogentic (mass wasting, weathering, erosion (Theories of Davis and Penck): Evolution of landforms under the action of river, wind, glacier and underground water.

Unit II: CLIMATOLOGY

Structure and composition of atmosphere, Insolation, heat budget, Latitude heat balance, temperature anomaly, Atmospheric moisture, Precipitation, forms of precipitation, Atmospheric pressure system, gradient, winds, climate, world climate, global climate changes, causes and effects.

Unit III: OCEANOGRAPHY

Relief of the ocean floor, submarine relief features (Atlantic, Pacific and Indian Ocean) movement of ocean water, currents, tides and waves, temperature of ocean water (Horizontal and Vertical distribution), salinity – factors controlling salinity, Marine deposits, marine life, corals, atolls, barrier reefs, oceanic pollution.

Unit IV: BIOGEOGRAPHY

Definition of Ecology, concept and principles of Ecosystem, meaning of Ecosystem, functioning of Ecosystem, Soil – genesis of Soil, factors of formation, soil profile, soil degradation and conservation, classification of world soil; Biomes of the world, deforestation and conservation of wildlife; Biodiversity, Biosphere reserves, National parks and Wildlife sanctuaries.

Unit V: HUMAN GEOGRAPHY

Evolution of Human geography, definition, nature and scope; Approaches and recent developments in human geography; Geographic thoughts- determinism, possibilism and neo-determinism; Major human races of the world and dispersion, indices for racial delimitation, ethnicity and related problems.

Unit VI: ECONOMIC GEOGRAPHY

Resources – concept of resources, classification of resources, resource planning; Agriculture- agriculture practices, major cereal and cash crops and their distribution, minerals

and power resources, energy crisis in the world; Industry- factors of localization and theories; Iron and steel industry, textiles, petrochemicals and electronic goods industries; Transport- mode of transport – **a**) Land transport- roads, trans-continental railways, **b)** waterways – Sea or oceanic route, inland waterways, **c**) Airways – Domestic and international airways, **d)** Pipelines; Communication types, media, satellite and information technology; International trade – bases, components, trade blocs, pattern of trade, recent changes in international trade.

Unit VII: POPULATION GEOGRAPHY

World population distribution pattern, factors influencing population density and distribution; Population growth, causes, issues, associated problems, and government policies; Migration – Types, stream, factors and consequences.

Unit VIII: SETTLEMENT GEOGRAPHY

Settlements – types, patterns, morphology, hierarchy (Urban & Rural); Problems of urban settlements, slums, and the problem of waste disposal and urbanization; Functional classification of towns; Geography factors affecting growth of settlements, distribution, and types of settlements – Rural and Urban.

Unit IX: REGIONAL GEOGRAPHY

Concept of region, area, zone regionalization in the world; Regional disparity, regional development strategies and environment issues in regional planning for sustainable development.

APPLIED GEOGRAPHY

Unit X: GENERAL GEOGRAPHY

Maps – Elements of map making; Representation of scales; Conventional signs; Map projection and interpretation of topographical maps. Weather instrument and interpretation; Digital mapping; Remote sensing; Thematic mapping (Dot method, choropleth method, isopleths method). Representation of data- bar graph, histogram, line graph, multiple bars and compound bar, pie diagram, etc. Principles of sampling; Spatial information technology, GIS, GPS, computer hardware and software, computer applications in data analysis. Measures of central tendency- dispersion, mean, median, mode, skewness, coefficient of correlation, and rank differentiation, Cartographic techniques – contours, climatograph, ergograph.

POST GRADUATE TEACHER

(GEOGRAPHY)

PAPER – II

(Geography of India)

Unit – I: Location settings of India

Extend, area neighboring, spatial relation.

Unit – II: Physiography of India

Major physical divisions, brief history of the Himalayas, Peninsular plateaus, northern plains, and island groups, distinctive features of each physical entity, drainage system, Main features.

Unit – III: The climate of India

Main elements of Indian climate: Classification of the Indian climate, Koeppen's and Thornthwaite's climate regions of India, Differences in the scheme of their classification.

Unit IV: Population of India

Distribution pattern, factors of population distribution, regional variations, population concentration index; Density of population- regional variations, density measures, population density region; Population growth, types, factors, regional variations, causes and consequences of rapid growth, population types; Demography and cultural attributes of population; Age structure sex ratio, occupational structure, literacy, religious composition of population, ethnic composition; Migration – causes and consequences.

Unit V: Agriculture of India

Agriculture as the basis of India's economy, agriculture practices, problems, development strategies, and transformation of Indian agriculture from tradition to modern. Package technology- positive and negative impacts, Major Crops- wheat, rice, sugarcane, cotton, jute, tea, rubber (distribution and production pattern), food budget of India, Indian agriculture and biotechnology, impact of globalization on agriculture.

Unit VI: Industries

History of manufacturing in India; Location factors of industries; Major industries-iron & steel, cotton textile, sugar, petrochemical, fertilizer and cement industries; Industrial regions of India, major and minor industrial districts, national industrial policy. Prior of modern industries, Hi-tech industries- main features; impact of new trade polices – globalization, liberalization and privatization on Indian industries, classification of industries.

POST GRADUATE TEACHER

(GEOGRAPHY)

Unit VII: Means of Transportation and Communication

Role of means of transport, roadways, railways, and ropeways; water transport- inland and oceanic; Air transport; Pipe transport; Comparative importance of different means of transport. Means of communication- media of means of communication, the internet and satellite communication in India.

Unit VIII: Human settlement

Types, patterns, morphology of Indian towns; Functional classification of towns; Waste disposal problems.

Unit IX: Planning in India

Five-year plans, planning strategies in India, integrated development project, tribal area development project, hills area development project, drought-prone area programme, desert area programme, watershed development project, Indira Gandhi canal command area development project – Main achievement, environmental issues & sustainable development.

Geography of North-East India with special reference to Arunachal Pradesh

Unit X: Location N/E India

Physiography, climate, drainage, soil and vegetation.

Unit XI: Ethnic composition

Racial history of tribal groups of Arunachal Pradesh, spatial distribution and cultural traits. Population- Patterns of distribution and density, state-wise and district-wise spatial distribution and density; factors controlling distribution and density pattern; Age-sex composition, working and non-working population, literacy and religious composition (with special emphasis on Arunachal Pradesh) population growth patterns, factors and population projection.

Unit XII: Resource base and Economic Development

Agriculture – Main practices, major crops, distribution of crops, problems and prospects.

a) Mineral resources- Main minerals, distribution pattern.
b) Water resources- Prospects of hydro-power development in Arunachal Pradesh.
c) Forest and Wildlife resources- Forest types and forest products, Conservation measures- wildlife sanctuaries, biosphere reserves and national parks.
d) Industries – Major industries, growth and prospects.

ANNEXURE- E

POST GRADUATE TEACHER

SUBJECT: HORTICULTURE

PAPER-I

Unit 1: General Horticulture

Horticulture its definition and branches, importance and scope, problems of production and marketing and remedial measures. Importance of fruits and vegetables in human diet, crop diversification. Classification of horticultural crop plants and their edible parts.

Unit 2: Basic Horticulture

Propagation, macro and micro propagation, rootstocks, propagation by seeds, cuttings, budding, layering and grafting, physiology of rooting. Nursery raising and their management.

Orchard management, location and site, planning and layout, pruning and training, soils management, essential elements and their functions and deficiency, role of micro nutrients and their deficiency problems, manures and fertilizers, weeds management, pests and diseases management, irrigation and drainage systems. Planting systems, multi storey cropping, intercropping, mulching, wind break, protection from frost and sunburn.

Unit 3: Crop Physiology

Plant growth and development, Photoperiodism and flowering, vernalization, seed and bud dormancy, bearing behaviour, fruitset seedlessness, fruit thinning and fruit drop, physiological disorders of horticultural crops, hormones and plant growth regulators and their roles.

Unit 4: Genetics and Plant breeding

Genetics and plant breeding, heredity and variation, Mendel's laws of inheritance, origin and distribution of horticultural crops, principles and methods of plant breeding for improvement of major horticultural crops, hybridization, heterosis and its exploitation, male sterility and self-incompatibility and polyploidy.

Seed technology, classes of seeds, production, processing and testing of seeds. Role of national and state seed agencies in production, processing and marketing of improved seeds.

Unit 5: Pomology

Origin, history and production technology of important fruits such as mango, banana, citrus, guava, papaya, grapes, pineapple, litchi, apple, pear, peach, plum, almond, aonla, walnut, etc. with special reference to climate, soil, propagation, cultivars, nutrition, irrigation, weeds control, pests and diseases, harvesting and marketing.

PAPER-II

Unit 1: Olericulture

Origin, history and production technology of important vegetables, spices and condiments like tomato, brinjal, chillies, cole crops, radish, carrot, turnip, beans, peas, potato, tapioca, okra, cucurbits, leafy vegetables, coriander, cumin, turmeric, ginger, onion, garlic, etc. with special

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(HORTICULTURE)

reference to climate, soil, seed rate, cultivars, nutrition, irrigation weeds control, pests and diseases and other management practices.

Unit 2: Plantation crops, medicinal and aromatic plants

Origin, history and production technology of important plantation crops like coconut, arecanut, pepper, cardamom, rubber, tea, coffee, cashew nut, etc. with special reference to climate, soil, seed production, cultivars, nutrition, irrigation and other management practices.

Origin, history and production technology of important aromatic and medicinal crops like palmarosa, lemon grass, isabgol, vetiver, cinchona, belladonna, rauvolfia, discorea, etc. with special reference to climate, soil, seed production, cultivars, nutrition, irrigation and other management practices.

Unit 3: Landscape Gardening

History of gardening in India, styles of gardening, their principles and practices with special reference to Mughal, Japanese and English gardens, elements and features of landscape gardening. Classification and utilization of ornamental trees, shrubs, climbers, herbaceous plants, perennial, annuals, bulbous and water loving plants, cactus, succulents and foliage plants, bonsai, home gardens, lawn and topiary.

Unit 4: Floriculture

Origin, history and production of important flower crops like rose, orchids, aster, marigold, chrysanthemum, gladiolus, carnation, gerbera, jasmine, dahlia, tuberose, lilies, etc. with special reference to climate, soil, propagation, cultivars, planting methods, nutrition, irrigation, aftercare, etc. prolonging storage and vase life of cut flowers and their utilization.

Unit 5: Post harvest technology and Value-addition

Post harvest technologies, harvesting with reference to maturity indices, techniques, sorting, grading, pre-cooling, treatments to prolong shelf life and important disorders. Cold chain storage systems, physicochemical changes and quality of horticultural produces after harvesting, processing of horticultural produce. Important value-added products from fruits and vegetables. Principles and methods of fruit and vegetable preservation, methods and equipments for processing. Preparation, packaging and marketing of value-added products like jellies, jams, ketchup, pickles, squashes, marmalade, etc.

ANNEXURE- F

POST GRADUATE TEACHER

SUBJECT: CHEMISTRY

PAPER-I

Unit 1: - Coordination compounds and Organometallics

Introduction, definition of coordination compounds, coordination Number, Werner's theory, ligands and their types, IUPAC-nomenclature of coordination compounds, isomerism, bonding in coordination compounds: Valence bond theory and crystal field theory, colour and magnetic properties in coordination compounds, biological importance of coordination compounds. Organometallics: types and nomenclature. Metal carbonyls, its preparation, properties and uses.

Unit 2: - Concept of organic chemistry

Hybridization of carbon in organic compounds, sigma and pi-bonds shapes of simple organic molecules, structural and geometrical isomerism, optical isomerism of compounds containing up to two asymmetric Centre (EZ concept excluded) IUPAC- nomenclature of simple organic compounds with different functional groups, conformation in Ethane and Butane(Newman and Sawhorse Projection), chair and boat forms of cyclohexane, and hyperconjugation, keto-enol tautomerism, determination of empirical and molecular formula of simple compound(only combustion method), hydrogen bonds-definition and their effect on physical properties of alcohol and carboxylic acid, inductive and resonance and their effect on acidity and basicity of organic acids and bases, polarity and inductive effect in alky halides, reactive intermediate produced during homolytic and heterolytic bond cleavage, formation, structure and stability of carbcations, carbanions and free radicals.

Unit 3: - Hydrocarbons

Nature and classification of hydrocarbons (aliphatic and aromatic), IUPAC nomenclature. Alkanes: Preparation, physical properties and chemical reactions including free radical mechanism of halogenation, combustion and pyrolysis, isomerism in alkanes. Alkenes and Alkynes: Structure of double bonds (in alkenes) and triple bonds (in alkynes), geometrical isomerism in alkenes, preparation, properties and reaction of alkenes and alkynes, addition of hydrogen, halogens, water, hydrogen halides (Markovnikov's rule and peroxide effect). Mechanism of electrophilic addition, acidic nature of alkenes and alkynes, reaction of alkenes with potassium permanganate, ozonolysis of alkenes and alkynes. Alkadienes: Classification, preparation of conjugated dienes. Benzene (Halogenation, Nitration, Sulphonation, Friedel-craft alkylation and acylation), effect of ortho, meta and para directing group in monosubstituted benzene; carcinogenic nature and toxicity.

Unit 4: - Haloakanes and Haloarenes

Introduction, classification on the basis of types of hybridization of carbon bonded to the halogen atom, Nomenclature of haloakanes and haloarenes, isomerism in haloalkanes and haloarenes, method of preparation, properties (physical and chemical) of haloalkanes and haloarenes, test to distinguish alkylhalides and arylhalides, mechanism and definition of S_N^1 and S_N^2 reaction. Reactivity of alkyhalides towards S_N^1 reaction and S_N^2reaction, some basic concept about optical activity and optical isomerism, stereo-chemical aspects of S_N^1 and S_N^2

reaction, uses and environmental effect of dichloromethane, trichloromethane, tetrachloromethane, idoform, freons and DDT.

Unit 5: - Alcohols, Phenols and Ethers

Alcohol: Nomenclature, physical and chemical properties, mechanism of substitution reaction, mechanism of dehydration and uses. Some important compounds (methanol and ethanol), Identification of primary, secondary and tertiary alcohol.

Phenols: Nomenclature, method of preparation, physical and chemical properties, acidic nature of phenol, electrophilic substitution reactions, uses of phenols, Kolbe's and Reimer-Tiemann reactions.

Ethers: Nomenclature, methods of preparation, physical and chemical properties and uses.

Unit 6: - Aldehydes, Ketones and Carboxylic Acids

Aldehydes and Ketones: - Nomenclature, isomerism, methods of preparation, physical and chemical properties, Aldol condensation, Cannizzaro reaction, Rosemund's reduction, Clemensons reduction, Perkin reaction. Relative reactivity of Aldehydes and Ketones, uses of formaldehyde, acetaldehyde, acetone and benzaldehyde, test to distinguish between aldehydes and ketones, Gattermann-Koch reaction, Etard reaction, Stephen reaction, Wolff-Kisher reduction, acidity of alpha hydrogens of aldehydes and ketones (aldol condensation).

Carboxylic Acids: - Nomenclature, structure of carboxyl group, methods of preparation, physical and chemical properties and uses. Acidity and effect of substitution on acid strength of carboxylic acid. Derivatives of carboxylic acid (Anhydride, acid chloride, amide and ester): preparation, properties and uses.

Unit 7: - Amines

Nomenclature, classification (aliphatic and aromatic), structure, preparation, physical and chemical properties, diazonium salts: Preparation, physical properties, chemical reactions and uses; test to distinguish between primary, secondary and tertiary amines. Sandmeyer reaction, Gattermann reaction, Balz-Schiemann reaction, Coupling reaction, importance of diazonium salts in synthetic organic chemistry.

Unit 8: - Polymers

Introduction, classification of polymers, types of polymerization reaction classification based on source of availability, structure, molecular forces and mode of synthesis, uses of various types of polymers, molecular masses of polymers, polydispersity index (PDI) and biodegradable polymers.

Unit 9: - Chemistry in Everyday Life.

Introduction, chemistry used in medical sciences: Drugs, designing of drug, classification of drugs, interaction of drugs with target, receptors as drug target, types of drugs: antipyretics, analgesic, antiseptic, disinfectants, tranquilizers, antibiotic (narrow and board spectrum), antifertility drugs, antihistamines and antacids; Chemicals in food, food

POST GRADUATE TEACHER

(CHEMISTRY)

preservation and artificial sweetening agents. Cleansing agents: Soap and Detergents, classification of detergents, advantage of synthetic detergents over soaps.

Unit 10: - Biochemistry

Carbohydrates: Classification, monosaccharides (glucose and fructose), structural determination of glucose and fructose on the basis of their chemical properties, open chain structure, Haworth structure, configuration, mutarotation, anomers, chemical reaction of glucose and fructose (reducing or non-reducing sugar). Oligosaccharides (sucrose, lactose, maltose), polysaccharides (starch, cellulose, glycogen).

Protein and amino acids: Peptide bond, primary, secondary and tertiary structure of protein. Denaturation of proteins Nucleic acid: Structure of DNA, nucleosides and nucleotides, and biological function of nucleic acids.

Vitamins: Classification and functions, diseases caused by the deficiency of vitamins. Enzymes and its mechanism of action and hormones.

Unit 11: - Practical Organic Chemistry

Detection of elements (N, S, halogens), detection and identification of functional group; hydroxyl (alcoholic and phenolic), carbonyl (aldehyde and ketone) carboxylic, amino and nitro.

Chemical methods for separation of mono-functional organic compound from binary mixture.

Unit 12: - Chemical Bonding and Molecular Structure

Valence electrons, Lewis structure, ionic bonds, covalent bond, bond parameters, polar character of covalent bond, covalent character of ionic bond, co-ordinate bond, valence bond theory, resonance, geometry of covalent molecule. VSEPR theory: Shapes of some simple molecules. Concept of hybridization involving s, p and d-orbitals and molecular orbital theory (homonuclear diatomic molecules only), Hydrogen bond: types of hydrogen bonds and its effect on properties of compounds.

Unit 13: - Environment Chemistry

Different types of pollution, acid rain, ozone layer depletion, greenhouse effect and global warming, pollution due to industrial wastes, green chemistry as an alternative tool for reducing pollution, strategy for control of environmental pollution.

PAPER-II

Unit 1: - Some Basic Concepts of Chemistry

General introduction: importance and scope of chemistry. Historical approach to particle nature of matter, laws of chemical combination, Dalton's atomic theory: concept of elements, atoms and molecules. Atomic and molecular masses, mole concept and molar masses, percentage composition, empirical and molecular formula, chemical reaction, stoichiometry, concept of limiting reagent, SI system of unit, properties of matter and their measurement and equivalent mass (Acids, bases and salt).

POST GRADUATE TEACHER

(CHEMISTRY)

Unit 2: - States of matter

Gas, liquid and solid: Types of intermolecular forces. Gaseous State: the laws governing, ideal gas behaviour, Dalton's law of partial pressure, kinetic theory of gasses, Maxwell-Boltzmann distribution law, real gasses: deviation from ideal behavior and equation. Liquid and their properties: vapour pressure and viscosity, classification of solids based on different binding force; molecular, ionic, covalent and metallic solids, crystalline and amorphous solids.

Unit cell, lattices, calculation of density of unit cell. Packing in solids, packing fficiency, voids number of atoms per unit cell in different cubic lattices, point defect in solids, electric and magnetic properties in solid.

Unit 3: - Structure of Atom

Discovery of electron, proton and neutron; atomic number, isotopes and isobars. Rutherford's model and its limitation, Bohr's model and its limitation, dual nature of matter and light, de Broglie's relationship, Black body radiation, Planks constant, Heisenberg uncertainty principle, wave mechanical model of the hydrogen atom quantum mechanical model of atom, Schrödinger equation, wave function, concept of orbitals, quantum numbers, shape of s, p and d orbitals, rule for filling electrons in orbitals: Aufbau principle, Pauli exclusion principle and Hund's rule, electronic configuration of atom, stability of half-filled and completely filled orbitals.

Unit 4: - Equilibrium

Equilibrium in physical and chemical processes, dynamic nature of equilibrium, law of mass action, equilibrium constant (Kc and Kp), Le Chatelier's principle (effect of concentration, temperature and pressure), ionic equilibrium, ionization of acids and bases, strong and weak electrolytes, degree of ionization, solubility product, common ion effect, and buffer solution.

Acid and Bases: Bronsted- Lowry and Lewis concept, Hydrolysis of salts, homogeneous and heterogeneous equilibria, Application of equilibrium constants, relationship between equilibrium constant and reaction quotient and Gibb's free energy.

Unit 5: - Surface chemistry

Adsorption: Physisorption and chemisorptions; factor affecting adsorption of gasses on solid., Catalysis: homogenous and heterogeneous activity and selectivity, uses of adorption, uses of homogeneous and heterogeneous catalysts and enzyme catalysis. Colloidal state: Distinction between true solutions, colloids and suspensions, Classification of colloids: lyophobic and lyophilic colloidal solution, multimolecular and macromolecular colloids, preparation and properties of colloidal solution; Tyndall effect, Brownian movement, electrophoresis and coagulation.

Emulsion: Types of emulsion, its preparation, properties and uses.

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(CHEMISTRY)

Unit 6: - Chemical Kinetics

Rate of a reaction (average and instantaneous), factors affecting rates of reaction: concentration, temperature, catalyst; order and molecularity of a reaction, rate law and rate constant, intergrated rate equations and half-life (only for zero and first order reaction); concept of collision theory (elementary idea, no mathematical treatment). Activation energy, Arrhenius equation, reaction mechanism (simple reaction only).

Unit 7: - Electrochemistry

Concept of oxidation and reduction, redox reaction, oxidation number, conductance in electrolytic solution, specific and molar conductivity, variation of conductivity with concentration. Kohlrausch's law, electrolysis and law of electrolysis, electrochemical cells and cell reactions, standard electrode potentials, SHE, electrochemical series, Nernst equation and its application to chemical cells, Galvanic cells, concentration cells, fuel cells, batteries and electrochemical corrosion.

Unit 8: - Solution

Solution and its types, expression of concentration of solution of solid in liquid, solubility of gases in liquid, solid solution, Raoult's laws, Raoult law as specific case of Henry's law. Idea and non-idea solution, colligative properties (lowering of vapour pressure, elevation in boiling point, depression of freezing point, osmotic pressure), colligative properties and determination of molar mass, abnormal molecular masses.

Unit 9: - Thermodynamics

Concept of system, types of system, surrounding, work, heat, energy, extensive and intensive properties, state function, first law of thermodynamics, internal energy and enthalpy, heat capacity and specific heat capacity, measurement of ΔU and ΔH, Hess's law of constant heat summation, enthalpy (bond dissociation, combustion, formation, atomization, sublimation, phase transition, ionization and dilution) concept of entropy, second law of thermodynamics, Gibb's free energy; criteria for spontaneity, free energy and chemical equilibrium, third law of thermodynamics.

Unit 10: - Classification of elements and Periodicity in properties

Significance of classification, history of the development of periodic table Mendeleev's periodic law and periodic table, modern periodic law and long form of periodic table, periodic trends in properties of elements (atomic radii, ionic radii, ionization enthalpy, electron gain enthalpy, electronegativity, metallic property, valency). Determination of position of elements in periodic table. Nomenclature of elements with atomic number 100 onwards.

Unit 11: - Hydrogen and s- Block Elements

Position of hydrogen in periodic table, occurrence, isotopes preparation properties and uses of hydrogen, hydrides (ionic covalent and interstitial) physical and chemical properties of water, hardness of water (cause of hardness and types and removal of hardness)

heavy water, and hydrogen peroxide (preparation, reaction and structure), and hydrogen as a fuel.

Alkali and Alkaline earth metals: general introduction of s- block elements, electronic configuration, occurrence, anomalous properties of the first element of each group, diagonal relationship, trends in the variation of properties (ionization enthalpy, atomic and ionic size), trends in chemical reactivity with oxygen, water, hydrogen and halogens. Uses of s-block elements.

Unit 12: - p- block Elements

General introduction of p-block elements:

Group-13 elements: - General introduction, electronic configuration, occurrence, variation of properties, oxidation states, trends in chemical reactivity, anomalous behaviours of first element of the group; Boron physical and chemical properties. Some important compounds: borax, boric acid, boron hydrides. Aluminum reaction with acids and bases.

Group-14 elements: - General introduction, electronic configuration, occurrence, variation of properties, oxidation states, trends in chemical reactivity, anomalous behavior of first element. Carbon: catenation, allotropic forms, physical and chemical properties; uses of some important carbon compounds. Important compounds of silicon: Silicon tetrachloride, silicones, silicates and zeolites, and their uses.

Group-15 elements: - General introduction, electronic configuration, occurrence, oxidation state, trends in physical and chemical properties and uses, compound of nitrogen: preparation and properties of ammonia and nitric acid; oxides of phosphorous: preparation and properties of phosphine, halides (PCl_3 and PCl_5) and oxoacids.

Group-16 elements: - General introduction, electronic configuration, oxidation state, occurrence, trends in physical and chemical properties; dioxygen: preparation, properties and uses; classification of oxides; ozone. Sulphur: allotropic forms, compounds of sulphur: preparation, properties and uses of oxides; sulphuric acid: industrial process of manufacture, properties and uses, oxyacid's of sulphur (structures only).

Group-17 elements: -General introduction, electronic configuration, oxidation states occurrence, trends in physical and chemical properties; compounds of halogens: preparation, properties and uses of chlorine and hydrochloric acid, interhalogen compounds, oxoacids of halogens (Structures only).

Group-18 elements: -General introduction, electronic configuration, occurrence, trends in physical and chemical properties and uses.

Unit 13: - d and f- Block Elements

General introduction, electronic configuration, occurrence and characteristic of transition metals. General trends in properties of the first-row transition metals: metallic character, ionization enthalphy, oxidation state, ionic radii, colour, catalytic property, magnetic

properties, interstitial compounds, alloy formation. Preparation and properties of $K_2Cr_2O_7$ and $KMnO_4$.

Lanthanoids: -Electronic configuration, oxidation states, chemical reactivity and lanthanoid contraction and its consequences.

Actinoids: - Electronic configuration, oxidation states and comparison with lanthanoids.

ANNEXURE- G

POST GRADUATE TEACHER

SUBJECT: COMMERCE

PAPER-I

Unit I: - Nature and Purpose of Business: -

Concept of Business; Business, Profession and Employment -meaning and characteristics; Objectives of business economic and Social; Role of profit in business; Classification of business activities- Industry & Commerce, Types of Industries-meaning and subgroups; Commerce-meaning and types; Trade and Auxiliaries-meaning and types.

Unit II: - Forms of business Organisations:

Sole Proprietorship- concept, merits and limitations; Joint Hindu Family Business -concept, merits and limitations; Partnership-concept, types, merits, limitations, types of partners, registration of a partnership firm, types of partners, partnership deed; Cooperative Societies - concept, types, merits and limitations; Company- concept, merits and limitations; Private, Public and one person company- concept; Stages in the formation of a company; Important documents used in the formation of a company, Concept of LLP (Limited Liability Partnership).

Unit III: - Private, Public and Global Enterprises:

Private sector and public sector enterprises- concept; Forms of public sector enterprises: Departmental undertakings, Statutory Corporations and Government Company -concept; Global Enterprises (MNCs) concept; Joint Meaning and benefits; Public private Partnership-concept.

Unit IV: - Business Services:

Concept and types of business services; Banking -meaning, types of banks, types of bank accounts; Functions of commercial banks; E- banking-concept; Insurance -Principles, types: Life, health, fire and marine-concept; Postal and telecom services-concept; Warehousing - concept, and functions, Importance of Logistics.

Unit V: -Emerging modes of Business:

E-Business-meaning, Scope and benefits; Resources required for successful implementation of e-business; On-line transaction-meaning; Outsourcing - Concept need, scope; ATM (automated teller machine)-meaning and utility.

Unit VI: - Social Responsibility of Business and Business Ethics:

Concept of Social responsibility; Arguments for and against social responsibilities; Responsibility towards owners, investors, employees, consumers, Government and Public; Business Ethics- concept and elements.

Unit VII: - Sources of Business Finance:

Concept of business finance; Owners funds-concept; Borrowed funds-concept; Equity shares, preference shares, retained earnings-their meaning, merits and limitations; Global Depository

receipts, American depository receipts, debenture and bonds, public deposits, loan from commercial banks, loan from financial institutions, Trade credit- concept.

Unit VIII: - Small Business:

Small scale enterprise as defined by MSMED Act 2006; Role of small business in Rural India; Problems of small business in India; Government schemes and agencies for small scale industries in rural, back ward and hilly areas- NSIC, DIC, NABARD, Role of SHGs (Self Help Groups).

Unit IX: - Internal Trade:

Meaning and types of internal trade; services rendered by a wholesaler and retailer; Types of retail Trade; Itinerant retailers- meaning and types; Fixed shop retailers-meaning and types: general store, single line stores, street stallholders, departmental stores, chain stores, super markets-concept; automatic vending machine-concept; Difference between internal and external trade; Role of Chambers of Commerce and Industry in promoting internal trade.

Unit X: - Accounting, Accounting concepts and conventious, Cash book, Journal, Other books, Bank reconciliation Statement, Depreciation, Trial balance, Final Account with adjustment, Profit & Loss Account, Balance Sheet, Cash Flow Statement.

Unit XI: - Partnership Account, Capital Account, Profit and Loss Account, Goodwill, Admission of a new partner, Retirement and death of a partner, Dissolution of a Partnership firm.

PAPER-II

Unit I: - Nature and significance of management:

Management-concept, objectives, importance; Management as Science, Art and Profession; Levels of management and their role; Management functions; Coordination - concept and importance.

Unit II: -Principles of management:

Principles of management - concept, and significance; Fayol's principles of management; Taylor's scientific management - Principles and techniques.

Unit III: - Management and Business Environment:

Business Environment-concept, importance; Dimensions of business Environment; Impact of Govt. Policy changes on business and industry with special reference to liberalisation, privatisation and globalisation in India.

Unit IV: - Planning:

Planning-Concept, Importance, limitations; Planning process, types of plans: Objective, strategy, policy, procedure, method rule, budget programme; Single use and standing plans-concept.

POST GRADUATE TEACHER

(COMMERCE)

Unit V: - Organising:

Organising-Concept and importance; Organising process; Concept of Functional and Divisional structures of organisation; Formal and Informal organisation-concept, advantages, disadvantages; Delegation-concept, elements and importance; Decentralisation- concept and importance; Difference between delegation and decentralisation.

Unit VI: - Staffing:

Concept and importance of staffing; Staffing as a part of Human Resource Management, Staffing process; Recruitment-meaning; Sources of recruitment-types and their merits and demerits; Selection-concept; selection process; Training and development - concept and importance, various methods of training.

Unit VII: - Directing:

Directing-Concept and elements; Supervision-concept, function of a supervisor; Motivation-concept, Maslow's hierarchy of needs; Financial and non-financial incentives; Leadership-concept and styles; Communication-concept, elements of communication process; Formal and informal communication-concept, merits, demerits, types of networks; Barriers to effective communication, improving communication effectiveness.

Unit VIII: -Controlling:

Concept and importance of controlling; Relationship between planning and controlling; Steps in the process of control

Unit IX: - Financial Management:

Concept and objectives of financial management; financial decisions: investment, financing and dividend-meaning and factors affecting; Financial planning- concept and importance; Capital structure- concept and factors affecting; Fixed capital concept and factor affecting its requirements.

Unit X: - Financial Markets:

Financial markets-concept, functions and types; Money market and its instruments; Capital market and its types; distinguish between capital market and money market; method of floatations in the primary market; distinguish between primary and secondary market; Stock exchange-meaning, functions and trading procedure; Security and Exchange Board of India (SEBI) - Objectives, functions.

Unit XI: - Marketing Management:

Marketing -concept, functions and role; Difference between marketing and selling; Marketing management-concept, Philosophies; Marketing mix- concept and elements; Product-concept; Branding-concept, advantages; Packaging- meaning, levels, functions; Labelling-concept, functions; Price- concept, factors determining fixation of price; Physical distribution-concept,

components; Promotion- concept, elements of promotion mix; Advertising- concept, role, objections against advertising; Person selling Concept and qualities of a good salesman; Sales promotion-concept, techniques; Public relations-concept and role. Concept of E-Marketing and Digital Marketing.

Unit XII: - Working Capital Management:

Working capital-concept, classification, importance; Objectives of working capital; Determinants and estimation of working capital requirements; Financing and management of working capital.

Unit XIII: - Consumer Protection:

Concept and importance of consumer protection; Consumer Protection Act 1986: meaning of consumer and consumer protection, rights and responsibilities of consumers, who can file a complaint against whom?, redressal machinery and remedies available; Role of consumer organisations and Non-Government Organisations.

ANNEXURE- H

POST GRADUATE TEACHER

SUBJECT: ENGLISH

PAPER-I

Section A
READING COMPREHENSION

Ability to comprehend, analyse and interpret unseen texts. Four unseen reading passages may be set with a variety of objective type/ multiple choice questions (including questions to test vocabulary) testing factual and global comprehension.

Section -B
GRAMMAR AND USAGE

Ability to apply the knowledge of syntax, grammatical items and use them accurately in the context provided. The following grammatical structures will be tested through error correction / editing /gap filling/ sentence completion / multiple choice questions.

- Articles
- Determiners
- Verbs/Tenses
- Adverbs
- Modals
- Voice
- Clauses
- Narration
- Prepositions
- Connectors
- Vocabulary/Word formation
- Idioms and Phrases
- Transformation of sentences

SECTION -C
WRITING ABILITY

(Ability to express opinion in a coherent and logical manner using appropriate language)

- One short composition e.g. Advertisement, Notice, Invitation or Reply (Formal and Informal)
- One out of two tasks such as factual description of any event or incident, writing of a report or a process.
- Writing one formal letter. Letter types include:
  - Business or official letters (for making enquiries, registering complaints, asking for and giving information, placing order and sending replies.
- Letter to the editors (giving facts, figures, suggestions/ opinions on an issue of public interest) on contemporary/ current issues.
- Application for a job with CV.
- Writing personal letters giving opinions / views/ stand in an article/ debate / speech etc on a given socio- culture issue in a style/ register suitable to the task. The issue could be related to

POST GRADUATE TEACHER

(ENGLISH)

- Environment
- Education
- Gender
- Equity and Social Justice
- Economic disparity etc.

PAPER-II

ENGLISH LITERATURE

- Age of Chaucer: Geoffrey Chaucer, William Langland
- Age of Elizabeth: Spenser, Dryden, Donne, Marvell, Marlowe, Shakespeare, Jonson, Bacon
- Age of Milton: Milton, Browne
- Age of Pope: Pope, Swift, Goldsmith
- Age of Transition: Johnson, Fielding, Blake
- Age of Romanticism: Wordsworth, Coleridge, Shelley, Keats, Byron, Lamb, Hazlitt
- The Victorian Age: Tennyson, Browning, Dickens, Austin, Macaulay, Carlyle, Ruskin
- Modem Age: Hardy, Shaw, Wells, Yeats, Lawrence, Joyce, Hopkins, T.S. Eliot
- 19th and 20th Century American Literature (e.g. Hemmingway, Whitman, Emerson etc.)
- Modern writing in English from other parts of the world e.g. Latin America /Africa / Australia / South Asia.
- Modern Indian Writing in English (e.g. Anita Desai, Vikram Seth, Nissim Ezekiel, K N Daruwalla, Ruskin Bond, R K Narayan, Mulk Raj Anand, Khushwant Singh, Kamla Markendaya, V.S. Naipaul, etc.)

ANNEXURE- I

POST GRADUATE TEACHER

SUBJECT: HISTORY

PAPER-I

SECTION-A (ANCIENT INDIA)

Unit-1: - Sources of the Ancient India History

- Literary sources
- Archeological sources
- Foreign Accounts

Unit-2: - Indus Valley Civilization

- Date, extent, town planning, scripts, seals, religion and trade
- Decline of the civilization and its causes Vedic Age

Vedic Age-

- Early Vedic age-Aryan and their original home
- Social, Political, economic and religious condition
- Later Vedic age- Social, political, economic and religious condition

Unit 3: - Jainism and Buddhism:

- Life and Teachings of Lord Mahavira
- Life and Teachings of Lord Buddha
- Their contribution to India culture
- Similarities and Dissimilarities between Jainism and Buddhism
- Decline of Jainism and Buddhism

Unit 4: -Political condition of India in the 6th century BCE

- The sixteen Mahajanapadas
- Rise and expansion of Magadha Empire
- Foreign Invasions
- Iranian and Macedonian Invasions and their impacts

Unit 5: -The Age of the Mauryas

- Sources of the Mauryan history
- Chandragupta Maurya- His Conquest & Achievements
- Ashoka- His conquest, Policy of Dhamma, Achievements
- Causes of its downfall

Unit 6: - The Gupta Empire

- Chandragupta-I: Conquest and Achievement
- Samudragupta- Conquest and Achievements

- Administration, Golden period and their downfall

Unit 7: - Reign of Harshavardhan

- Sources of information
- Harsha's Conquest and Administration
- Religious, Social and Economic Condition
- Account of Hiuen T-sang

SECTION-B (MEDIVAL INDIA)

Unit 8: - North India between 800 AD-1000 A D

- Emergence of the Pratiharas
- Struggle for Empire between Pratiharas, Palas and Rashtrakutas

Unit 9: - The Chola Empire

- Rise of Chola Empire
- Central Administration and Local Self Government
- Art and Architecture

Unit 10: - Foundation of Delhi Sultanate

- Qutab-Ud-di-Aibak
- Iltutmish
- Giyas-ud-din-Balban
- Consolidation and Decline of Delhi Sultanate
- Alla-ud-din-Khilji
- Muhamamad-bin-Khilji

Unit 11: - The Vijayanagar Empire

- Rise and Growth of empire
- Art and Architecture
- Achievement of Krishnadeva Raya
- Decline of the Vijayanagar Empire

Unit 12: - The Bhakti and the Sufi Movements

- Origin of Bhakti movements, ideas & practices
- Bhakti Movements in South India
- Bhakti Movement in North India
- Leaders of Bhakti Movements

POST GRADUATE TEACHER

(HISTORY)

- Sufis-Teaching of Sufism, Leaders of Sufi Movement.

Unit 13: - The Mughal Empire- Its Zenith and Decline

- Akbar- Conquests and Consolidation of the Empire
- Religious and Rajput policy
- Mansabdari System
- Achievement of Akbar
- Shahjahan: Art and Architecture, Age of Magnificence
- Aurangzeb: Conquests, Religious and Deccan Policy, Downfall of the Mughal Empire.

Unit 14: - The Marathas

- Shivaji: His Role in the rise of the Marathas
- Administration
- Anglo-Maratha War

PAPER-II

SECTION-A (MODERN INDIA)

Unit 1: - Rise of British Power in India

- Early British Power in Bengal
- Dual System of Government in Bengal
- Cause for early success of the British

Unit 2: - Land Revenue Policy under the British Rule

- Permanent Settlement
- Ryotwari Settlement
- Mahawari Settlement
- Economic Impact of the Revenue arrangement

Unit 3: - Socio-Religious Reform Movements: -

- Raja Ram Mohan Roy and the Brahmo Samaj
- Dayanand Saraswati and Arya Samaj
- Swami Vivekananda and the Ramakrishna Mission
- Sir Sayyid Ahmed and the Aligarh Movement

Unit 4: - Peasants Movement

- Indigo Revolt

- Deccan Riots
- Mopilla Uprising

Unit 5: - The Revolt of 1857

- Cause- long term and immediate
- Nature and extent of the revolt
- Causes of the failure of the revolt
- Queen's proclamation Act and end of East India Company Rule

Unit 6: - Rise of Nationalism (1885-1905)

- Formation of the India national Congress
- Moderate leader and their ideologies
- Partition of Bengal and Swadeshi Movement

Rise of Nationalism (1905-1919)

- Surat Split
- Home Rule League
- Under ground and Terrorism Movement
- Lucknow Pact

Unit 7: - Mahatma Gandhi and Nationalism Movement (1919-1947)

- Emergence of Gandhi in Indian Politics
- Gandhiji's early movements
- Jallianwala Bagh Massacre, Khilafat and Non- Cooperation movement
- Salt Satyagrah and Civil Disobedience movement
- Round Table Conferences
- Quit India movement- India toward independence

SECTION-B (CONTEMPORARY WORDLD)

Unit 8: - Rise of Modern World

- Renaissance and reformation
- The Industrial revolution
- The glorious revolution
- The French revolution
- The American War of Independence

POST GRADUATE TEACHER

(HISTORY)

Unit 9: - World Wars

- First and Second world war- Causes and Consequences
- The World after Second world War-emergence of Power Blocks
- Emergence of third world and non-alignment movement
- UNO and its role in international affairs.

Unit 10: - The Cold War (1945-1991)

- Origin of Cold War.
- Super Power Rivalry from 1945 onwards- the end of Cold War
- Disarmament: - Concept and theories
- Obstacles to disarmament

Unit 11: - Development in Asia and Africa

- Revolution in China
- Struggle of the Apartheid

SECTION-C (HISTORY OF NORTH EAST AND ARUNACHALPRADESH)

Unit 12: - History of North East India

- Early state in Pragjyotishpur: Kamrup
- The Ahom state and their relation with neighbouring tribes
- Decline of the Ahoms

Unit 13: - History of North East with special reference to Arunachal Pradesh.

- Pre-colonial society- Economy and occupations
- Indigenous faith and practices
- Position of woman in society and policy formation.
- Concept of Innerline and Outerline
- Mc Mahon line
- The Ango-Abor War

ANNEXURE- J

POST GRADUATE TEACHER

SUBJECT: MATHEMATICS

PAPER-I

Unit-I:

- **SET:**

Sets and their representation, empty set, finite and infinite sets, equal sets. subsets of a set. subsets of the set of real numbers. Power set. Universal set. Union and intersection of sets. Difference between two sets. Complement of a set. De Morgan's laws.

- **Relation and Function:**

Ordered pair, Cartesian product of sets. Number of elements in the Cartesian product of two finite sets, Cartesian product of a set with itself. Definition of relation, pictorial diagram, domain, co-domain and range of a relation. Function as a special kind of relation from one set to another: Pictorial representation of a function, domain, co-domain and range of a function. Real valued function. Type of functions: constant function, identity function, polynomial function, rational function, modulus function, signum function and greatest integer function with their graphs. Sum, difference, product and quotient of functions. Composite function and invertible function, binary operations.

- **Trigonometric Functions:**

Positive and negative angles: - Radian Measure and Degree measure and their conversion from one measure to another. Definition of trigonometric functions with the help of unit circle. Graph of 'trigonometric functions. Expressing $\sin(x+y)$ and $\cos(x+y)$ in terms of $\sin x$, $\sin y$, $\cos x$, and $\cos y$. Identities related to $\sin 2x$, $\cos 2x$, $\tan 2x$, $\sin 3x$, $\cos 3x$ and $\tan 3x$. Solutions of a trigonometric equation, solutions of triangles. Heights and distances, inverse trigonometric functions: definition, domain range, Principle value branches and its properties.

Unit-II: ALGEBRA

- **Principle of Mathematical induction: -**

Process of the proof by "The Principle of mathematical induction".

- **Complex number and Quadratic Equations: -**

Imaginary number, Complex numbers, Algebra of complex numbers, Argand plane and polar representation of complex numbers, statements of fundamental theorem of Algebra, solution of quadratic equations. Modulus, conjugate and argument (amplitude) of a complex number, square root of a complex number. Cube roots of unity, triangle inequality.

- **Linear Inequalities: -**

Linear inequalities, Algebraic and graphical solutions of linear inequalities in one variable. Graphical solutions of linear inequalities in two variables. Absolute value, inequalities of means, Cauchy-Schwarz inequality.

POST GRADUATE TEACHER

(MATHEMATICS)

- **Permutation and Combination:**

Fundamental Principle of counting, factorial n, permutation and combination, derivation of formulae [P(n,r), C(n,r)] and their simple applications.

- **Binomial theorem:**

Binomial theorem for positive integral index. Pascal's triangle, general and middle term in the binomial expansion, simple applications. Binomial theorem for any index. Properties of Binomial coefficients.

- **Sequence and Series:**

Sequence and series, Arithmetic Progression, Geometric Progression and Harmonic Progression, nth term and sum to n terms of A.P, G.P and H.P. Arithmetic mean (A.M), Geometric Mean (G.M) and Harmonic Mean (H.M), relation between A.M, G.M and H.M. Special series.

Unit III: Two dimensional co-ordinate geometry

- **Straight Lines: -**

Slope of a line and angle between two lines, various forms of equation of a line Parallel to axes, point-slope form, slope-intercept form, Two points form, intercept form and normal form, general equation of a line. Distance of a point from a line.

- **Conic Section: -**

Section of a cone: - Circle, ellipse, parabola and Hyperbola, equation of a circle, Standard equation of a circle, standard equation of parabola, ellipse and hyperbola and their simple properties.

- **Three dimensional co-ordinate geometry: -**

Coordinates of a point in space, distance between two points, section formula, direction cosines, direction ratios, direction ratio of a line joining two points. Cartesian and vector equation of a line, coplanar and skew lines, Angle between two lines. Shortest distance between two lines. Cartesian and Vector equations of a plane in different forms, angle between two planes and angle between a line and plane. Distance of a point from a plane.

Unit-IV: Calculus

- **Limit and Derivatives:**

Derivatives introduced as rate of change: both as that of distance function and geometrically, intuitive idea of limit. Definition of derivative, relate it to slope of tangent of the curve, derivative of sum, difference, product and quotient of functions, derivative of composite functions, chain rule, derivative of inverse trigonometric functions, derivative of implicit function, exponential and logarithmic functions and derivative of functions expressed in

parametric forms. Second order derivatives. Rolle's and Lagrange's mean value theorem and their geometric interpretation.

- **Application of derivative: -**

Rate of change of quantity, increasing and decreasing functions, tangents and normal, approximation, maxima and minima.

- **Integral Calculus: -**

Integral as an antiderivative, fundamental integrals involve algebraic expression, trigonometric identities, integration by substitution, integration by parts, integration as a limit of sum, fundamental theorem of integral calculus, basic properties of definite integral and evaluation of definite integrals. Application of definite integrals to find the area enclosed between simple curves (lines, circle, parabolas, ellipse & modulus function).

- **Differential equation: -**

Definition, order and degree, general and particular solution of a differential equation. Formation of differential equations whose general solution is given. Solution of differential equations: method of separation of variables, homogeneous differential equation and first order linear differential equations.

UNIT-V: Vectors

Vector and scalars, magnitude and direction of a vector, a point vector, negative of a vector, components of a vector, addition of vectors, multiplication of a vector by a scalar, position vector of a point, position vector of a point dividing a line segment in a given ratio. Scalar (dot) product of two vectors, projection of vectors on a line. Vector (Cross) product of two vectors, scalar and vector product of three vectors.

Unit- VI: Boolean Algebra

Boolean Algebra as an algebraic structure, Principle of duality. The conditional and Bio-conditional statements, valid arguments and their duality. Application of Boolean Algebra to switching circuits.

Unit-VII:

- **Linear Algebra**

Vector space, sub-space, linear combination of vectors, linear dependence and independence of vectors, basis and dimension of vector space.

- **Real Analysis**

Limit and continuity of functions, Sequences: subsequence, bounded sequence, convergence of sequences, monotonic sequence, Cauchy sequence, Cauchy's first and second theorem on limits, Limit inferior and limit superior of sequence.

POST GRADUATE TEACHER

(MATHEMATICS)

- **Topology**

Definition of topology, discrete topology, indiscrete topology, standard topology on R, co-finite and co-countable topology, basis and sub-basis for a topological space, open set, closed set, closure, interior point, exterior point, limit point, boundary point, derived set, separation axiom $(T_1, T_2, T_3, T_4, T_5)$, regular and normed spaces.

PAPER-II

Unit-I: ALGEBRA

Polynomials and polynomial equation, complex roots, symmetric roots, relation between roots and coefficients, Cardon's method of solving a cubic equation.

- **Set theory**:

Sets and functions, relations, equivalence relation, partial order relation.

- **Infinite Series:**

Infinite series, Comparison test, Cauchy's roots test, D'Alembert's ratio test, logarithmic test and Raabe's test for convergence of series. Alternating series, Leibnitz test, Absolute and conditional convergence of series.

Unit- II: Abstract Algebra

Abelian group, subgroup, cyclic group, normal sub-group, Lagrange's theorem, quotient group, permutation group, Cayley's theorem, Fundamental theorem of Homomorphism, definition and examples of Rings, fields, Integral domains and their properties

Unit-III:

- **Linear Algebra**

Vector space over R and C, Linear dependence and independence, subspaces, Bases and dimensions, quotation spaces, linear transformation. Rank-Nullity theorem, inverse of linear transformation, matrix of a linear transformation.

- **Algebra of Matrices**

Row and column reduction, Echelon form, congruence and similarity, rank of a matrix, inverse of a matrix, Solution of system of linear equations, Eigenvalue and Eigen Vectors, characteristic of polynomial, Cayley- Hamilton theorem.

Unit-IV: Trigonometry

De Moivre's theorem for rational indices, expansion of $sinx, sinnx$ and $cosx, cosnx$ in power of x, exponential expression for circular functions, complex arguments, Gregory's series, Hyperbolic functions, Summation of Trigonometric series.

POST GRADUATE TEACHER

(MATHEMATICS)

Unit-V: Determinants and matrices

- **Determinants**

Definition and properties of determinants (of order not more than three), minor and cofactors. Cramer's rule for the solution of linear equations.

- **Matrix**

Symmetric, Skew-symmetric, Hermitian, Skew-Hermitian Adjoint of a matrix, inverse matrices, elementary operation on square matrices, Rank of a matrix, equivalence of row and column rank. Application of matrices to solve a system of linear equations (both homogeneous and non- homogenous)

Unit- VI:

- **Calculus:**

Differential calculus: Limits and continuity, derivative, successive differentiation, Leibnitz theorem, Cauchy's mean value theorem, Taylor's mean value theorem, expansion of functions, Maclaurin's expansion, different form of remainders, indeterminate forms, tangents and normal, curvature, Asymptotes, singular points.

- **Advance Calculus:**

Function of two or more variables, limit and continuity of functions of more than one variable, partial derivatives and differentiability of composite functions. Euler's theorem on homogeneous function on n-variables.

Unit-VII: Integral Calculus

Reduction formula for $\int sin^n x\, dx$, $\int cos^n x\, dx$, $\int sin^n x \cos^m x\, dx$ and its application in more than one variable, Beta and Gamma function, partial differentiation, change of variable, composite function, homogeneous function, Euler's theorem on homogeneous function, total derivative, higher order partial derivatives. Young's theorem and Schwarz theorem.

Unit- VIII: Differential Equation

Formation of differential equation of 1st order and first degree, homogeneous linear equation, exact differential equation, equation reducible to linear form, Clairaut's form of first order but not of first-degree equation (up to third degree), equations solvable for x, y *and* p, linear differential equation with constant coefficient, orthogonal trajectories. Linear differential equation with variable coefficients, transformation of the equation by changing the independent variable. Simultaneous equation of the form $\frac{dx}{P} = \frac{dy}{Q} = \frac{dz}{R}$, Total differential equations.

POST GRADUATE TEACHER

(MATHEMATICS)

Unit IX:

- **Co-ordinate Geometry**

Two Dimensional Co-ordinate geometry: Pair of straight lines, homogeneous equation of second degree, angle between a pair of lines, condition for the general second-degree equation to represent a pair of lines, point of intersection of pair of parallel and perpendicular lines.

- **General equation of second degree:**

Conic and centre of conics, tangents, normal, chord of contact, polar equation of a conic with respect to focus as pole.

- **Three dimensional Co-ordinate geometry:**

Ideas of polar and cylindrical co-ordinates in three-dimension, General equation of sphere, intersection of a plane and a sphere, equation of a tangent plane.

Unit- X:

- **Vector Analysis**

Triple product of vectors, equation of lines, planes and sphere, coplanar vectors. Vector differentiation with respect to a scalar, gradient, curl, divergence and vector identities.

- **Real Analysis:**

The Riemann integral: Definition and conditions of integrability, Darboux theorem, integrability of the sum and difference of integrable functions. Fundamental theorem of calculus, mean value theorems. Definition and existence of R.-S (Riemann Steieltjes) integral. Properties of R-S (Riemann Steieltjes) integral.

Unit-XI: Statistics and Probability:

Frequency distribution, Measure of location and dispersion, movements, skewness and kurtosis. Method of least square, correlation and regression, coefficient of correlation, regression of lines.

Definition of probability, Baye's theorem, Theorem on total probability, Random variable and probability distribution, Binomial distribution, Poisson distribution, normal distribution, Mean and variance, moment generating function.

Unit- XI: Linear Programming Problem:

Linear Programming problem, basic solution, basic feasible solution and optional and optimal solution, graphical method of solutions, problem related to diet, manufacturing allocation and transportation problem.

ANNEXURE- K

POST GRADUATE TEACHER

SUBJECT: PHYSICS

PAPER-I

Mechanics and properties of materials

Unit 1: - Physical world and measurement

System of Unit, measurement of length, mass and its dimensional analysis, errors in measurement.

Unit 2: - Kinematics

Uniform motion, non-uniform motion, accelerated motion, vectors, motion in plan, circular motion and its example, projectile motion.

Unit 3: - Laws of motion

Newton's laws of motion, inertial and non-inertial frames, elastic and inelastic collision, friction,

Unit 4: - Work, Energy & Power

Work done by a constant force and by a variable force, kinetic and potential energy, power, gravitational potential energy, spring constant, potential energy of a spring, different forms of energy, mass - energy equivalence.

Unit 5: - Motion of system of particles and rigid body

Centre of mass and its application, moment of force, torque angular momentum and its application. Moment of inertia, theorem of parallel axis and perpendicular axis. Moment of inertia of uniform rod, ring, disc, sphere and cylinder.

Unit 6: - Gravitation

Universal law of gravitation, variation of "g" due to altitude and depth and rotation of earth, gravitational potential, escape velocity, orbital velocity of satellite, geostationary satellite and polar satellite and their uses.

Unit 7: - Properties of matter

Elasticity, Hook's law, Elastic constant of isotopic solid and their relation, fluid pressure, Pascal's law, buoyancy, Archimedes principle, surface tension and its application, viscosity, Stoke's law, Poiseuille's equation, Bernoulli's theorem and its application.

Unit 8: - 'D' Alembert's principle motion under central force field, equation of orbit under centre force, Kepler's law. Generalised co-ordinates, Lagrange equation. Hamiltonian and Hamilton's Canonical equation and its application.

Heat and Thermodynamics

Unit 1: - Kinetic theory of gases, deduction of pressure, Maxwell law of velocity distribution and its experimental verification, equi-partition law of energy, transport phenomena,

POST GRADUATE TEACHER

(PHYSICS)

conductivity and diffusion, Brownian motion, Avogadro's number, ideal gas equation, Vander Waal's equation.

Unit 2: - Thermal expansion in solid, specific heat of gases at constant volume and constant pressure, specific heat in solid (Dulong and Petite's law).

Unit 3: - Thermodynamics

Zeroth laws and first law of thermodynamics, reversible and irreversible process, isothermal and adiabatic process. Carnot engine and refrigerator, Efficiency and co-efficiency performance of heat engine, second law of thermodynamic, Claussius-Clapeyron equation. Kelvin thermodynamic scale of temperature and their application Gibbs's phase rule, triple point, Joule-Thomson effect.

Unit 4: - Transfer of heat

Conduction, convection and radiation, terminal conductivity of solid, black body radiation, Kirchhoff's law, Wien's displacement law, Stefan's law, Rayliegh Jean formula, Planck's law, Newton's law of cooling, solar constant, surface temperature of the sun.

Waves & Oscillation

Unit: -1 Oscillation

Periodic motion and periodic function, simple harmonic motion and its equation energy of SHM. Simple pendulum damped simple harmonic motion and its equation. Logarithmic decrement, Relaxation time, Q factor, free and forced oscillation, resonance and sharpness.

Unit: -2 Waves

Longitudinal and transverse wave transverse wave in string and its differential equation with solution, Velocity of sound in air. Newton's formula and Laplace's correction. Factors affecting the velocity of sound in air and gases. Displacement relation for progressive wave, principle of superposition of waves, standing wave in string and pipes, fundamental nods and harmonics, inference, beats and Doppler's effect of sound and light.

Unit: -3 Quantum Mechanics

Heisenberg's uncertainly principle basic postulates of Quantum Mechanics, Schrodinger's time dependent and time independent equation, Eigen function, Eigen value. Application of Schrodinger's equation to particle in one-dimension infinite potential well, potential step and Rectangular potential barrier. One dimensional infinite harmonic Oscillators, linear operator, Harmition operator.

POST GRADUATE TEACHER

(PHYSICS)

Unit: -4 Mathematical physics and Relativity

Divergences, gradient curl of a vector, Gauss divergence Theorem, Stoke's Theorem, Green's Theorem and its application, Series solution of linear differential equation (Legendre and Bessel equation). Fourier series and its application to square wave Sawtooth wave and triangular wave.

Formulation of special theory of relativity, Einstein basic postulates, Lorentz transformation-length contraction and time dilation, addition of velocities, variation of mass with velocity, mass- energy equivalences.

PAPER II

OPTICS

Unit: -I Ray optics and optical instrument

Reflection of light by spherical mirror, refraction of light, total internal reflection and its application, refraction at spherical surfaces and by lenses, lens maker's formula. Magnification and power of lens, combination of thin lenses in Contact, refraction and dispersion of light through prism, Scattering of light

Compound microscope and astronomical telescope and their magnifying power

Unit 2: - Wave Optics

Wave front, Huygens Principle, refraction urd reflection of plane wave using Huygens Principle. Coherent and incoherent addition of waves, interference of light wave and young's experiment, Newton's ring, Michelson and Febry- Perrot interference, Freshel and Fraunhoffer diffraction, diffraction due to single slit and grating, Resolving power of microscope, telescope, grating, Polarisation of light, Brewster's law of polarization by scattering, analysis of elliptically and circularly polarized light, Polaroid's, specific rotation

ELECTROSTATICS

Unit1: - Electric charge and fields

Electric charge, basic properties of electric charge coulomb's law and superposition principle, electric fields and its physical signification, electric field due to point charge, electric field lines, Electrics dipole' Electric filed due to dipole and behaviour of dipole in a uniform external electric field. Electric flux, Gauss's theorem and its application

Unit2: - Electric potential and Capacitance

Electrostatics potential, Potential due to point charge, electric dipole and system of charge, Equipotential surfaces, electric potential energy of system of two charge Dielectric and

polarization, capacitor and capacitance, parallel plate capacitor and effect of dielectric on capacitance, combination of capacitor, energy stored in a capacitor, Van de Graff generator.

Electricity and Magnetism

Unit I: - Current Electricity

Electric current, Ohm's law and its limitation, Drift velocity and origin of resistivity, temperature dependence of resistivity, colour code of carbon resistors, combination of resistors- series and parallel, electrical energy and power, cell, emf and internal resistance of cells in bridge and parallel, Kirchhoff's law, Wheatstone bridge, meter bridge, potentiometer and its application, Thermoelectricity and its effect thermocouple, measurement of temperature.

Unit 2: - Moving charge and Magnetism

Magnetic force. Motion in combined electric and magnetic field, cyclotron, synchrotron, Hall effect, Bio-Savart law and its application, Ampere's circuit law and its application, Force between two parallel currents, torque on current loop, magnetic dipole. Moving coil galvanometer. Conversion of galvanometer into Ammeter and Voltmeter

Magnetism and Gauss's law, Earth's magnetism, magnetization and magnetic intensity, Magnetic Properties of materials, permanent magnets and electromagnets.

Unit 3: - Electromasnetic induction and alternating current

Magnetic flux, Faraday's law of induction, Lenz's Law and conservation of energy, motion of electromotive force, Eddy currents, sell and mutual inductance and their determination by using Ballistic galvanometer. Growth and decay of current in - L-R, C-R and LCR circuits, peak and rms value of a.c, reactance and impedance, LC oscillate, LCR Power of a.c circuit, watt, a.c generator, transformers.

Modern Physics: -

Photoelectric effect, experimental study of photoelectric effect, Einstein's photoelectric equation, photos cell. Compton effect, Raman effect, wave nature of matter, De-Broglie relation, Davisson and Germer Experiment

Alpha - particle scattering and Rutherford model of atom, Bohr's Theory of hydrogen atom, the lines spectra of the hydrogen atom, Sommer field's elliptical orbit and relativistic correction, vector model of atom, Quantum numbers, Pauli's exclusion principle, Zeeman effect, production of X- rays and its Characteristic, diffraction of - x-rays, Bragg's law, measurement of wavelength.

Atomic masses and composition of nucleus, size of nucleus mass defect, binding energy per nucleons and its variation with mass number, magic number, nuclear force, liquid drop model.

Radioactivity, decay law, half and mean life, properties of alpha beta and gamma ray, nuclear fission and nuclear fusion, Q- value of a reaction, Thresholds energy, Quark model of elementary particle.

Electronics and communication

Unit I: - Electronic

Intrinsic and extrinsic semiconductor, p-type and n-type, P-N junction diode as rectifier, half wave, full wave and bridge rectifier, different types of diode, photodiode, Zener diode, LED, Solar cell, Zener diode as voltage regulator.

Transistor, action of transistor, characteristics of transistor, transistor as amplifier-CB, CE and CC configuration with h- parameters, voltage gain, current gain, power gain, Feedback Amplifier and advantage of negative feedback amplifier , R-C couple, amplifier and push amplifier (Class A and Classes B) Transistor as Switch, Transistor as Oscillator, Barkhusen criterion, Hartley and Colpitts Oscillator, R-C Shift and Wein Bridge Oscillator, Multi-vibrator monostable and bistable.

Logic gates OR, AND, NOT, NAND, XOR Gates, Integrated circuit, wafer chips. MSI, LSI, VLSI and Norton theorem.

Unit 2: - Communication

Elementary idea of analog and digital communication need for modulation, amplitude modulation, phase modulation, frequency modulation and pulse modulation. Data transmission, Fax and modem, Production and detection and amplitude modulated wave, demodulation.

Propagation of electromagnetic wave in atmosphere, SKY wave, ground wave and space wave propagation, satellite communication. Line communication - two-line, wire line, cables, telephone links optical fibre, lasers.

Dynamic: - Moments and production of inertia, parallel axes theorem- D Alembert's Principle. The general equation of motion of a rigid body, motion of the centre of inertia and motion relative to the centre of inertia. Motion about a fixed axis. Compound pendulum.

POST GRADUATE TEACHER

(PHYSICS)

Unit 3: - Linear Programming

Linear programming problem, Basic solution, basic feasible solution and optical and optimal solution, graphical method of solution, Problem related to duality, manufacturing, allocation and transportation problem.

Unit 4: - Introduction to computer programming

What is computer? Mechanical Computer, different generation of computer. Micro-Computer, Super-Computer, Macro-Computers, Microprocessors, Memory System (Internal and Extremal). Software system, application software, categories of language, Machine language, Assembly Language. High level and fourth generation language.

ANNEXURE- L

POST GRADUATE TEACHER

SUBJECT: POLITICAL SCIENCE

PAPER-I

Unit: - Political Thought

Kautilya, Plato, Aristotle, Machiavelli, Marx, Shri Aurobindo, M.K. Gandhi, M.N Roy.

Unit II: - Political Theory

Meaning and scope of Political Science, relation with other social sciences. Approaches to the study of Political Science: Traditional (Philosophical, Historical, Institutional, Legal), Modern (Behaviorism, Post- Behaviorism and Marxism). Key concepts of State and Political System: David Easton, G. Almond. Theories of Origin of State: Historical, Evolutionary, Social-Contract and Marxism. Key concepts; Right, Liberty, Equality, Law and Justice. Culture and Political Socialization; Theory of Democracy; the world variants.

Unit III: - Comparative government and Politics

Meaning, nature and scope of comparative government, method of study Traditional and Modern. Typology of Government: Parliamentary, Presidential, Federal and Unitary government. Representation and Election: methods of representation, electoral processes, Ensuring free and fair election, Judiciary- USA, UK, China.

PAPER -II

Unit I: - Indian Government and politics

Constitutional development of India since1858, Constituent Assembly and Making of the Constitution and constituent Assembly. The Ideological bases, Preamble and major objectives of the Constitution, Fundamental Rights and Duties, Directive Principles of State Policy and their changing countours, amendment, politics in India; nation building and its problems, politics of planned development. Federalism; center-state relations, the emerging trends, Legislature, Executive and Judiciary in India. Political parties and pressure groups. Politics of defection and coalition. Electoral system in India: recent developments in India politics, national integration, regionalism; communalism; casteism and Terrorism.

Unit II: - Contemporary International Politics

Cold war era in world politics: disintegration of former USSR and collapse of Bi-polarity. US dominance in world and nerve centre of economic and political power. International organisations in unipolar world. Environment and natural resources. Globalization- economic, political and cultural; manifestations, debates on the nature of consequences.

POST GRADUATE TEACHER

(POLITICAL SCIENCE)

Unit III: - Foreign Policy of India and international Relations

Foreign policy: Meaning and its determinants, foreign policy and national interest, Basic principles of foreign policy, NAM. India's relation with major powers, United States, Russia, China and Pakistan. India's nuclear policy in the 21st century. India's role in the UNO. India and SAARC. India and the Middle East. India's Policy towards Arab countries (Iran, Israel and Palestine).

Unit IV: - Local Self -Government with Special Reference to Arunachal Pradesh

Local self -government: Meaning, nature and scope, difference between local self-government and state government. Development of local self-government in India, rural local self-government, urban local self- government. The 73rd and 74th Constitution Amendments Acts 1992, state control of local self-governments. Major traditional village councils of Arunachal Pradesh. Assam Frontier Administration of Justice Regulations 1945. Daying Ering Committee report 1964; North East Frontier Agencies (N.E.F. A) Panchayat Raj Regulations 1964, Arunachal Pradesh Panchayati Raj Act 1997. North East Council and its role in socio-economic development.

ANNEXURE- M

POST GRADUATE TEACHER

SUBJECT: HINDI

विषय- हिन्दी

प्रश्न पत्र।

इकाई- 1

1. व्याकरण तथा रचना

(क) समास, लिंग, वर्तनी-विचार, वाक्य रचना, कारक, पद परिचय, मुहावरे, लोकोक्तियां, विराम चिह्न

(ख) कामकाजी हिंदी और रचनात्मक लेखन

(ग) अपठित गद्यांश तथा पद्यांश।

2. जनसंचार माध्यम और लेखन -

(क) मुद्रित / प्रिण्ट, पत्र-पत्रिकाएँ, रेडियो, टेलिविजन, सिनेमा, इंटरनेट

(ख) फीचर लेखन एवं कंटेण्ट लेखन

(ग) सोशल मीडिया

इकाई- 2

1. भारतीय काव्यशास्त्र –

(क) काव्य लक्षण, काव्य प्रयोजन, काव्य हेतु, काव्य गुण एवं काव्य दोष

(ख) साहित्य के विविध रूप एवं उनका संक्षिप्त परिचय

(ग) रस सिद्धान्त, रस निष्पत्ति, रस का स्वरूप, रस के विभिन्न अंग, साधारणीकरण, सहृदय की अवधारणा

(घ) रस विवेचन, अलंकार विवेचन, शब्द शक्ति विवेचन, ध्वनि सिद्धांत, औचित्य सिद्धान्त, वक्रोक्ति सिद्धांत छंद विवेचन – मात्रिक (चौपाई, रोला, हरिगीतिका, दोहा, कुंडलियां, छप्पय, मुक्त छंद) एवं वर्णिक (वंशस्थ, वसंततिलका, मन्दाक्रान्ता, शार्दूलविक्रीडित, सवैया,कवित्त)

इकाई- 3

1. पाश्चात्य काव्यशास्त्र

(क) अरस्तू - अनुकरण सिद्धांत तथा विरेचन सिद्धांत

POST GRADUATE TEACHER

(HINDI)

(ख) लौंजाइनस - काव्य में उदात्त तत्व

(ग) क्रोचे-अभिव्यंजनावाद

(घ) टी. एस. इलियट- परम्परा एवं निर्वैयक्तिकता का सिद्धांत

(ङ) आई.ए. रिचर्ड्स का मूल्य सिद्धान्त एवं काव्य भाषा सिद्धांत

(च) साहित्य सिद्धांत, विचारधाराएँ -

आभिजात्यवाद, स्वच्छंदतावाद, आदर्शवाद, यथार्थवाद, कलावाद, मनोविश्लेषणवाद, मार्क्सवाद, अस्तित्ववाद, आधुनिकतावाद, उत्तरआधुनिकतावाद,

इकाई- 4

1. भाषा विज्ञान, हिन्दी भाषा तथा देवनागरी लिपि

(क) भाषा की परिभाषा एवं अभिलक्षण, भाषा विज्ञान के अध्ययन की दिशाएँ, अनुप्रयुक्त भाषा विज्ञान

(ख) हिन्दी ध्वनियों का वर्गीकरण, ध्वनि-परिवर्तन के कारण, शब्द और अर्थ का संबंध, अर्थ परिवर्तन की दिशाएँ, अर्थ परिवर्तन के कारण

(ग) रूपिम की अवधारणा, रूपिम के प्रकार, पद संबंधी रूप-परिवर्तन के कारण, वाक्यों के प्रकार, वाक्य- रचना में परिवर्तन के कारण

(घ) हिन्दी भाषा का विकास - आदिकाल, मध्यकाल और आधुनिक काल

(ङ) हिन्दी की उपभाषाओं और बोलियों का सामान्य परिचय, हिन्दी और बोलियों का पारस्परिक संबंध, हिन्दी के विविध रूप

2. (क) देवनागरी लिपि की विशेषताएँ, देवनागरी वर्णमाला का मानकीकरण, हिन्दी की वर्तनी का मानकीकरण

(ख) हिन्दी भाषा आन्दोलन, हिन्दी सेवी संस्थाएँ

POST GRADUATE TEACHER

(HINDI)

3. निबंध लेखन –

(क) देश / राष्ट्र संबंधित

(ख) समाज से संबंधित

(ग) भारत की समस्याओं से संबंधित

(घ) विज्ञान संबंधित

(ङ) भारतीय ज्ञान परंपरा

प्रश्न पत्र ।।

इकाई- 5

1. हिन्दी साहित्य का इतिहास -

(क) साहित्य और इतिहास का अन्त: सम्बन्ध:, काल विभाजन और नामकरण

(ख) आदिकाल - परिवेश, आदिकालीन काव्य की मुख्य प्रवृत्तियाँ, सिद्ध साहित्य, नाथ साहित्य, रासो साहित्य, जैन साहित्य, लौकिक साहित्य

(ग) भक्ति काव्य - परिवेश, भक्ति आन्दोलन: उद्भव और विकास, संत काव्य, सूफी काव्य, कृष्ण काव्य, परिचय और प्रवृत्तियाँ, भक्तिकालीन साहित्य और लोकजागरण

(घ) रीति का स्वरूप एवं रीतिकाल का परिवेश, रीतिबद्ध काव्य, रीतिसिद्ध काव्य, रीतिमुक्त काव्य, रीतिकाल की उपलब्धियाँ

(ङ) आधुनिक काल - मध्ययुगीन भाव-बोध और आधुनिक भाव-बोध में अंतर, आधुनिक काल का परिवेश

(च) हिन्दी काव्य - भारतेन्दु युग: परिवेश एवं विशेषताएँ, द्विवेदी युग: परिवेश एवं विशेषताएँ, छायावाद युग: परिवेश, विभिन्न काव्यधाराएँ - राष्ट्रीय-सांस्कृतिक कविता, छायावाद, प्रेम और मस्ती का काव्य, प्रगतिवाद, प्रयोगवाद, नयी कविता, साठोत्तर कविता,समकालीन कविता (1980 से अब तक)

POST GRADUATE TEACHER

(HINDI)

(छ) हिन्दी उपन्यास - प्रेमचन्द युग से पूर्व की प्रवृतियाँ, प्रेमचन्द युग की प्रवृतियाँ, प्रेमचन्दोतर युगीन प्रवृतियाँ, समकालीन प्रवृतियाँ

ज) हिन्दी नाटक - जयशंकर प्रसाद से पूर्व की प्रवृत्तियाँ, जयशंकर प्रसाद युग की प्रवृतियाँ, समकालीन प्रवृतियाँ, हिन्दी रंगमंच

झ) हिन्दी निबंध - आचार्य रामचन्द्र शुक्ल से पूर्व की प्रवृतियाँ, आचार्य रामचन्द्र शुक्ल युग की प्रवृतियाँ, समकालीन प्रवृतियाँ

(ञ) हिन्दी आलोचना - हिन्दी आलोचना का विकास रामचन्द्र शुक्ल से पूर्व, रामचन्द्र शुक्ल युगीन, रामचन्द्र शुक्लोतर, समकालीन हिन्दी आलोचना (1980 से अब तक), दलित-विमर्श, स्त्री-विमर्श, आदिवासी-विमर्श, किन्नर-विमर्श, दिव्यांग-विमर्श, वृद्ध-विमर्श

(ट) गद्य - साहित्य की अन्य विधाएं - जीवनी-साहित्य, आत्मकथा, यात्रावृत्त, संस्मरण, रेखाचित्र, रिपोर्ताज, इंटरव्यू, पत्र-साहित्य

इकाई- 6

1 हिन्दी पद्य साहित्य-

(क) कबीर - कबीर ग्रंथावली (सं० डॉक्टर. श्यामसुंदर दास) - गुरुदेव कौ अंग, सुमिरण कौ अंग- दोनों से क्रमश: प्रारंभिक 15-15 साखियाँ

(ख) मलिक मुहम्मद जायसी - जायसी ग्रंथावली (सं. रामचन्द्र शुक्ल), - नागमती वियोग खण्ड - पद संख्या 1 से 15 तक

(ग) सूरदास - भ्रमरगीत सार (सं० रामचन्द्र शुक्ल)- पद संख्या 1 से 25 तक

(घ) तुलसीदास - रामचरितमानस (गीता प्रेस) - अयोध्याकाण्ड- दोहा संख्या 191 से 205 तक

(ङ) बिहारी सतसई (सं. जगन्नाथ दास 'रत्नाकर')- दोहा संख्या 1 से 25 तक

(च) मैथिलीशरण गुप्त - साकेत (नवम सर्ग) - प्रारंभिक 15 छंद

(छ) जयशंकर प्रसाद - कामायनी (श्रद्धा सर्ग, इड़ा सर्ग)

POST GRADUATE TEACHER

(HINDI)

(ज) निराला - राम की शक्ति - पूजा

(झ) सुमित्रानंदन पंत - प्रथम रश्मि, नौका विहार

(ञ) महादेवी वर्मा - मैं नीर भरी दुख की बदली, यह मन्दिर का दीप इसे नीरव जलने दो।

(ट) अज्ञेय - नदी के द्वीप, भीतर जागा दाता

(ठ) नागार्जुन - अकाल और उसके बाद, मनुष्य हूँ

(ड) मुक्तिबोध - भूल- गलती

(ढ) केदारनाथ सिंह - फर्क नहीं पड़ता

(ण) धूमिल - मोचीराम

(त) अरुण कमल - अपनी केवल धार

(थ) अनामिका - दरवाजा

(द) ओमप्रकाश वाल्मीकि - तब तुम क्या करोगे?

(ध) निर्मला पुतुल - बिटिया मुर्मू के लिए

इकाई - 7

1. हिन्दी गद्य साहित्य-

(क) उपन्यास

प्रेमचन्द - रंगभूमि

फणीश्वरनाथ रेणु - मैला आंचल

श्रीलाल शुक्ल - राग दरबारी

(ख) नाटक -

जयशंकर प्रसाद - स्कंदगुप्त

POST GRADUATE TEACHER

(HINDI)

मोहन राकेश - आधे अधूरे

(ग) एकांकी -

उपेन्द्रनाथ अश्क - सूखी डाली

(घ)हिन्दी कहानी-

प्रेमचंद - पूस की रात,

जैनेन्द्र- पाजेब,

अमरकांत - डिप्टी कलक्टरी

मन्नू भंडारी- यही सच है हरिशंकर परसाई-

भोलाराम का जीव

ज्ञानरंजन - पिता

ममता कालिया - बोलनेवाली औरत ओमप्रकाश वाल्मीकि - यह अंत नहीं

सुशीला टाकभौरे - सिलिया

(ङ) रेखाचित्र-

रामवृक्ष बेनीपुरी - बलदेव सिंह

(च)आत्मकथा-

मन्नू भंडारी - एक कहानी यह भी

(छ)यात्रावृत्त-

अज्ञेय - परशुराम से तूरखुम

POST GRADUATE TEACHER

(HINDI)

इकाई- 8

1. अनुवाद

(क) अंग्रेजी से हिन्दी, हिन्दी से अंग्रेजी

2. पौराणिक ग्रंथों का सामान्य ज्ञान -

(क) संक्षिप्त रामायण

(ख) संक्षिप्त महाभारत

(ग) संक्षिप्त बुद्ध चरित