

**Syllabus
for
GENERAL TEST (501)**

GENERAL TEST

Note:

There will be one Question Paper which will have 28 questions out of which 25 questions need to be attempted.

The Question paper will contain questions from the following topics:

- General Knowledge,
- Current Affairs (National and International)
- General Science
- General Mental Ability,
- Numerical Ability,
- Reasoning (Simple application of basic mathematical concepts Quantitative arithmetic / algebra geometry / mensuration / statistics),
- Logical and Analytical Reasoning.

**LANGUAGES
(Section 1)**

SYLLABUS FOR LANGUAGES

Note:

There will be one Question Paper which will have 23 questions out of which 20 questions are to be attempted.

SECTION	Code	Name	
Section 1 (38 Languages)	101	English Language and Literature	Questions from the Language Section may be from the following topics but are not limited to: 1. Reading Comprehension: There may be a passage (maximum 150-300 words) based on the following: i. Factual ii. Narrative iii. Literary 2. Verbal Ability 3. Rearranging the parts 4. Choosing the correct word 5. Synonyms and Antonyms 6. Vocabulary
	102	Hindi Language and Literature / हिंदी भाषा और साहित्य	
	103	Assamese	
	104	Bengali	
	105	Gujarati	
	106	Kannada	
	107	Malayalam	
	108	Marathi	
	109	Odia	
	110	Punjabi	
	111	Tamil	
	112	Telugu	
	113	Urdu	
	114	English for Communication	
	115	Hindi for Communication / संचार के लिए हिंदी	
	201	Arabic	
	202	Bodo	
	203	Chinese	
	204	Dogri	
	205	French	
	206	German	
	207	Italian	
	208	Japanese	
209	Kashmiri		
210	Konkani		
211	Maithili		
212	Manipuri		
213	Nepali		
214	Persian		
215	Russian		
216	Santhali		
217	Sindhi		
218	Spanish		
219	Tibetan		
220	Sanskrit		
221	Garo		
222	Khasi		
223	Pali		



SYLLABUS OF
Teaching Aptitude
(327)



Teaching Aptitude

Note:

There will be one Question Paper which will have 23 questions out of which 20 questions need to be attempted.

Unit No.	Details
1	Two narratives/ newspaper reports about schools/teachers/ children/ Questions on data/information/analysis/issues Such as Gender, school access, teacher's work, scores
2.	Based on popular films on education, books, documentaries showing the struggles of girls', tribals' and Dalits'
3.	Science (i) Based on observation of natural phenomenon (ii) famous Indian Scientists, women scientists, (iii) Current information such as COVID, technology and programs in science
4.	Mathematics (i) Based on sense of proportion, perspective, abilities that mathematics gives (ii) Famous mathematicians, women mathematicians (iii) Difficulties that children face while learning Mathematics
5.	Arts, Music and Drama (Performing and Visual Arts) (i) Academies of art teaching (ii) Benefits of practising art forms (iii) Indian art and music traditions
6.	Social Sciences (i) Based on difficulties that children face in social sciences (ii) Details of subjects being taught (iii) Nobel and other award winners for creating knowledge such as in economics or other fields. (iv) Teachers in history: Buddha, Jain, construction of teachers in Upanishads.
7.	Language and Literature (i) Based on famous stories, novels, poems that have reference to school/education/learning and are in NCERT syllabus from Class 6 to 12. (ii) Biographies/autobiographies of famous women/tribals/Dalits who have described their school experiences, teachers or a class. (iii) Difficulties that children face while learning poems or grammar.

PSYCHOLOGY-324

PSYCHOLOGY-324

Syllabus

Note:

There will be one Question Paper which will have 28 questions out of which 25 questions need to be attempted.

PSYCHOLOGY

Unit I: Variations in Psychological Attributes

The unit aims at studying how people differ with respect to their various psychological attributes. Individual differences in human functioning; Assessment of psychological attributes; Intelligence: Individual differences in intelligence; Theories of intelligence; Culture and intelligence; Special abilities: Aptitude — nature, and measurement; Creativity; Emotional intelligence.

Unit II: Self and Personality

This unit focuses on the study of self and personality in the context of different approaches in an effort to appraise the person. The assessment of personality will also be discussed. self-esteem, self-efficacy, and self-regulation; Culture and self; Concept of personality; Major approaches — Type and Trait, Psychodynamic, Humanistic, Behavioural, Cultural; Assessment of personality: Self-report measures, behavioural analysis, and projective measures.

Unit III: Meeting Life Challenges

This unit deals with the nature of stress and how responses to stress depend on an individual's appraisal of stressors. Strategies to cope with stress will also be dealt with. Nature, types, and sources of stress; Effects on psychological functioning and health; Coping with stress; Promoting positive health and well-being.

Unit IV: Psychological Disorders

This unit discusses the concepts of normality and abnormality and the major psychological disorders. Concepts of abnormality and psychological disorders; Classification of disorders; Factors underlying abnormal behaviour; Major psychological disorders – Anxiety, Somatic, Dissociative, Mood, Schizophrenic, Developmental, and Behavioural-Substance use related.

Unit V: Therapeutic Approaches

The unit discusses the goals, techniques, and effectiveness of different approaches to treating psychological disorders. Nature and process of therapy: Therapeutic relationship; Types of therapies: Psychodynamic, Humanistic, Cognitive, Behaviour and Bio-medical; Alternative therapies — Yoga, Meditation; Rehabilitation of mentally ill.

Unit VI: Attitude and Social Cognition

This unit focuses on the formation and change of attitudes, cultural influences on attributional tendencies, and conditions influencing pro-social behaviour. Explaining social behaviour: Impression formation and explaining behaviour of others through attributions; Social cognition; Schemas and stereotypes; Nature and components of attitudes; Attitude formation and change; Behaviour in the presence of others; Pro-social behaviour; Prejudice and discrimination; Strategies for handling prejudice.

Unit VII: Social Influence and Group Processes

The unit deals with the concept of the group, its functions, and the dynamics of social influence on conformity, obedience, and compliance. Different conflict resolution strategies will also be discussed.

Conformity, Obedience, and Compliance; Cooperation and Competition; Nature and formation of groups; Types of groups; Social identity; Influence of the group on individual behaviour; Inter-group conflicts; Conflict resolution strategies.

Unit VIII: Psychology and Life

The unit focuses on the application of psychological understanding to some important social issues.

Human-environment relationship; Environmental effects on human behaviour: Noise, pollution, crowding, natural disasters; Promoting pro-environmental behaviour; Psychology and social concerns: Aggression, Violence, Peace, Discrimination and Poverty, health, the impact of television on behaviour.

Unit IX: Developing Psychological Skills

The unit deals with some effective psychological and interpersonal skills for facilitating personal-social development.

Effective psychological skills: Observational skills, Interviewing skills, Testing skills, Counselling skills — empathy, authenticity, positive regard, and Communication skills — listening.

ACCOUNTANCY/BOOK KEEPING-301 SYLLABUS FOR CLASS 12

Note:

There will be one Question Paper which will have 28 questions out of which 25 questions need to be attempted.

Accounting for Not-for-Profit Organizations and Partnership Firms

Unit I: Accounting Not-for-Profit Organisation

- Not-for-profit organization: Meaning and Examples.
- Receipts and Payments: Meaning and Concept of Fund-based and non-fund-based Accounting.
- Preparation of Income and Expenditure Account and Balance sheet from receipt and payment account with additional information.

Unit II: Accounting for Partnership

- Nature of Partnership Firm: Partnership deed (meaning, importance).
- Final Accounts of Partnership: Fixed v/s Fluctuating capital, Division of profit among partners, Profit, and Loss Appropriation account.

Unit III: Reconstitution of Partnership

Changes in profit sharing ratio among the existing partners – Sacrificing ratio and Gaining ratio.

- Accounting for Revaluation of Assets and Liabilities and Distribution of reserves and accumulated profits.
- Goodwill: Nature, Factors Affecting and Methods of Valuation: Average profit, Super profit, Multiplier, and Capitalization methods.
- Admission of a Partner: Effect of admission of a partner, Change in profit sharing ratio, the Accounting treatment for goodwill, Revaluation of assets and liabilities, Reserves (accumulated profits), and Adjustment of capital.
- Retirement/Death of a Partner: Change in profit sharing ratio, Accounting treatment of goodwill, Revaluation of assets and liabilities, Adjustment of accumulated profits (Reserves).

Unit IV: Dissolution of Partnership Firm

- Meaning, Settlement of accounts: Preparation of realization account and related accounts (excluding piecemeal distribution, sale to a company, and insolvency of a Partner)

Company Accounts and Financial Statement Analysis

Unit V: Accounting for Share and Debenture Capital

- Share Capital: Meaning, Nature, and Types.
- Accounting for Share Capital: Issue and Allotment of Equity and Preference Shares; Oversubscription and Under subscription; Issue at par, premium, and at discount; Calls in advance, Calls in arrears, Issue of shares for consideration other than cash.
- Forfeiture of Shares: Accounting treatment, Re-issue of forfeited shares.
- Presentation of shares and Debentures Capital in the company's balance sheet.
- Issue of Debenture – At par, premium, and discount; Issue of debentures for consideration other than cash.

- Redemption of the debenture.
- Out of proceeds of fresh issue, accumulated profits, and sinking fund.

Unit VI: Analysis of Financial Statements

- Financial Statements of a Company: Preparation of simple financial statements of a company in the prescribed form with major headings only.
- Financial Analysis: Meaning, Significance, Purpose, Limitations.
- Tools for Financial Analysis: Comparative statements, Common size statements.
- Accounting Ratios: Meaning and Objectives, Types of Ratios:

Liquidity Ratios: Current ratio, Liquidity ratio.

Solvency Ratio: Debt to equity, Total assets to debt, Proprietary ratio.

Activity Ratio: Inventory turnover, Debtors turnover, Payables turnover, Working capital turnover, fixed assets turnover, Current assets turnover.

Profitability Ratio: Gross profit, Operating ratio, Net profit ratio, Return on Investment, Earning per Share, Dividend per Share, Profit Earning ratio.

Unit VII: Statement of Changes in Financial Position

- Cash Flow Statement: Meaning and Objectives, Preparation, Adjustments related to depreciation, dividend and tax, sale and purchase of non-current assets (as per revised standard issued by ICAI).

Computerized Accounting System

Unit I: Overview of Computerized Accounting System

- Concept and Types of Computerized Accounting System (CAS).
- Features of a Computerized Accounting System.
- Structure of a Computerized Accounting System.

Unit II: Using a Computerized Accounting System

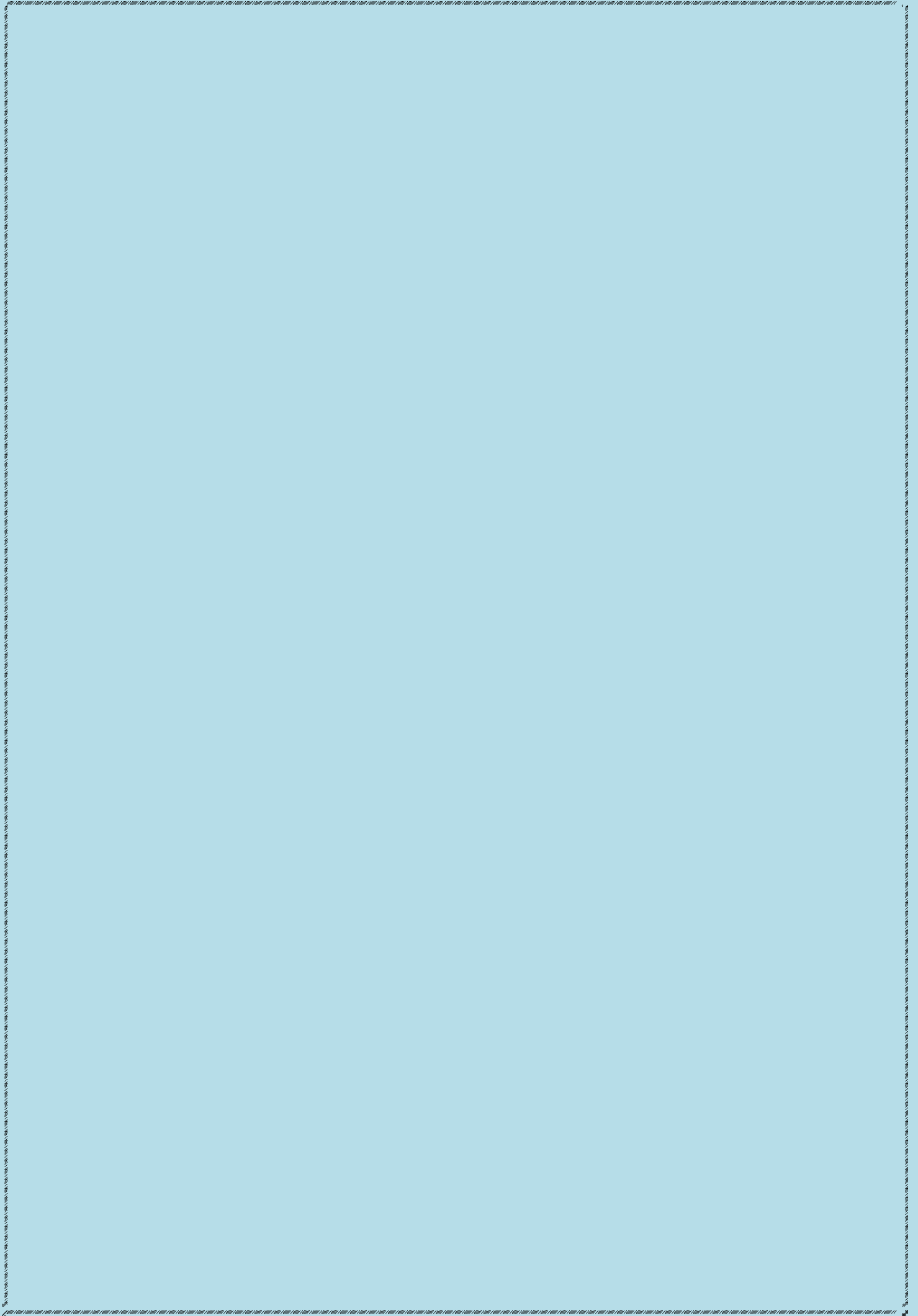
- Steps in the installation of CAS, Preparation of chart of accounts, Codification, and Hierarchy of account heads.
- Data entry, Data validation, and Data verification.
- Adjusting entries, Preparation of financial statements, Closing entries, and Opening entries.
- Security of CAS and Security features are generally available in CAS (Students are expected to understand and practice the entire accounting process using an accounting package.)

Unit III: Accounting Using Database Management System (DBMS)

- Concepts of DBMS. Objects in DBMS: Tables, Queries, Forms, Reports.
- Creating data tables for accounting.
- Using queries, forms, and reports for generating accounting information. Applications of DBMS in generating accounting information such as shareholders' records, sales reports, customers' profiles, suppliers' profiles payroll, employees' profiles, and petty cash registers.

Unit IV: Accounting Applications of Electronic Spreadsheets

- Concept of an Electronic Spreadsheet (ES).
- Features offered by Electronic Spreadsheet.
- Applications of Electronic Spreadsheet in generating accounting information, preparing depreciation schedules, loan repayment schedules, payroll accounting, and other such.



AGRICULTURE (302)

AGRICULTURE

(302)

Syllabus

AGRICULTURE (302)

Note:

There will be one Question Paper which will have 28 questions out of which 25 questions need to be attempted.

Unit-1: Agrometeorology, Genetics and Plant Breeding, Biochemistry and Microbiology

Agrometeorology: Elements of Weather-rainfall, temperature, humidity, wind velocity, Sunshine weather forecasting, climate change in relation to crop production.

Genetics & Plant Breeding :

- (a) Cell and its structure, cell division-mitosis and meiosis and their significance
- (b) The organization of the genetic materials in chromosomes, DNA, and RNA (c) Mendel's laws of inheritance. Reasons for the success of Mendel in his experiments, Absence of linkage in Mendel's experiments. (d) Quantitative inheritance, continuous and discontinuous variation in plants. (e) Monogenic and polygenic inheritance. (f) Role of Genetics in Plant breeding, self and cross-pollinated crops, methods of breeding in field crops-introduction, selection, hybridization, mutation and polyploidy, tissue and cell culture. (g) Plant Biotechnology-definition and scope in crop production.

Biochemistry: pH and buffers, Classification and nomenclature of carbohydrates; proteins; lipids; vitamins, and enzymes.

Microbiology: Microbial cell structure, Micro-organisms- Algae, Bacteria, Fungi, Actinomycetes, Protozoa, and Viruses. Role of micro-organisms in respiration, fermentation, and organic matter decomposition

Unit-2: Livestock Production

Scope and importance : (a) Importance of livestock in agriculture and industry, the White Revolution in India. (b) Important breeds Indian and exotic, distribution of cows, buffaloes, and poultry in India.

Care and management : (a) Systems of cattle and poultry housing (b) Principles of feeding, and feeding practices.

Balanced ration definition and ingredients. (d) Management of calves, bullocks, pregnant and milch animals as well as chicks, cockrels and layers, and poultry. (e) Signs of sick animals, symptoms of common diseases in cattle and poultry, Rinderpest, black quarter, foot and mouth, mastitis and haemorrhagic septicemia, coccidiosis, Fowl pox and Ranikhet disease, their prevention, and control.

Artificial Insemination: Reproductive organs, collection, dilution, and preservation of semen and artificial insemination, the **role of artificial insemination in cattle improvement. Livestock**

Products: Processing and marketing of milk and Milk products.

AGRICULTURE (302)

Unit-3: Crop Production

Introduction : (a) Targets and achievements in foodgrain production in India since independence and its future projections, sustainable crop production, commercialization of agriculture, and its scope in India. (b) Classification of field crops based on their utility-cereals, pulses, oils seeds, fiber, sugar, and forage crops.

Soil, Soil fertility, Fertilizers, and Manures: (a) Soil, soil pH, Soil texture, soil structure, soil organisms, soil tilth, soil fertility, and soil health. (b) Essential plant nutrients, their functions, and deficiency symptoms. (c) Soil types of India and their characteristics. (d) Organic manure, common fertilizers including straight, complex, fertilizer mixtures and biofertilizers; integrated nutrient management system.

Irrigation and Drainage: (a) Sources of irrigation (rain, canals, tanks, rivers, wells, tubewells). (b) Scheduling of irrigation based on critical stages of growth, time interval, soil moisture content, and weather parameters. (c) Water requirement of crops. (d) Methods of irrigation and drainage. (e) Watershed management

Weed Control: Principles of weed control, methods of weed control (cultural, mechanical, chemical, biological, and Integrated weed management).

Crops: Seedbed preparation, seed treatment, time and method of sowing/planting, seed rate; dose, method, and time of fertilizer application, irrigation, intercultural and weed control; common pests and diseases, caused by bacteria, fungi virus, and nematode, and their control, integrated pest management, harvesting, threshing, post-harvest technology: storage, processing, and marketing of major field crops-Rice, wheat, maize, sorghum, pearl millet, groundnut, mustard, pigeon-pea, gram, sugarcane, cotton, and berseem.

Unit-4: Horticulture

- (a) Importance of fruits and vegetables in the human diet, Crop diversification & Processing Industry. (b) Orchard- location and layout, ornamental gardening, and kitchen garden. (c) Planting system, training, pruning, intercropping, protection *from frost* and sunburn. (d) Trees, shrubs, climbers, annuals, perennials-definition, and examples. Propagation by seed, cutting, budding, layering, and grafting. (e) Cultivation practices, processing, and marketing of (i) Fruits - mango, papaya, banana, guava, citrus, grapes. (ii) Vegetables - Radish, carrot, potato, onion, cauliflower, brinjal, tomato, spinach, and cabbage. (iii) Flowers - Gladiolus, canna, chrysanthemums, roses and marigold. (f) Principles and methods of fruit and vegetable preservation. (g) Preparation of jellies, jams, ketchup, chips, and their packing.

ANTHROPOLOGY (303)

Syllabus

ANTHROPOLOGY (303)

Note:

There will be one Question Paper which will have 28 questions out of which 25 questions need to be attempted.

Unit-1: Physical Anthropology:

- (i) Preliminary knowledge of Human genetics. Mendel's Laws of Heredity Monohybrid and Dihybrid Ratio.
- (ii) Definition of Race and Racial criteria, the significance of skin colour, Eye form and colour, Head form, and ABO blood groups as racial criteria.
- (iii) Racial classification, distinctive physical features, and geographical distribution of the major racial groups of man: Caucasoid, Mongoloid, Negroid, and Australoid.

Unit-2: Prehistoric Archaeology:

- (i) Tool Making: Techniques of manufacturing core and flake tools, primary and secondary flaking, pressure flaking, grinding, and polishing. Materials used in making prehistoric tools.
- (ii) Tool families: Pebble tools, Hand axes, Cleavers, Scrapers, Microliths, Points, Blades, Awl, Gravers, Celts, Sickles, Spearhead, Arrowhead, and Bone tools.
- (iii) Prehistoric Cultures: A brief outline of the following prehistoric cultures of the Paleolithic, Mesolithic, and Neolithic periods-
- (iv) A comparative study of the salient features of Paleolithic and Neolithic cultures.

Unit-3: Material Culture and Economic Anthropology :

- (i) Economic life: meaning and aspects, characteristic features of the primitive or simple economic system.
- (ii) Subsistence economy: domestication of animals-pastoralism, agriculture-shifting cultivation, horticulture, terrace cultivation, and plough cultivation.
- (iii) A brief outline of the methods of hunting, fishing, and agriculture with reference to Various communities of North East India as far as practicable.

Unit-4: Social Anthropology and Ethnography :

A: Social Anthropology :

- (i) Family: Definition, forms, and types: nuclear family, joint family, a family of orientation, a family of procreation, monogamous, and polygamous (polygynous and polyandrous).
- (ii) Clustered relationship in a nuclear family.
- (iii) Rules of residence: Patrilocal, matrilocal, neolocal, avunculocal, bi-local, matripatri local. Rules of descent: Patrilineal and matrilineal descent.
- (iv) Functions of family, social nature of family.

B: Ethnography :

- (i) A brief outline of the land and people of North-East India.
- (ii) Study of material culture and economic life of the following communities
- (iii) The Garo: Shifting or Jhum cultivation.
- (iv) The Mishing: Plough cultivation
- (v) A study of the social organization of the Ao Naga and the Apatani.

ANTHROPOLOGY (303)

Unit-5: Ecology :

- (i) Meaning and definition of ecology and environment.
- (ii) Elements of the environment: Solid, liquid, and gas.
- (iii) Physical or abiotic environment, biological or biotic environment, and sociocultural environment.
- (iv) Man as the main agent to disturb the ecological balance.

FINE ARTS (312)

**(Painting, Sculpture,
Graphics, and
Commerical Arts)**

Syllabus

Note:

There will be one Question Paper which will have 28 questions out of which 25 questions need to be attempted.

FINE ARTS (312)

PAINTING

Unit 1: The Rajasthani and Pahari Schools of Miniature Painting

Unit 2: The Mughal and Deccan Schools of miniature painting

Unit 3: The Bengal School and Cultural Nationalism

Unit 4: The Modern Trends in Indian Art

Unit 1: The Rajasthani and Pahari Schools of Miniature Painting (16th Century A.D to 19th Century A.D.)

Introduction to Indian Miniature Schools: Western-Indian, Pala, Rajasthani, Mughal, Central India, Deccan, and Pahari.

(A) *The Rajasthani Schools*

1. Origin and development of the following schools in brief:
Mewar, Bundi, Bikaner, Kishangarh, and Jaipur, and the main features of the Rajasthani schools.
2. Study of the following Rajasthani paintings:

Title / Set / Painter	School
• A Folio from Ramayana paintings of Sahibdin	Mewar
• One Court scene Hunting scene or Festival scene	Mewar Jagat Singh II
• One Folio from Ragamala or Rasikapriya	Bundi
• One painting of a Hunting Scene in a Forest Maharaja	Kotah with Kotah
• Radha (Bani-Thani) by Nihal Chand	Kishangarh
• Pabuji Ki Phad, Folk Scroll painting	Bhilwara

(B) The Pahari Schools:

1. Origin and development of Basohli, Guler, and Kangra schools in brief and main features of the Pahari schools
2. Study of the following Pahari Paintings:

Title / Set / Painter	School
• One Folio of Ramayana (Sangri – Early Phase)	Basohli
• One Folio of Gita Govinda of Jaideva by Manaku	Guler
• One Krishna Lila or Bhagavata Purana Sukh	Kangra Folio by Nain
• One painting from Nayaka Nayika Baramasa or Ragamala	Guler or Kangra or
• Krishna with Gopis	Basohli
• Nand, Yashoda, and Krishna with Kinsmen Going to Vrindavana	Kangra

Unit 2: The Mughal and Deccani Schools of Miniature Painting (16th Century A.D. to 19th Century A.D.)

1. The Mughal School

1. Origin and development of the Mughal School in brief and main features of the Mughal School
2. Study of the following Mughal Paintings:

Title	Painter	School
• A Folio from Akbar Namah	Basawan	Akbar
• Baber Crossing the river Sone	Jagannath	Akbar
• Jahangir holding the picture	Abul Hassan	Jahangir
• Falcon on Bird-Rest	Ustad Mansoor	Jahangir
• Kabir and Raidas	Ustad Faqirullah Khan	Shajahan
• Marriage procession of Dara Shikoh	Haji Madni	Provincial Mughal (Oudh)

2. The Deccani School

1. Origin and development of the Deccani School and Main features of the Deccan School.

2. Study of the following Deccani Paintings:

- | | |
|---|------------|
| a. Ibrahim AdilShah II of Bijapur | Bijapur |
| b. Raga Hindola | Ahmednagar |
| c. Ragini Pat-hamsika | Ahmednagar |
| d. Hazrat Nizamuddin Auliya and Amir Khusro | Hyderabad |
| e. Chand Bibi Playing Polo (Chaugan) | Golconda |

Unit 3: The Bengal School and Cultural Nationalism

- New Era in Indian Art Introduction

• Study of the following paintings:

- | | |
|---|-----------------------|
| (i) Rama Vanquishing the Pride of the Ocean | Raja Ravi Verma |
| (ii) Journey's End | Rabindranath Tagore |
| (iii) Parthasarathy | Nandlal Bose |
| (ii) Ghalib's Poetry Painting based on | M.A.R. Chughtai |
| (iii) Select a cubistic painting | Gaganendranath Tagore |
| (iv) Mother and child | Jamini Roy |
| (v) Female Face | Rabindranath Tagore |
| (vi) Hill Women | Amrita Sher Gill |
- National flag and the Symbolic significance of its forms and colours.
 - Contribution of Indian Artists in the Struggle for National Freedom Movement
 - Tiller of the Soil-Nandlal Bose.

Unit 4: The Modern Trends in Indian Art Introduction

S.No	Painting	Artist/Painter
i.	Mother Teresa	M.F. Hussain
ii.	Birth of Poetry	K.K. Hebbar
iii.	Gossip	N.S. Bendre
iv.	Tantric Painting	G.R. Santosh
v.	Words and images	K.C.S. Pannikar

vi.	Rama Vanquishing the Pride of the Ocean	Raja Ravi Varma
vii.	Mother and child	Jamini Roy
viii.	Haldi Grinders	Amrita Sher Gil
ix.	Mother Teresa	M.F. Husain
x.	The Vulture	Kamlesh Dutt Pande

Sculpture

Study of the following sculptures:

(i)	Triumph of Labour	D. P. Roychowdhury
(ii)	Santhal Family	Ramkinker Vajj
(iii)	Standing Woman	Dhanraj Bhagat
(iv)	Cries Unheard	Amar, Nath Sehgal
(v)	Ganesha Figure	P.V.Jankiram
(vi)	Dhanpal	Sankho Chaudhuri
(vii)	Chatturmukhi	Aekka Yada Giri Rao

Graphic-Prints

(i)	Whirlpool	Krishna Reddy
(ii)	Children	Somnath Hore
(iii)	Devi	Jyoti Bhatt
(iv)	Of walls	Anupam Sud
(v)	Man, Woman and Tree	K. Laxma Goud

BIOLOGY/BIOLOGICAL STUDIES/BIOTECHNOLOGY/BIOCHEMISTRY-304

**BIOLOGY/BIOLOGICAL
STUDIES/BIOTECHNOLOGY/
BIOCHEMISTRY**

Syllabus

Note:

There will be one Question Paper which will have 28 questions out of which 25 questions need to be attempted.

BIOLOGY/BIOLOGICAL STUDIES/BIOTECHNOLOGY/BIOCHEMISTRY

Unit I: Reproduction

Salient features and classification of animals- non-chordate up to phyla level and chordate up to class level (three to five salient features and at least two examples). Reproduction in organisms: Reproduction, a characteristic feature of all organisms for continuation of species; Modes of reproduction – Asexual and sexual; Asexual reproduction; Modes- Binary fission, sporulation, budding, gemmule, fragmentation; vegetative propagation in plants.

Sexual reproduction in flowering plants: Flower structure; Development of male and female gametophytes; Pollination–types, agencies, and examples; Outbreedings devices; Pollen-Pistil interaction; Double fertilization; Post fertilization events– Development of endosperm and embryo, Development of seed and formation of fruit; Special modes– apomixis, parthenocarpy, polyembryony; Significance of seed and fruit formation.

Human Reproduction: Male and female reproductive systems; Microscopic anatomy of testis and ovary; Gametogenesis- spermatogenesis & oogenesis; Menstrual cycle; Fertilization, embryo development upto blastocyst formation, implantation; Pregnancy and placenta formation (Elementary idea); Parturition (Elementary idea); Lactation (Elementary idea).

Reproductive health: Need for reproductive health and prevention of sexually transmitted diseases (STD); Birth control- Need and Methods, Contraception and Medical Termination of Pregnancy (MTP); Amniocentesis; Infertility and assisted reproductive technologies – IVF, ZIFT, GIFT (Elementary idea for general awareness).

Unit II: Genetics and Evolution

Heredity and variation: Mendelian Inheritance; Deviations from Mendelism– Incomplete dominance, Co-dominance, Multiple alleles and Inheritance of blood groups, Pleiotropy; Elementary idea of polygenic inheritance; Chromosome theory of inheritance; Chromosomes and genes; Sex determination– In humans, birds, honey bee; Linkage and crossing over; Sex linked inheritance- Haemophilia, Colour blindness; Mendelian disorders in humans– Thalassaemia; Chromosomal disorders in humans; Down's syndrome, Turner's and Klinefelter's syndromes.

Molecular Basis of Inheritance: Search for genetic material and DNA as genetic material; Structure of DNA and RNA; DNA packaging; DNA replication; Central dogma; Transcription, genetic code, translation; Gene expression and regulation– Lac Operon; Genome and human genome project; DNA fingerprinting.

Evolution: Origin of life; Biological evolution and evidences for biological evolution (Paleontological, comparative anatomy, embryology and molecular evidence); Darwin's contribution, Modern Synthetic theory of Evolution; Mechanism of evolution– Variation (Mutation and Recombination) and Natural Selection with examples, types of natural selection; Gene flow and genetic drift; Hardy-Weinberg's principle; Adaptive Radiation; Human evolution

BIOLOGY/BIOLOGICAL STUDIES/BIOTECHNOLOGY/BIOCHEMISTRY-304

Unit III: Bioloy and Human Welfare

Health and Disease: Pathogens; parasites causing human diseases (Malaria, Filariasis, Ascariasis, Typhoid, Pneumonia, common cold, amoebiasis, ring worm); Basic concepts of immunology– vaccines; Cancer, HIV and AIDs; Adolescence, drug, and alcohol abuse.

Improvement in food production: Plant breeding, tissue culture, single cell protein, Biofortification; Apiculture and Animal husbandry.

Microbes in human welfare: In household food processing, industrial production, sewage treatment, energy generation and as biocontrol agents and biofertilizers

Unit IV: Biotechnology and Its Applications

Principles and process of Biotechnology: Genetic engineering (Recombinant DNA technology).

Application of Biotechnology in health and agriculture: Human insulin and vaccine production, gene therapy; Genetically modified organisms- Bt crops; Transgenic Animals; Biosafety issues– Biopiracy and patents

Unit V: Human Physiology

Organisms and environment: Habitat and niche; Population and ecological adaptations; Population interactions–mutualism, competition, predation, parasitism; Population attributes–growth, birth rate and death rate, age distribution.

Ecosystems: Patterns, components; productivity and decomposition; Energy flow; Pyramids of number, biomass, energy; Nutrient cycling (carbon and phosphorous); Ecological succession; Ecological Services– Carbon fixation, pollination, oxygen release.

Biodiversity and its conservation: Concept of Biodiversity; Patterns of Biodiversity; Importance of Biodiversity; Loss of Biodiversity; Biodiversity conservation; Hotspots, endangered organisms, extinction, Red Data Book, biosphere reserves, National parks, and sanctuaries.

Environmental issues: Air pollution and its control; Water pollution and its control; Agrochemicals and their effects; Solid waste management; Radioactive waste management; Greenhouse effect and global warming; Ozone depletion; Deforestation; Any three case studies as success stories addressing environmental issues.

BUSINESS STUDIES - 305

**BUSINESS STUDIES - 305
SYLLABUS**

BUSINESS STUDIES – 305

Note:

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Principles and Functions of Management

Unit I: Nature and Significance of Management

- Management – concept, objectives, importance.
- Nature of management; Management as Science, Art, Profession.
- Levels of management – top, middle supervisory (First level).
- Management functions – planning, organizing, staffing, directing, and controlling.
- Coordination – nature, and importance.

Unit II: Principles of Management

- Principles of Management – meaning, nature, and significance.
- Fayol’s principles of management.
- Taylor’s Scientific Management – Principles and Techniques.

Unit III: Business Environment

- Business Environment – meaning and importance.
- Dimensions of Business Environment – Economic, Social, Technological, Political, and Legal.
- Economic Environment in India; Impact of Government Policy Changes on Business and Industry, with special reference to the adoption of the policies of liberalization privatization, and globalization.

Unit IV: Planning

- Meaning, features, importance, and limitations.
- Planning process.
- Types of Plans – Objectives, Strategy, Policy, Procedure, Method, Rule, Budget, Programme

Unit V: Organising

- Meaning and importance.
- Steps in the process of organizing.
- Structure of organization – functional, and divisional.
- Formal and informal organization.
- Delegation: meaning elements and importance.
- Decentralization: meaning and importance.
- Difference between delegation and decentralization.

Unit VI: Staffing

- Meaning, need, and importance of staffing.
- Staffing as a part of Human Resources Management.
- Steps in the staffing process.
- Recruitment – meaning and sources.
- Selection – meaning and process.
-
- Training and Development – meaning, need, methods – on-the-job and off-the-job methods

BUSINESS STUDIES - 305

of training.

Unit VII: Directing

- Meaning, importance, and principles.
- Elements of Direction:
 - Supervision – meaning and importance
 - Motivation – meaning and importance, Maslow’s hierarchy of needs; Financial and non-financial incentives.
 - Leadership – meaning, importance; qualities of a good leader.
 - Communication – meaning and importance, formal and informal communication; barriers

to effective communication.

Unit VIII: Controlling

- Meaning and importance.
- Relationship between planning and controlling.
- Steps in the process of control.
- Techniques of controlling.

Business Finance and Marketing

Unit IX: Business Finance

- Business finance – meaning, role, objectives of financial management.
- Financial planning – meaning and importance.
- Capital Structure – meaning and factors.
- Fixed and Working Capital – meaning and factors affecting their requirements.

Unit X: Financial Markets

- Concept of Financial Market: Money Market – natural instruments;
- Capital market: nature and types – primary and secondary market.
- The distinction between capital market and money market.
- Stock Exchange – meaning, functions, NSEI, OTCI, Trading Procedure.
- Securities and Exchange Board of India (SEBI) – Objectives, Functions.

Unit XI: Marketing

- Marketing – meaning, functions, role.
- The distinction between marketing and selling.
- Marketing mix – concept and elements:
 - Product – nature, classification, branding, labeling, and packaging
 - Physical distribution: meaning, role; Channels of distribution, – meaning, types, factors, determining the choice of channels.
 - Promotion – meaning and role, promotion mix, Role of Advertising and personal selling; objections to Advertising.
 - Price: factors influencing pricing.

Unit XII: Consumer Protection

- Importance of consumer protection.
- Consumer rights.
- Consumer responsibilities.
- Ways and means of consumer protection – Consumer awareness and legal redressal with special reference to the Consumer Protection Act.
- Role of consumer organizations and NGOs.

Unit XIII: Entrepreneurship Development

- Concept, Functions, and Need.
- Entrepreneurship Characteristics and Competencies.
- Process of Entrepreneurship Development.
- Entrepreneurial Values, Attitudes, and Motivation – Meaning and Concept.

Chemistry - 306

Syllabus

Note:

There will be one Question Paper which will have 28 questions out of which 25 questions need to be attempted.

CHEMISTRY - 306

Unit I: Solid State

Classification of solids based on different binding forces: molecular, ionic covalent, and metallic solids, amorphous and crystalline solids (elementary idea), unit cell in two-dimensional and three-dimensional lattices, calculation of density of unit cell, packing in solids, packing efficiency, voids, number of atoms per unit cell in a cubic unit cell, point defects, electrical and magnetic properties, Band theory of metals, conductors, semiconductors and insulators and *n* and *p*-type semiconductors.

Unit II: Solutions

Types of solutions, expression of concentration of solutions of solids in liquids, the solubility of gases in liquids, solid solutions, colligative properties – the relative lowering of vapour pressure, Raoult's law, elevation

of B.P., depression of freezing point, osmotic pressure, determination of molecular masses using colligative properties, abnormal molecular mass, Vant Hoff factor.

Unit III: Electrochemistry

Redox reactions; conductance in electrolytic solutions, specific and molar conductivity variations of conductivity with concentration, Kohlrausch's Law, electrolysis and laws of electrolysis (elementary idea), dry cell – electrolytic cells and Galvanic cells; lead accumulator, EMF of a cell, standard electrode potential, Nernst equation and its application to chemical cells. Relation between Gibbs energy change and EMF of a cell, fuel cells; corrosion.

Unit IV: 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 specific rate constant, integrated rate equations, and half-life (only for zero and first-order reactions); the concept of collision theory (elementary idea, no mathematical treatment). Activation energy, Arrhenius equation.

Unit V: Surface Chemistry

Adsorption – physisorption and chemisorption; factors affecting adsorption of gases on solids; catalysis: homogenous and heterogeneous, activity and selectivity: enzyme catalysis; colloidal state: the distinction between true solutions, colloids, and suspensions; lyophilic, lyophobic multimolecular and macromolecular colloids; properties of colloids; Tyndall effect, Brownian movement, electrophoresis, coagulation; emulsions – types of emulsions.

Unit VI: General Principles and Processes of Isolation of Elements

Principles and methods of extraction – concentration, oxidation, reduction electrolytic method, and refining; occurrence and principles of extraction of aluminum, copper, zinc, and iron.

Unit VII: *p*-Block Elements

Group 15 elements: General introduction, electronic configuration, occurrence, oxidation states, trends in physical and chemical properties; nitrogen – preparation, properties, and uses; compounds of nitrogen: preparation and properties of ammonia and nitric acid, oxides of nitrogen (structure only); Phosphorous-allotropic forms; compounds of phosphorous: preparation and properties of phosphine, halides (PCl₃, PCl₅), and oxoacids (elementary idea only).

Group 16 elements: General introduction, electronic configuration, oxidation states, 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 sulphur dioxide; sulphuric acid: industrial process of manufacture, properties and uses, oxoacids 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 VIII: d and f Block Elements

General introduction, electronic configuration, occurrence and characteristics of transition metals, general trends in properties of the first-row transition metals – metallic character, ionization enthalpy, oxidation states, 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.

Unit IX Coordination Compounds

Coordination compounds: Introduction, ligands, coordination number, colour, magnetic properties and shapes, IUPAC nomenclature of mononuclear coordination compounds, bonding, Werner's theory VBT, CFT; isomerism (structural and stereo) importance of coordination compounds (in qualitative analysis, extraction of metals and biological systems).

Unit X: Haloalkanes and Haloarenes

Haloalkanes: Nomenclature, nature of C-X bond, physical and chemical properties, mechanism of substitution reactions. Optical rotation.

Haloarenes: Nature of C-X bond, substitution reactions (directive influence of halogen for monosubstituted compounds only).

Uses and environmental effects of – dichloromethane, trichloromethane, tetrachloromethane, iodoform, freons, DDT.

Unit XI: Alcohols, Phenols, and Ethers

Alcohols: Nomenclature, methods of preparation, physical and chemical properties (of primary alcohols only); identification of primary, secondary, and tertiary alcohols; mechanism of dehydration, uses, with special reference to methanol and ethanol.

Phenols: Nomenclature, methods of preparation, physical and chemical properties, acidic nature of phenol, electrophilic substitution reactions, uses of phenols.

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

Unit XII: Aldehydes, Ketones, and Carboxylic Acids

Aldehydes and Ketones: Nomenclature, nature of carbonyl group, methods of preparation, physical and chemical properties, mechanism of nucleophilic addition, the reactivity of alpha hydrogen in aldehydes; uses.

Carboxylic Acids: Nomenclature, acidic nature, methods of preparation, physical and chemical properties; uses.

Unit XIII: Organic Compounds Containing Nitrogen

Amines: Nomenclature, classification, structure, methods of preparation, physical and chemical properties, uses, and identification of primary secondary, and tertiary amines.

Cyanides and Isocyanides – will be mentioned at relevant places in context.

Diazonium salts: Preparation, chemical reactions, and importance in synthetic organic chemistry.

Unit XIV: Biomolecules

Carbohydrates – Classification (aldoses and ketoses), monosaccharide (glucose and fructose), D-L configuration, oligosaccharides (sucrose, lactose, maltose), polysaccharides (starch, cellulose, glycogen): importance.

Proteins - Elementary idea of α -amino acids, peptide bonds, polypeptides, proteins, primary structure, secondary structure, tertiary structure, and quaternary structure (qualitative idea only), denaturation of proteins; enzymes.

***Hormones* –Elementary idea (excluding structure).**

Vitamins – Classification and functions.

Nucleic Acids: DNA and RNA

Unit XV: Polymers

Classification – Natural and synthetic, methods of polymerization (addition and condensation), copolymerization. Some important polymers: are natural and synthetic like polythene, nylon, polyesters, bakelite, and rubber. Biodegradable and non-biodegradable polymers.

Unit XVI: Chemistry in Everyday Life

1. Chemicals in medicines – analgesics, tranquilizers, antiseptics, disinfectants, antimicrobials, antifertility drugs, antibiotics, antacids, and antihistamines.
2. Chemicals in food – preservatives, artificial sweetening agents, **elementary idea of antioxidants.**
3. Cleansing agents – soaps and detergents, cleansing action.

Computer Science/ Informatics Practices - 308 Syllabus

Computer Science/Informatics Practices

- 308

Note:

There will be one Question Paper which will contain Two Sections i.e. Section A and Section B [B1 and B2].

Section A will have 10 questions covering both i.e. Computer Science/Informatics Practices which will be compulsory for all candidates.

Candidates are required to choose either B1 or B2 according to their choice.

Section B1 will have 18 questions from Computer Science out of which 15 questions are to be attempted.

Section B2 will have 18 questions purely from Informatics out of which 15 questions are to be attempted.

In total, candidate has to attempt 25 questions.

Section A

Exception and File Handling in Python

Exception Handling: syntax errors, exceptions, need for exception handling, user-defined exceptions, raising exceptions, handling exceptions, catching exceptions, Try - except - else clause, Try - finally clause, recovering and continuing with finally, built-in exception classes.

File Handling: text file and binary file, file types, open and close files, reading and writing text files, reading and writing binary files using pickle module, file access modes.

Database Concepts

Introduction to database concepts, the difference between database and file system, relational data model: the concept of the domain, tuple, relation, keys - candidate key, primary key, alternate key, foreign key;

Relational algebra: selection, projection, union, set difference, and cartesian product;

Structured Query Language

Advantages of using Structured Query Language, Data Definition Language, Data Query Language, and Data Manipulation Language, Introduction to MySQL, Creating a database using MySQL, Data Types

Data Definition: CREATE TABLE, DROP TABLE, ALTER TABLE,

Data Query: SELECT, FROM, WHERE

Data Manipulation: INSERT, UPDATE, DELETE

Math functions: POWER (), ROUND (), MOD ().

Text functions: UCASE ()/UPPER (), LCASE ()/LOWER (), MID ()/SUBSTRING ()/SUBSTR (), LENGTH (), LEFT (), RIGHT (), INSTR (), LTRIM (), RTRIM (), TRIM ().

Date Functions: NOW (), DATE (), MONTH (), MONTHNAME (), YEAR (), DAY (), DAYNAME ().

Aggregate Functions: MAX (), MIN (), AVG (), SUM (), COUNT (); using COUNT (*). Querying and manipulating data using Group by, Having, and Order by.

Operations on Relations - Union, Intersection, Minus, Cartesian Product, JOIN

Computer Networks

Introduction to computer networks, Evolution of networking,

Network types: LAN, WAN, MAN

Network devices: Modem, Ethernet Card, Repeater, Hub, Switch, Router, Gateway.

Network Topologies: Mesh, Ring, Bus, Star, and Tree topologies

The basic concept of MAC and IP Address

Difference between Internet and web

Section B1: Computer Science

Chapter 1: Exception and File Handling in Python

Exception Handling: syntax errors, exceptions, need for exception handling, user-defined exceptions, raising exceptions, handling exceptions, catching exceptions, Try - except - else clause, Try - finally clause, recovering and continuing with finally, built-in exception classes.

File Handling: text file and binary file, file types, open and close files, reading and writing text files, reading and writing binary files using pickle module, file access modes.

Chapter 2: Stack

Stack (List Implementation): Introduction to stack (LIFO Operations), operations on the stack (PUSH and POP), and its implementation in Python. Expressions in Prefix, Infix, and postfix notations, evaluating arithmetic expressions using stack, conversion of Infix expression to postfix expression

Chapter 3: Queue

Queue (List Implementation): Introduction to Queue (FIFO), Operations on Queue (INSERT and DELETE), and its implementation in Python.

Introduction to DQueue and its implementation in Python.

Chapter 4: Searching

Searching: Sequential search, Binary search, Analysis of Sequential and Binary Search. Dry run to identify best, worst, and average cases. Implementation of searching techniques in Python.

Chapter 5: Sorting

Overview of sorting techniques, Bubble Sort, Selection Sort, and Insertion Sort. Dry run to identify best, worst, and average cases. Implementation of sorting techniques in Python.

Hashing: Hash Functions, Collision Resolution, Implementing the Map Abstract Data Type.

Chapter 6: Understanding Data

Data and its purpose, collection, and organization; understanding data using statistical methods: mean, median, standard deviation, variance; data interpretation; visualization of data.

Chapter 7: Database Concepts

Introduction to database concepts, the difference between database and file system, relational data model: the concept of the domain, tuple, relation, keys - candidate key, primary key, alternate key, foreign key;

Relational algebra: selection, projection, union, set difference, and cartesian product;

Chapter 8: Structured Query Language

Advantages of using Structured Query Language, Data Definition Language, Data Query Language, and Data Manipulation Language, Introduction to MySQL, Creating a database using MySQL, Data Types

Data Definition: CREATE TABLE, DROP TABLE, ALTER TABLE,

Data Query: SELECT, FROM, WHERE

Data Manipulation: INSERT, UPDATE, DELETE

Math functions: POWER (), ROUND (), MOD ().

Text functions: UCASE ()/UPPER (), LCASE ()/LOWER (), MID ()/SUBSTRING ()/SUBSTR (), LENGTH (), LEFT (), RIGHT (), INSTR (), LTRIM (), RTRIM (), TRIM ().

Date Functions: NOW (), DATE (), MONTH (), MONTHNAME (), YEAR (), DAY (), DAYNAME ().

Aggregate Functions: MAX (), MIN (), AVG (), SUM (), COUNT (); using COUNT (*). Querying and manipulating data using Group by, Having, and Order by.

Operations on Relations - Union, Intersection, Minus, Cartesian Product, JOIN

Chapter 9: Computer Networks

Introduction to computer networks, Evolution of networking,

Network types: LAN, WAN, MAN

Network devices: Modem, Ethernet Card, Repeater, Hub, Switch, Router, Gateway.

Network Topologies: Mesh, Ring, Bus, Star, and Tree topologies

The basic concept of MAC and IP Address

Difference between Internet and web

Section B2: Informatics Practices

Chapter 1: Database Query using SQL

Math functions: POWER (), ROUND (), MOD ().

Text functions: UCASE ()/UPPER (), LCASE ()/LOWER (), MID ()/SUBSTRING ()/SUBSTR (),LENGTH (), LEFT (), RIGHT (), INSTR (), LTRIM (), RTRIM (), TRIM ().

Date Functions: NOW (), DATE (), MONTH (), MONTHNAME (), YEAR (), DAY (), DAYNAME ().

Aggregate Functions: MAX (), MIN (), AVG (), SUM (), COUNT (); using COUNT (*).Querying and manipulating data using Group by, Having, and Order by.

Operations on Relations - Union, Intersection, Minus, Cartesian Product, JOIN

Chapter 2: Data Handling using Pandas – I

Introduction to Python libraries- Pandas, NumPy,

Matplotlib. Data structures in Pandas - Series and DataFrames.

Series: Creation of Series from – an array, dictionary, scalar value; mathematical operations; Head and Tail functions; Selection, Indexing, and Slicing.

DataFrames: creation - from the dictionary of Series, list of dictionaries, Text/CSV files; display; iteration; Operations on Rows and columns: add, select, delete, rename; Head and Tail functions; Indexing using Labels, Boolean Indexing; Styling & Formatting data, Head and Tail functions; Joining, Merging, and Concatenations.

Importing/Exporting Data between CSV files and DataFrames.

Chapter 3: Data Handling using Pandas – II

Descriptive Statistics: max, min, count, sum, mean, median, mode, quartile, Standard deviation, variance.

DataFrame operations: Aggregation, group by, Sorting, Deleting and Renaming Index, Pivoting.

Handling missing values – dropping and filling.

Importing/Exporting Data between MySQL database and Pandas.

Chapter 4: Plotting Data using Matplotlib

Purpose of plotting; drawing and saving the following types of plots using Matplotlib – line plot, bargraph, histogram, pie chart, frequency polygon, box plot, and scatter plot.

Customizing plots: color, style (dashed, dotted), width; adding label, title, and legend in plots.

Chapter 5: Introduction to Computer Networks

Introduction to Networks, Types of networks: LAN, MAN, WAN.

Network Devices: modem, hub, switch, repeater, router, gateway

Network Topologies: Star, Bus, Tree, Mesh.

Introduction to Internet, URL, WWW, and its applications- Web, email, Chat, VoIP.

Website: Introduction, the difference between a website and a webpage, static vs dynamic web page, webserver, and hosting of a website.

Web Browsers: Introduction, commonly used browsers, browser settings, add-ons and plug-ins, cookies.

Chapter 6: Societal Impacts

Digital footprint, Etiquette for Net surfing and communicating through social media, data protection, Intellectual Property Rights (IPR) and their violation, plagiarism licensing and copyrights, Free and Open Source Software (FOSS), Cybercrime and cyber laws, hacking,

phishing, cyberbullying, Overview of Indian IT Act, preventing cybercrime.

E-waste, its hazard, and management

Awareness about health concerns related to the usage of technology like effects on eyesight, physiological issues, and ergonomic aspects.

Chapter 10: Data Communication

Concept of communication, Types of Data Communication, switching techniques

Communication Media: Wired Technologies – Twisted pair cable, Co-axial cable, Ethernet Cable, Optical Fibre;

Introduction to mobile telecommunication technologies

Wireless Technologies – Bluetooth, WLAN, Infrared,

Microwave

Network Protocol: Need for Protocol, Categorization, and Examples of protocol, HTTP, FTP, IP, PPP; electronic mail protocol

Concept of Channel, Bandwidth (Hz, KHz, MHz), and Data Transfer rate (bps, Kbps, Mbps, Gbps, Tbps)

Chapter 11: Security Aspects

Threats and prevention: Viruses, Worms, Trojan horses, Spam, Cookies, Adware, Firewall, http vs https

Network Security Concepts: Firewall, Cookies, Hackers and Crackers

Antivirus and their workings

Network security threats: Denial of service, Intrusion problems, Snooping, Eavesdropping

**ECONOMICS /
BUSINESS
ECONOMICS-309
Syllabus for Class 12**

ECONOMICS/BUSINESS ECONOMICS-309

Note:

There will be one Question Paper which will have 28 questions out of which 25 questions need to be attempted.

Unit I: Introduction to Microeconomics

- What is microeconomics?
- Central problems

Unit II: Consumer Behaviour and Demand

- **Consumer's Equilibrium:** meaning and attainment of equilibrium through Utility Approach: One and two commodity cases.
- **Demand:** market demand, determinants of demand, demand schedule, demand curve, movement along and shifts in the demand curve, price elasticity of demand, measurement of price elasticity of demand – percentage, total expenditure, and geometric methods

Introductory Macroeconomics

Unit III: National Income and Related Aggregates — Basic Concepts and Measurement

- Macroeconomics: meaning.
- Circular flow of income, concepts of GDP, GNP, NDP, NNP (at market price and factor cost).
- Measurement of National Income – Value Added method, Income method, and Expenditure method.

Unit IV: Determination of Income and Employment

- Aggregate demand, aggregate supply, and their components
- Propensity to consume and propensity to save (average and marginal)
- Meaning of involuntary unemployment and full employment
- Determination of income and employment: two-sector model
- Concept of investment multiplier and its working
- Problems of excess and deficient demand
- Measures to correct excess and deficient demand – availability of credit, change in government spending

Unit V: Money and Banking

- Money: meaning, evolution, and Functions
- Central Bank: meaning and functions
- Commercial banks: meaning and functions

Unit VI: Government Budget and the Economy

- Government budget – meaning and its components
- Objectives of government budget
- Classification of receipts – revenue and capital; classification of expenditure – revenue and capital, plan and non-plan, and developmental and non-developmental

- Balanced budget, surplus budget, and deficit budget: meaning and implications
- Revenue deficit, fiscal deficit, and primary deficit: meaning and implications; measures to contain different deficits.

Unit VII: Balance of Payments

- Foreign exchange rate – meaning (fixed and flexible), merits and demerits; determination through demand and supply
- Balance of payments accounts – meaning and components
- A brief analysis of recent exchange rate issues

INDIAN ECONOMIC DEVELOPMENT

Unit VIII: Development Experience (1947-90) and Economic Reforms since 1991

A brief introduction of the state of the Indian economy on the eve of independence. Indian economic system and common goals of Five-year Plans.

Main features, problems, and policies of agriculture (institutional aspects and new agricultural strategy), industry (IPR 1956; SSI – role & importance), and foreign trade.

Unit IX: Current Challenges Facing the Indian Economy

Poverty – absolute and relative; Main programmes for poverty alleviation: A critical assessment;

Human Capital Formation – How many people become resource; Role of human capital in economic development;

Rural development: Key issues – credit and marketing – the role of cooperatives; agricultural diversification;

Employment: Growth and changes in the workforce participation rate in formal and informal sectors; problems and policies

Infrastructure: Meaning and Types: Case Studies: Health: Problems and Policies – A critical assessment;

Sustainable Economic Development: Meaning, Effects of Economic Development on Resources and Environment, including global warming

Unit X: Development Experience in India

- A comparison with neighbours
- India and Pakistan
- India and China
- Issues: economic growth, population, sectoral development, and other Human Development Indicators

ENGINEERING GRAPHICS-310

ENGINEERING GRAPHICS (310)

Syllabus

ENGINEERING GRAPHICS-310

Note:

There will be one Question Paper which will have 28 questions out of which 25 questions need to be attempted.

ISOMETRIC PROJECTION OF SOLIDS

Unit 1: Construction of isometric scale showing main divisions of 10mm and smaller divisions of 1mm, also showing the leading angles.

Isometric projection (drawn to isometric scale) of solids such as cubes; regular prisms and pyramids (triangular, square, pentagonal, and hexagonal); cone; cylinder; sphere; hemisphere; keeping the base side of the solid parallel or perpendicular to HP/VP. The axis of the solid should be either perpendicular to HP / VP or parallel to HP and VP.

ISOMETRIC PROJECTION OF SOLIDS

Unit 2: Combination of any two above-mentioned solids keeping the base side parallel or perpendicular to HP/VP and placed centrally together (the Axis of both the solids should not be given parallel to HP).

Machine Drawing (Machine Parts)

Unit 3: Drawing to full-size scale with instruments.

Introduction of threads: Standard profiles of screw threads - Square, Knuckle, B.S.W., Metric (external and internal); Bolts – Square head, Hexagonal head; Nuts – Square head, Hexagonal head; Plain washer; a combination of nut and bolt with or without a washer for assembling two parts together.

Machine Drawing (Machine Parts)

Unit 4: Free-hand sketches

Conventional representation of external and internal threads; Types of studs – Plain stud, Square-neck stud, Collar stud; Types of rivets – Snap head, Flat head, Pan head (without tapered neck), 60° Counter Sunk Flat head.

Machine Drawing (Assembly and Dis-assembly)

Unit 5: Bearings

- (i) Open-Bearing
- (ii) Bush- Bearing

Unit 6: Rod Joint:

- (i) Cotter joints for round rods (Sleeve and cotter joint)
- (ii) Cotter-joints for square rods (Gib and cotter-joint)

Unit 7: Tie-rod and Pipe-joint

- (i) Turnbuckle
- (ii) Flange pipe joints *are to be shown.*

ENTREPRENEURSHIP- 311

ENTREPRENEURSHIP

- 311

Syllabus

ENTREPRENEURSHIP- 311

Note:

There will be one Question Paper which will have 28 questions out of which 25 questions need to be attempted.

Unit 1: Entrepreneurial Opportunity

- Sensing Entrepreneurial Opportunities
- Environment Scanning
- Problem Identification
- Idea fields
- Spotting Trends
- Creativity and Innovation

Selecting the Right Opportunity

Unit 2: Entrepreneurial Planning

- Forms of business organization- Soleproprietorship, Partnership, Company
- Business Plan: concept, format.
- Components: Organizational plan; Operational plan; Production plan; Financial plan; Marketing plan;
Human Resource planning

Unit 3: Enterprise Marketing

- Marketing and Sales Strategy
- Branding, Logo, Tagline
Promotion Strategy

Unit 4: Enterprise Growth Strategies

- Franchising: Concept, types, advantages, limitations.
- Mergers and Acquisition: Concept, reasons, types.

ENTREPRENEURSHIP- 311

Unit 5: Business Arithmetic

- Computation of Working Capital
- Inventory Control and EOQ
- Return on Investment (ROI) and Return on Equity (ROE)

• Unit 6: Resource Mobilization

- Capital Market- Primary
- Angel Investor: Features
- Venture Capital: Features, funding.

ENVIRONMENTAL STUDIES-307

ENVIRONMENTAL STUDIES - 307

SYLLABUS

ENVIRONMENTAL STUDIES-307

Note:

There will be one Question Paper which will have 28 questions out of which 25 questions need to be attempted.

1. Human Beings and Nature

- (i) Modern schools of ecological thought.
- (ii) Deep ecology (Gary Snyder, Earth First) vs. shallow ecology.
- (iii) Stewardship of land (e.g. Wendell Berry).
- (iv) Social ecology [Marxist environmentalism and socialist ecology (Barry Commoner)].
- (v) Feminism.
- (vi) Green Politics (e.g. Germany and England).
- (vii) Sustainable Development.

Modern schools of ecological thought; definition and basic understanding of Deep Ecology as opposed to Shallow Ecology; Stewardship, Social Ecology - Marxist environmentalism and Socialist Ecology, Ecofeminism, Green political movements of Germany and England, and Sustainable Development (basic concepts).

World Wide Fund for Nature – organization, mission, strategy for conservation.

Greenpeace – organization, mission statement, core values, objectives, and strategy.

2. Population and Conservation Ecology

- (i) Population dynamics: factors causing population change (birth, death, immigration, and emigration); the relation between the factors; age structure and its significance; population pyramids; survivorship curves; three general shapes r and K strategies.

Factors causing population change (birth, death, immigration, and emigration); the relation between the factors; Age structure and its significance; Population Pyramids – interpretation and implications. Rate of change of population – the three general shapes of Survivorship Curves, r and K strategies, and differences between the two.

- (ii) Human populations (Malthusian model and demographic transition).

Definition of Carrying Capacity; Malthusian view: the concept of ‘over-population’ and shortage of resources; Questioning Malthus. Population Growth vs. Disparate Consumption of Resources within and amongst Nations. Definition and understanding of Demographic Transition; Factors influencing demographic transition.

Population Regulation: growth without regulation (exponential); simple population regulation (logistic growth curve); factors regulating population size (space, food and water, territories, predators, weather and climate, parasites and diseases, disasters and self-regulation). Basic understanding of the Exponential growth curve (J – J-shaped) and Logistic growth curve (S-shaped); Factors regulating population size (space, food and water, territories, predators, weather and climate, parasites and diseases, disasters and self-regulation).

ENVIRONMENTAL STUDIES-307

Human population control: family planning; education; economic growth; status of women.

Strategies for human population control with emphasis on women's empowerment. (Details of methods of family planning not required.)

- (iii) Threats to the ecosystem: habitat destruction; genetic erosion; loss of diversity; expanding agriculture; impounded water; waste from human societies; and increasing human consumption.

Only a brief understanding of the causes and consequences of threats to provisioning and regulatory functions of the ecosystem with suitable examples.

- (iv) Conservation: importance; the critical state of Indian forests; conflicts surrounding forested areas - populations and tribals and their rights
- tourism - poaching - roads - development projects - dams; scientific forestry and its limitations; social forestry; the role of the forest department; NGOs; joint forestry management; wildlife - sanctuaries, conservation, and management in India; Project Tiger as a case study in conservation.

Definition of: Conservation, in situ, and ex-situ conservation. Importance of Conservation.

In-situ conservation: Wildlife sanctuaries, National parks, Biosphere reserves (definition, objectives, features, advantages, and disadvantages).

Ex-situ conservation: zoos, aquaria, plant collection (objectives, features, advantages, and disadvantages).

Conflicts in managing and conserving Forests: India's forest cover, issues concerning people living in and around forests with particular reference to tribal rights; threats to forests: poaching, developmental projects like roads and dams, and over-exploitation of forest resources (direct and indirect).

The role of the forest department and NGOs in managing forests.

Some management measures: are scientific forestry, social forestry (various types of social forestry), Joint Forestry Management (JFM), and ecotourism.

Definition, scope, advantages, and disadvantages of each of the above.

Project Tiger as a case study in conservation: Origin, aims, and objectives, successes, failures.

3. Monitoring Pollution

- (i) Pollution monitoring.

Primary and secondary pollutants. Importance of monitoring air pollution including Ambient Air Quality Monitoring (gaseous and particulate). Concept of carbon credits and carbon trading in regulating emissions. Causes for excessive vehicular pollution and various steps taken to regulate pollution-emission standards for new vehicles, implementation of CNG programme, inspection & maintenance programme for in-use vehicles, phasing out of old commercial vehicles, and promotion of public transport.

ENVIRONMENTAL STUDIES-307

(ii) Monitoring the atmosphere: techniques.

Monitoring at emission source and of ambient air quality, criteria for monitoring stations, types of stations, number of stations, frequency of data collection, characteristics of ambient air sampling, and basic consideration for sampling (to be dealt with in brief). Classification of techniques- manual and instrumental. Manual-Passive Samplers, High Volume Samplers, and Bubbler Systems. Instrumental-photometric techniques-NDIR, Chemiluminescence - principle and use.

(iii) International and national air quality standards.

National Ambient Air Quality Monitoring (NAAQM); the main functions of the Central Pollution Board and the State Pollution Control Board, objectives of air quality standards, New name of NAAQM, National Air Monitoring Programme (NAMP) objectives of the NAMP.

Definition of air quality standards and importance; National air quality standards for gases/particulate matter covered under WHO guidelines.

(iv) Water testing: indicators of water quality.

Indicators (electrical conductivity, turbidity, pH, dissolved oxygen, faecal waste, temperature, hardness, nitrates, and sulphates) the significance of each and their interpretations. B.O.D. and C.O.D., the theoretical concept only (lab work for better understanding and not for testing)

(v) Soil testing: indicators of soil type and quality and laboratory work.

Soil indicators- the characteristics of a good soil indicator, the three basic types of soil indicators- biological, physical, and chemical, are two examples of each. The information provided by each of these types of indicators. Definitions, effects, and experiments to find out soil respiration, soil pH, soil aggregate, infiltration rate, and simple methods of controlling each of these.

4. Third World Development

(i) Urban-rural divide: urbanization - push and pull factors; consequences on rural and urban sectors; future trends and projections.

Causes of migration - push and pull factors, consequences on rural and urban areas, and ways to reduce migration. Future trends and projections.

(ii) A critical appraisal of conventional paradigm of development from the viewpoints of sustainability, environmental impact, and equity.

Definition of Development.

An understanding that development has become synonymous with growth. This approach has the following impacts on the environment: (a) Ignoring negative environmental impacts; (b) Changing patterns of resource use due to market pressures;

(c) Overuse and exploitation of resources;

(d) Diversion of scarce resources to luxury goods; (e) Disparate access to resources;

(f) Increasing waste and pollution.

The above is to be explained with suitable examples.

ENVIRONMENTAL STUDIES-307

(iii) A case study of the Gandhian approach in terms of its aims and processes.

Local self-governance – basic principles behind village policy, Antoday, Sarvoday, Panchayati Raj; local self-sufficiency, local markets, and environmental sustainability. The village as the basis of development; promotion of cottage industries and intermediate technologies; focus on employment.

The above is to be contrasted with today's paradigm of growth.

(iv) Urban environmental planning and management: problems of sanitation; water management; transport; energy; air quality; housing; constraints (economic, political) in tackling the problems; inapplicability of solutions that have worked in the First World, and the need for an indigenous approach to the urban environment.

A basic understanding of the following urban environmental problems: problems of sanitation, water management, transport, energy; air quality, and housing.

Awareness of some indigenous solutions: Rainwater harvesting, garbage segregation, composting, energy from solid and liquid wastes, sewage management (dry toilets, Decentralized Water Management System (DEWATS))

Features of new urbanism, goals of smart growth. The following examples of urban planning and management from the Third World are to be studied:

- Bogota – Bolivia (Traffic Management);
- Cuba (Urban agriculture using organic methods);
- Curitiba – Brazil (Traffic planning and urban renewal using innovative measures);
- Cochabamba – (Water management and protests against privatization of water supply).

5. Sustainable Agriculture

(i) Traditional Agriculture in India: irrigation systems; crop varieties; techniques for maintaining soil fertility; the impact of colonialism; Indian agriculture at independence - food scarcity - food import - need for increasing production - the need for land reform; green revolution - HYVs - fertilizers - pesticides - large irrigation projects (dams); critical appraisal of the green revolution from the viewpoints of agro-bio diversity; soil health; the ecological impact of pesticides; energy (petroleum and petrochemicals); ability to reach the poorer sections of the rural communities; sustainability - need for sustainable agriculture - characteristics for sustainable agriculture; techniques of water soil and pest management.

Definition of the following terms: traditional agriculture, natural farming, organic agriculture, modern agriculture (use of hybrid seeds, high-yielding varieties, chemical fertilizers, and pesticides), gene revolution (genetically modified seeds), and sustainable agriculture.

Irrigation systems:

Macro vs micro irrigation systems - canal irrigation/dam as compared to sprinkler/ drip/ trickle drip/dug wells. Basic features, advantages, and disadvantages of each kind. Traditional rainwater harvesting- tankas, khadins, ahar, pynes, zings, johads, and eris (suitability of each type in the particular region).

ENVIRONMENTAL STUDIES-307

Features of pre-colonial agriculture in India: growing for sustenance rather than market; multi-cropping, management of soil health, diversity in seed.

Colonial influence: punitive taxation, commercial crops for export and British industry, devaluation of sustainable traditional practices. Bengal famine. Comparative study of pre-colonial, colonial and post-colonial agriculture and its impact.

Green Revolution: Origin (food scarcity - food import - need for increasing production).

Basic principles of Green Revolution- Development of High Yielding Varieties (HYV); introduction of fertilizers and pesticides; mono-cropping.

Environmental, social, and economic impacts -advantages and disadvantages (from the viewpoints of agro-bio diversity; soil health; the ecological impact of pesticides; energy use; input costs; benefits to small and medium farmers, community level and household level food security).

Land reform – need, advantages, failures, and successes.

Elements of sustainable agriculture: Mixed farming, mixed cropping, inter-cropping, crop rotation, use of sustainable practices of water soil and pest management for improving soil fertility (organic fertilizers, bio-fertilizers, green manure, with two examples) and pest control (biopesticides). Integrated Pest Management (IPM); eating local foods

Management of agricultural produce: Storage; Food preservation-different methods like use of low temperatures, high temperatures, drying, canning, preservation by salt and sugar. Transportation of Food.

Food processing - Definition, food preservation, packaging, grading.

Food adulteration and Food additives-definitions; types of adulteration, harmful effects of adulteration.

Quality Marks - ISI (Indian Standard Institute); AGMARK (Agricultural Marketing); FPO(Fruit Product Order) - a brief explanation only.

(ii) Food: the twin problems of production and access; food situation in the world; integrated and sustainable approach to food security for the Third World. Food Security.

Meaning of Food Security, need for food security. The problems in attaining food security - are those of production, storage, and access. An integrated and sustainable approach to food security for the Third World including working for environmental sustainability and social and economic sustainability through land reform, credit support to farmers, market support to farmers, inadequacies in the present marketing system, ways to improve marketing system, improving access to food, ownership of seeds.

An understanding that national-level food security may not translate into household and community-level food security or long-term environmental sustainability unless the above factors are addressed.

Main features of the Food Security Law 2013.

6. Environmental and Natural Resource Economics

(i) Definition: resources; scarcity and growth; natural resource accounting.

Classification of natural resources - based on origin (abiotic and biotic), based on renewability (renewable and non-renewable), based on development (potential and actual), based on distribution (ubiquitous and localized); scarcity and growth, natural resource accounting.

Classification of resources as renewable and non-renewable.

Definition, basic principles, advantages and disadvantages of Physical accounting.

ENVIRONMENTAL STUDIES-307

(ii) GNP vs. other forms of measuring income. GDP, GNP – definitions, advantages, and disadvantages of using them as tools for measuring growth.

(iii) Economic status and welfare (net economic welfare, natural capital, ecological capital, etc.)

A broad overview of the purpose of environmental economics.

Definition and classification: Defensive expenditure (its classification); natural/ ecological capital.

(iv) Externalities: cost-benefit analysis (social, ecological).

Externalities – definition, kinds (positive and negative), impacts.

Cost Benefit Analysis - Definition, the process in brief, advantages, and disadvantages.

EPR (Extended Producer Responsibility) -definition, examples, advantages.

(v) Natural capital regeneration.

What is natural capital? Kinds of natural capital; classification of ecosystem services, causes of degradation (acid deposition, air pollution, deforestation, loss of biodiversity, and emission of carbon dioxide), ecological footprint and man's disproportionate use of natural resources, importance of preserving and regenerating natural capital.

7. International Relations and the Environment

(i) Trans-national characteristics of environmental issues using the case study of Amazonia, Trade in Wild Life and Ozone Depletion.

Case study of Amazonia - causes for exploitation of forests, reasons for the acceleration of deforestation, effects of government policies, the ecological value of rainforests, and possible solutions to the problem.

Case study of ivory trade in Africa - reasons for flourishing trade of ivory in the past, steps taken to curb the trade, and the consequences of the ban in trade.

Case study of ozone depletion - what is meant by the ozone layer and how does it get depleted, (Chapman's cycle), potential effects of ozone depletion, common ozone-depleting substances (halons, carbon tetrachloride, CFCs, methyl chloroform, methyl bromide, and HCFCs) and their life span in the atmosphere; Ozone hole; steps taken to control ozone depletion.

(ii) Impact of international politics, national sovereignty, and interest.

(iii) International trade: a theoretical perspective; free trade vs. protectionism; import barriers; domestic industry vs. free trade; transnational companies - a historical perspective (colonialism and its lasting impact today); trade between the first and the third world - characteristics - terms of trade; India's international trade - characteristics - major imports and exports - foreign exchange crises

- the export imperative and its impact on the environment; the case study of aquaculture in India; diversion of scarce resources from the production of subsistence needs to commercial products; toxic waste trade - extent and impact; Globalisation - trade regimes (WTO, GATT, IPR) and their impact on the third world.

Definition, advantages, and disadvantages of globalization, free trade, and protectionism.

Transnational Companies (TNCs) – definition; TNCs and the environment – conflict of interest.

History of third world countries' trade with the developed countries (with special reference to India) with regards to composition and terms of trade (export of primary goods and import of finished goods at higher cost tapping of primary goods leading to environment degradation- open cast mining, agriculture, aquaculture, etc.).

Case study of aquaculture in India to understand the impact of free trade.

ENVIRONMENTAL STUDIES-307

Economic allocation of scarce resources and its impact on the environment.

Toxic waste trade – definition, origin, factors sustaining, impact on third world countries(example – health and environmental impacts),and steps to mitigate it (Bamako and Basel Conventions).

GATT – the organization and its metamorphosis into WTO.

Principles and functions of WTO: creating a level playing field for international trade through MFN (Most Favoured Nation), NT(National Treatment), and reduction of import barriers - tariff and non-tariff barriers and trading to comparative advantages.

Full forms of and areas addressed in the WTOGATT, TRIPS, TRIMS, Agreement on Agriculture (AOA). A brief understanding of how these agreements impacted India's trade,food security, economic well-being, and environmental sustainability.

Definition of IPR and its categories: copyrights, patents, trademarks, industrialdesign rights, geographical indicators, and trade secrets.

A brief understanding of each of the above categories.

(iv) International aid: agencies; advantages; limitations; need for re-orienting aid; aid vs. self-reliance.

International aid – advantages, and disadvantages; Types of Aid: Tied and Untied Aid - advantages and limitations of each.

GEOGRAPHY/GEOLOGY-313

GEOGRAPHY/GEOLOGY

SYLLABUS

Note:

There will be one Question Paper which will have 28 questions out of which 25 questions need to be attempted.

GEOGRAPHY/GEOLOGY

Fundamentals of Human Geography

Unit I: Human Geography: Nature and Scope

Unit II: People

- The population of the world – distribution, density, and growth;
- Population change-spatial patterns and structure; determinants of population change;
- Age-sex ratio; rural-urban composition;
- Human development – concept; selected indicators, international comparisons.

Unit III: Human Activities

- Primary activities – concept and changing trends; gathering, pastoral, mining, subsistence agriculture, modern agriculture; people engaged in agriculture and allied activities – some examples from selected countries;
- Secondary activities – concept; manufacturing: agro-processing, household, small scale, large scale; people engaged in secondary activities – some examples from selected countries;
- Tertiary activities – concept; trade, transport, and communication; services; people engaged in tertiary activities – some examples from selected countries;
- Quaternary activities – concept; knowledge-based industries; people engaged in quaternary activities – some examples from selected countries.

Unit IV: Transport, Communication, and Trade

- Land transport – roads, railways – rail network; trans-continental railways;
- Water transport- inland waterways; major ocean routes;
- Air transport – Intercontinental air routes;
- Oil and gas pipelines;
- Satellite communication and cyberspace;
- International trade – Basis and changing patterns; ports as gateways of international trade, the role of WTO in International trade.

Unit V: Human Settlements

- Settlement types – rural and urban; morphology of cities (case study); distribution of megacities; problems of human settlements in developing countries.

GEOGRAPHY/GEOLOGY-313

India: People and Economy

Unit I: People

- Migration: international, national – causes and consequences;
- Human development – selected indicators and regional patterns;
- Population, environment, and development.

Unit II: Human Settlements

- Rural settlements – types and distribution;
- Urban settlements – types, distribution, and functional classification.

Unit III: Resources and Development

- Land resources – general land use; agricultural land use – major crops; agricultural development and problems, common property resources;
- Water resources – availability and utilization – irrigation, domestic, industrial, and other uses; scarcity of water and conservation methods – rainwater harvesting and watershed management (one case study related to participatory watershed management to be introduced) ;
- Mineral and energy resources – metallic and non-metallic minerals and their distribution; conventional and non-conventional energy sources;
- Industries – types and distribution; industrial location and clustering; changing pattern of selected industries – iron and steel, cotton textiles, sugar, petrochemicals, and knowledge-based industries; impact of liberalization, privatization, and globalization on industrial location;
- Planning in India – target area planning (case study); the idea of sustainable development (case study).

Unit IV: Transport, Communication, and International Trade

- Transport and communication — roads, railways, waterways, and airways; oil and gas pipelines; national electric grids; communication networkings – radio, television, satellite, and internet;
- International trade — changing pattern of India's foreign trade; seaports and their hinterland and airports.

Unit V: Geographical Perspective on Selected Issues and Problems

- Environmental pollution; urban-waste disposal;
- Urbanisation-rural-urban migration; problem of slums;
- Land Degradation.

HISTORY-314

HISTORY (314)

Syllabus for Class 12

Note:

There will be one Question Paper which will have 28 questions out of which 25 questions need to be attempted.

HISTORY

Unit I: The Story of the First Cities Harappan Archaeology

Broad overview: Early urban centres.

Story of discovery: Harappan civilization.

Excerpt: Archaeological report on a major site. *Discussion:* how it has been utilized by archaeologists/historians?

Unit II: Political and Economic History: How Inscriptions Tell a Story

Broad overview: Political and economic history from the Mauryan to the Gupta period.

Story of discovery: Inscriptions and the decipherment of the script. Shifts in the understanding of political and economic history.

Excerpt: Asokan inscription and Gupta period land grant.

Discussion: Interpretation of inscriptions by historians.

Unit III: Social Histories using the Mahabharata

Broad overview: Issues in social history, including caste, class, kinship, and gender.

Story of discovery: Transmission and publications of the Mahabharata.

Excerpt: From the Mahabharata, illustrating how it has been used by historians.

Unit IV: A History of Buddhism: Sanchi Stupa

Broad overview:

- (a) A brief review of religious histories of Vedic religion, Jainism, Vaishnavism, and Saivism.
- (b) Focus on Buddhism.

Story of discovery: Sanchi Stupa.

Excerpt: Reproduction of sculptures from Sanchi. *Discussion:* Ways in which sculpture has been interpreted by historians, and other sources for reconstructing the history of Buddhism.

Unit V: Medieval Society Through Travellers' Accounts

Broad Overview: Outline of social and cultural life as they appear in travellers' accounts.

Story of their writings: A discussion of where they travelled, why they travelled, what they wrote, and for whom they wrote.

Excerpts: from Alberuni, Ibn Battuta, Bernier.

Discussion: What these travel accounts can tell us and how they have been interpreted by historians?

Unit VI: Religious Histories: The Bhakti-Sufi Tradition

Broad Overview:

- (a) Outline of religious developments during this period.
- (b) Ideas and practices of the Bhakti-Sufi saints.

Story of Transmission: How Bhakti-Sufi compositions have been preserved.

Excerpt: Extracts from selected Bhakti Sufi works.

Discussion: Ways in which these have been interpreted by historians.

HISTORY-314

Unit VII: New Architecture: Hampi

Broad Overview:

- (a) Outline of new buildings during the Vijayanagar period — temples, forts, irrigation facilities.
- (b) Relationship between architecture and the political system.

Story of Discovery: Account of how Hampi was found.

Excerpt: Visuals of buildings at Hampi.

Discussion: Ways in which historians have analyzed and interpreted these structures.

Unit VIII: Agrarian Relations: The Ain-i-Akbari

Broad overview:

- (a) Structure of agrarian relations in the 16th and 17th centuries.
- (b) Patterns of change over the period.

Story of Discovery: Account of the compilation and translation of Ain-i-Akbari.

Excerpt: From the Ain-i-Akbari

Discussion: Ways in which historians have used the text to reconstruct history.

Unit IX: The Mughal Court: Reconstructing Histories through Chronicles

Broad Overview:

- (a) Outline of political history c. 15th-17th centuries.
- (b) Discussion of the Mughal court and politics.

Story of Discovery: Account of the production of court chronicles, and their subsequent translation and transmission.

Excerpts: From the *Akbarnama* and *Padshahnama*.

Discussion: Ways in which historians have used the text to reconstruct political histories.

Unit X: Colonialism and Rural Society: Evidence from Official Reports

Broad overview:

- (a) Life of zamindars, peasants, and artisans in the late 18th century.
- (b) East India Company, revenue settlements, and surveys.
- (c) Changes over the nineteenth century.

Story of official records: An account of why official investigations into rural societies were undertaken and the types of records and reports produced.

Excerpts: From Firminger's *Fifth Report*, Accounts of Francis Buchanan-Hamilton, and Deccan Riots Report.

Discussion: What do the official records tell and do not tell, and how they have been used by historians?

Unit XI: Representations of 1857

Broad Overview:

- (a) The events of 1857-58.
- (b) How these events were recorded and narrated.

Focus: Lucknow.

Excerpts: Pictures of 1857. Extracts from contemporary accounts.

Discussion: How the pictures of 1857 shaped British opinion of what had happened.

Unit XII: Colonialism and Indian Towns: Town Plans and Municipal Reports

Broad Overview: The growth of Mumbai, Chennai, hill stations, and cantonments in the 18th and 19th centuries.

Excerpts: Photographs and paintings. Plans of cities. Extract from town plan reports. Focus on Kolkata town planning.

Discussion: How the above sources can be used to reconstruct the history of towns? What these sources do not reveal.

Unit XIII: Mahatma Gandhi Through Contemporary Eyes

Broad Overview:

- (a) The nationalist movement 1918-48,
- (b) The nature of Gandhian politics and leadership.

Focus: Mahatma Gandhi in 1931.

Excerpts: Reports from English and Indian language newspapers and other contemporary writings.

Discussion: How newspapers can be a source of history.

Unit XIV: Partition through Oral Sources

Broad Overview:

- (a) The history of the 1940s;
- (b) Nationalism, Communalism, and Partition.

Focus: Punjab and Bengal.

Excerpts: Oral testimonies of those who experienced partition.

Discussion: Ways in which these have been analyzed to reconstruct the history of the event.

Unit XV: The Making of the Constitution

Broad Overview:

- (a) Independence and the new nation-state.
- (b) The making of the Constitution.

Focus: The Constitutional Assembly debates.

Excerpts: From the debates.

Discussion: What do such debates reveal and how they can be analyzed?

HOME SCIENCE-315

HOME SCIENCE-315

Note:

There will be one Question Paper which will have 28 questions out of which 25 questions need to be attempted.

Unit I: Nutrition, Food Science and Technology

1. Clinical nutrition and Dietetics

- a) Significance
- b) Diet Therapy Objectives.
- c) Role of nutritionist
- d) Types of diets
- e) scope and career

2. Public Nutrition and Health

- a) Concept of Public Health and Nutrition.
- b) Nutritional Problems in India.
- c) Strategies to tackle nutritional problems.
- d) Scope and career

3. Catering and food services management

- a) Types of food service system
- b) Management in Food Services.
- c) scope and career

4. Food Processing and technology.

- a) Basic concepts - food science, food Processing food technology, food manufacturing
- b) Development of food processing and technology and its importance
- c) Classification of processed food.
- d) Scope and career.

5. Food Quality and safety

- a) Basic Concepts - food safety, food contamination food adulteration
- b) Food Standards Regulation - India (FSSAI, Agmark) and International (CAC, WTO, ISO)
- c) Food safety management systems
- d) Scope and career.

Unit II: Human Development: Lifespan Approach

1. Early childhood care and education.

- a) NCF (Principles and objectives.
- b) Concept of crèche, daycare centre, and Montessori schools.
- c) The viewpoint of Psychologists - Piaget and Vygotsky
- d) Scope and career.

HOME SCIENCE-315

2. Special Education and support services

- a) Disability
- b) special Education methods
- c) scope and career

3. Management of institutions and programmes for children, youth, and elderly

- a) Children: Vulnerable, programmes
- b) Youth: Vulnerable, programmes
- c) Elderly: Vulnerable, programmes
- d) Scope and career

Unit III: Fabric and Apparel.

1. Design for fabric and Apparel

- a) Design Analysis - structure and Applied
- b) Elements of design.
- c) Principles of design.
- d) Scope and career.

2. Fashion design and Merchandising

- a) Fashion terminology - Fashion, style, Fad, classic.
- b) Fashion Development - History and Evolution
- c) Fashion Merchandising
- d) Scope and career

3. Production and Quality Control in the Garment Industry

- a) Stages of apparel production
- b) Quality Assurance in the Garment Industry
- c) Scope and career

4. Care and Maintenance of fabrics in Institutions

- a) Laundry equipment - Washing drying and ironing
- b) Institutional Laundry
- c) Scope and career

Unit IV: Resource Management

1. Human Resource Management

- a) Significance and functions of HRM
- b) Scope and career

2. Hospitality Management

- a) Concept of different hospitality establishments
- b) Guest Cycle
- c) Departments in Hospitality organization's Front Office, Housekeeping, food, and beverages
- d) Scope and career

HOME SCIENCE-315

3. Consumer Education and Protection

- a) Consumer Problems.
- b) Consumer Protection Act (2019) - consumer rights and responsibilities
- c) Standard Marks - ISI, Agmark, FSSAI, Hallmark, silk Mark, Wool Mark, Eco mark
- d) Voluntary consumer organizations
- e) Scope and career.

Unit V: Communication and Extension

1. Development of communication and Journalism

- a) Basic concepts- Development, Development Journalism, and Development Communication.
- b) Methods of communication
- c) Scope and career.

2. Media management, Design, and Production

- a) Media planning
- b) Media designing and production.
- c) Media evaluation and feedback
- d) Scope and career

Unit VI: Career Options after Home Science Education

Career options of self and wage employment in various fields of Home Science.

KNOWLEDGE TRADITIONS-PRACTICES IN INDIA-316

**KNOWLEDGE TRADITIONS-PRACTICES IN
INDIA-316**

SYLLABUS

KNOWLEDGE TRADITIONS-PRACTICES IN INDIA-316

Note:

There will be one Question Paper which will have 28 questions out of which 25 questions need to be attempted.

Knowledge Traditions and Practices of India

1 Agriculture: A Survey

Agriculture in Prehistory and Protohistory/ Textual Sources/ Types of Lands/ Rain-Fed and Irrigated Crops/ Implements/ Seed and Sowing/ Manures/ Pests and Their Management/ Cattle Management/ Horticulture and Arboriculture/ Fishing/ Agriculture and Society

2 Architecture: A Survey

- Early and Classical Architecture

Temple Architecture/ Rock-Cut Structures/ Monolithic Temples/ Constructed Temples/ Public and Private Architecture

Architecture: A Survey

- Medieval & Colonial Architecture

Fort and Palace Architecture/ Mosques/ Mausoleums/ Colonial Architecture

3 Dance: A Survey

- Classical Dance Forms

Classical Period/ Middle Period/ Modern Period/ Classical Dance Forms/ Bharatanatyam/ Kathakali/ Kathak/ Kucipudi/ Manipuri/ O'issi/ Sattriya

- Folk Dance Forms

Chau/ Bihu/ Rauf/ Padayani/ DolluKunitha/ Dandiya/ Ghumar/ Kalbelia/ Chau&fla/ Bhangra/ Giddha/ Garba/ Lava)i/ Bamboo Dance

4 Education Systems and Practices: A Survey

Goals of Indian Education/ Teaching and Learning/ The Teacher and the Student/ Centres of Education/ Temples as First Schools/ Gurukulas/ Viharas and Universities/ Community-Supported Education/ The Continuing System

KNOWLEDGE TRADITIONS-PRACTICES IN INDIA-316

Two Types of Knowledge and the Right Pupil/ Mere Intellectual Knowledge Is Not Enough/The Link between Teacher and Pupil/ Teachers Invite Students to Come to Them/Controlling the Mind and the Senses: the Goal of Indian Education/ Teacher's Directives to Students on their Completion of Study/ what Is a Useful Life?/Hsüan-Tsang's (Xuanzang) Impressions of Indian Education/ Hsüan-Tsang's (Xuan Zang) Description of Nalanda University

An Italian Explorer's Record of Indian Education in the 17th Century/ A Description of Indian Education in the 18th Century/ The Teacher's Subsistence/ Respect for the Teacher/Physical Education and Sports/ Description of the University at Navadveep (Nuddeah) in Bengal in 1791/ Love of Learning and Support for Education among Indians/ A widespread Colonial Network of Indigenous Schools

5 Ethics: Individual and Social

The Cosmic Order/ Buddhist Ethics/ Jain Ethics/ Sikh Ethics/ The Bhakti

Movement Primary Texts on Ethics: Individual and Social: A Selection

From Jain Granthas/ From Buddhist Granthas/ From Asoka's Edicts/ From the Kural (tr. P.S. Sundaram)

6 Martial Arts Traditions: A Survey

- Texts/ Practice of Martial Arts/ Stick Combat/ Kaaripayau Martial Arts Traditions: A Selection from Primary Texts Wrestling in the Mahabharata/ Mallapura_a/ Marmasastram

7 Language and Grammar

Languages of India/ Study of Language in India/ Disciplines of Language Studies in India/ Classification of Speech-Sounds/ Theory of Grammar

8 Other Technologies: A Survey

Harappan Technologies/ Later Pottery/ Glass/ Water Management/ Textile Technology/

Wing Technology/ Pyrotechnics/ Cosmetics and Perfumes

Other Technologies: A Selection from Primary Texts

Gemmology/ Water Management/ Textiles and Garments/ Perfumes and Cosmetics

LEGAL STUDIES-317

LEGAL STUDIES

SYLLABUS

LEGAL STUDIES-317

Note:

There will be one Question Paper which will have 28 questions out of which 25 questions need to be attempted.

PART	UNIT	
I	Judiciary	<ul style="list-style-type: none"> i. Structure and Hierarchy of Courts and Legal Offices in India ii. Constitution, Roles, and Impartiality iii. Appointments, Training, Retirement, and Removal of Judges iv. Courts and Judicial Review
II	Topics of Law	<ul style="list-style-type: none"> i. Law of Property ii. Law of Contracts iii. Law of Torts iv. Introduction to Criminal Laws in India
III	Arbitration, Tribunal Adjunction, and Alternative Dispute Resolution	<ul style="list-style-type: none"> i. Adversarial and Inquisitorial Systems ii. Introduction to Alternative Dispute Resolution iii. Types of ADR iv. Arbitration, Administrative, Tribunals v. Mediation and Conciliation vi. Lok Adalats vii. Ombudsman viii. Lokpal and Lokayukta
IV	Human Rights in India	<ul style="list-style-type: none"> i. Introduction – International Context ii. Constitutional Framework and Related Laws in India iii. Complaint Mechanisms of Quasi-judicial Bodies
V	Legal Profession in India	<ul style="list-style-type: none"> Introduction The Advocates Act, 1961, The Bar Council of India, Lawyers and Professional Ethics, Advertising by Lawyers, Opportunities for Law graduates, Legal Education in India, Liberalization of the Legal Profession, Women and the Legal Profession in India
VI	Legal Services	<ul style="list-style-type: none"> i. Legal background – Free Legal Aid under Criminal law, Legal Aid by the State, Legal Aid under the Indian Constitution, NALSARegulations, 2010 ii. Criteria for giving free Legal Services iii. Lok Adalats iv. Legal Aid in Context of Social Justice and Human Rights

LEGAL STUDIES-317

VII	International Context	<p>i. Introduction to International Law</p> <p>ii. Sources of International Law – Treaties, Customs, and ICJ Decisions</p> <p>iii. International Institutions, International Human Rights</p> <p>iv. Customary International Law</p> <p>v. International Law & Municipal Law</p> <p>vi. International Law & India</p> <p>vii. Dispute Resolution – ICJ, ICC, and Other Dispute Resolution Mechanisms</p>
VIII	Legal Maxims	<p>Important Legal Maxims.</p> <p>Meaning with illustrations of the following:</p> <ul style="list-style-type: none"> - <i>Actus non facit reum nisi mens sit rea</i> - <i>Ad valorem</i> - <i>Amicus Curiae</i> - <i>Audi alterem partem</i> - <i>Assentio Mentium</i> - <i>Bona fide</i> - <i>Bona Vacantia</i> - <i>Caveat Emptor</i> - <i>Corpus Delicto</i> - <i>Damnum Sine Injuria</i> - <i>De Die in Diem</i> - <i>De Minimis Lex Non Curat</i> - <i>Doli Incapax</i> - <i>Ejusdem Generis</i> - <i>Ex Post Facto</i> - <i>Ignorantia Facti Excusat – Ignorantia Juris Non Excusat</i> - <i>Injuria Sine Damnum</i> - <i>Locus Standi</i> - <i>Nemo Debet Esse Judex in Propria SuaCausa</i> - <i>Nemo debt non quad habit</i> - <i>Noscitur a Sociis</i> - <i>Obiter Dicta</i> - <i>Pari Materia</i> - <i>Per Incuriam</i> - <i>Qui Facit Per Alium, Facit Per Se</i> - <i>Quid pro quo</i> - <i>Ratio Decidendi</i> - <i>Res ipsa loquitur</i> - <i>Res Judicata Accipitur Pro Veritate</i> - <i>Salus Populi Est Suprema Lex</i> - <i>Stare Decisis</i> - <i>Ubi Jus Ibi Remedium</i>

MASS MEDIA AND COMMUNICATION-318

MASS MEDIA AND COMMUNICATION SYLLABUS

MASS MEDIA AND COMMUNICATION-318

Note:

There will be one Question Paper which will have 28 questions out of which 25 questions need to be attempted.

1. Communication

(i) Culture and Communication

What is culture? Relationship between culture and mass media; communication in the cultural context; media as a vehicle of cultural transmission; representation and stereotyping in Mass Media.

(ii) Communication and Social Change

Social change: meaning; media as a catalyst for social change (with examples of various social movements).

2. Journalism

(i) Qualities of a good Journalist.

An understanding of the following: a nose for News, inquisitiveness, language skills, trustworthiness, and empathy.

(ii) Ethical Issues in Journalism.

A brief understanding of each of the following with examples: sensationalism, fake news, paid news, plagiarism, advertorials, partisan reporting, and sting operations.

3. TV

A. Advertising

(i) Advertising concepts & process,

(ii) Functions of Advertising,

(iii) Types of Advertising (Cross promotions, Merchandise, Convert Advertising),

(iv) Forms of Advertising

B. Film

(i) Pre-Shooting stage.

(ii) Shooting Stage.

(iii) Post-Shooting Stage.

4. Radio

(i) Writing for Radio

Characteristics of a Radio Script: conversational language, active voice, simple sentences, avoidance of technical jargon, and capability of creating imageries.

(ii) Recording Radio Programmes

Brief understanding of the radio studio and transmission equipment: types of microphones; amplifiers, sound mixer, speakers; and audio recording.

(iii) Radio Jockeying

MASS MEDIA AND COMMUNICATION-318

Role of a radio jockey; skills required: command of language (spoken and written), connectedness with the audience; knowledge about the recording equipment.

5. Cinema

(i) History of Cinema

A brief understanding of the early experiments done by the following: Lumiere Brothers, John Grierson, Robert Flaharty, and Dada Saheb Phalke.

(ii) Cinema Genres.

Defining genre theory; an understanding of the various types of genres (with suitable examples): action, westerns, comedy, crime, drama, fantasy/sci-fi, historical, animation, romance, and musical.

(iii) Cinema and Social Change.

Parallel Cinema movement in India: Issues depicted and low budget production process (with reference to examples such as Shyam Benegal's Manthan).

6. Social Media

(i) Definition of social media.

(ii) Types of social media platforms.

Self-explanatory.

(iii) Role of social media in democracy.

Role of social media in creating collective identities with reference to sharing of information; cyberactivism (with suitable examples)

(iv) Cyber Crime.

An understanding of online bullying; stalking; trolling; and online frauds.

(v) Netiquettes.

Meaning and importance of netiquettes; an understanding of netiquettes such as identification of oneself; respect for others' privacy, use of appropriate language and imagery; do not spam.

7. New Media

(i) The Internet is the meeting point of all the mass media.

(ii) Broadcasting

(iii) The mass communication model of a few transmitting to a vast number of receivers.

(iv) Gigantic organization.

(v) Huge technical infrastructure

(vi) Large-scale revenue.

MASS MEDIA AND COMMUNICATION-318

- (vii) The changed paradigm due to the Internet.
- (viii) Empowering an individual to post data on the Internet.
- (ix) Information, and messages in one medium triggering off activity in the others.
- (x) Many sources of the same information.
- (xi) Distribution of information between individuals on an unprecedented global scale.
- (xii) The rapidity of opinion generation on a local, national, and global scale.
- (xiii) The socio-political implications of the new information order.
- (xiv) The Strengthening of Democracy.
- (xv) Emerging Trends in Mass Communication

Mathematics/Applied Mathematics (319)

**MATHEMATICS/
APPLIED
MATHEMATICS (319)**

Syllabus

Mathematics/Applied Mathematics (319)

Note:

There will be one Question Paper which will contain Two Sections i.e., Section A and Section B [B1 and B2].

Section A will have 10 questions covering both i.e., Mathematics/Applied Mathematics which will be compulsory for all candidates.

Candidates are required to choose either B1 or B2 according to their choice.

Section B1 will have 18 questions from Mathematics out of which 15 questions are to be attempted.

Section B2 will have 18 questions purely from Applied Mathematics out of which 15 questions are to be attempted.

In total, candidate has to attempt 25 questions in total.

SECTION A

1. Algebra	4. Differential Equations
(i) Matrices and types of Matrices	(i) Order and degree of differential equations
(ii) Equality of Matrices, transpose of a Matrix, Symmetric, and Skew Symmetric Matrix	(ii) Formulating and solving differential equations with variable separable
(iii) Algebra of Matrices	5. Probability Distributions
(iv) Determinants	(i) Random variables and their probability distribution
(v) Inverse of a Matrix	(ii) Expected value of a random variable
(vi) Solving of simultaneous equations using Matrix Method	(iii) Variance and Standard Deviation of a random variable
2. Calculus	(iv). Binomial Distribution
(i) Higher order derivatives	6. Linear Programming
(ii) Tangents and Normals	(i) Mathematical formulation of Linear Programming Problem
(iii) Increasing and Decreasing Functions	(ii) Graphical method of solution for problems in two variables
(iv). Maxima and Minima	(iii) Feasible and infeasible regions
3. Integration and its Applications	(iv). Optimal feasible solution
(i) Indefinite integrals of simple functions	
(ii) Evaluation of indefinite integrals	
(iii) Definite Integrals	
(iv). Application of Integration as the area under the curve	

Mathematics/Applied Mathematics (319)

Section B1: Mathematics

UNIT I: RELATIONS AND FUNCTIONS

1. Relations and Functions

Types of relations: Reflexive, symmetric, transitive, and equivalence relations. One-to-one and onto functions, composite functions, the inverse of a function. Binary operations.

2. Inverse Trigonometric Functions

Definition, range, domain, principal value branches. Graphs of inverse trigonometric functions. Elementary properties of inverse trigonometric functions.

UNIT II: ALGEBRA

1. Matrices

Concept, notation, order, equality, types of matrices, zero matrices, transpose of a matrix, symmetric and skew-symmetric matrices. Addition, multiplication, and scalar multiplication of matrices, simple properties of addition, multiplication, and scalar multiplication. Non-commutativity of multiplication of matrices and existence of non-zero matrices whose product is the zero matrix (restrict to square matrices of order 2). Concept of elementary row and column operations. Invertible matrices and proof of the uniqueness of inverse, if it exists; (Here all matrices will have real entries).

2. Determinants

Determinants of a square matrix (up to 3×3 matrices), properties of determinants, minors, cofactors, and applications of determinants in finding the area of a triangle. Adjoint and inverse of a square matrix. Consistency, inconsistency, and number of solutions of a system of linear equations by examples, solving a system of linear equations in two or three variables (having unique solution) using the inverse of a matrix.

UNIT III: CALCULUS

1. Continuity and Differentiability

Continuity and differentiability, derivative of composite functions, chain rule, derivatives of inverse trigonometric functions, derivative of implicit function. Concepts of exponential, logarithmic functions. Derivatives of $\log x$ and e^x . Logarithmic differentiation. Derivative of functions expressed in parametric forms. Second-order derivatives. Rolle's and Lagrange's Mean Value Theorems (without proof) and their geometric interpretations.

2. Applications of Derivatives

Applications of derivatives: Rate of change, increasing/decreasing functions, tangents and normals, approximation, maxima, and minima (first derivative test motivated geometrically and second derivative test given as a provable tool). Simple problems (that illustrate basic principles and understanding of the subject as well as real-life situations). Tangent and Normal.

Mathematics/Applied Mathematics (319)

3. Integrals

Integration as an inverse process of differentiation. Integration of a variety of functions by substitution, by partial fractions, and by parts, only simple integrals of the type –

$$\int \frac{dx}{x^2 \pm a^2}, \int \frac{dx}{\sqrt{x^2 \pm a^2}}, \int \frac{dx}{\sqrt{a^2 - x^2}}, \int \frac{dx}{ax^2 + bx + c}, \int \frac{dx}{\sqrt{ax^2 + bx + c}},$$
$$\int \frac{(px + q)}{ax^2 + bx + c} dx, \int \frac{(px + q)}{\sqrt{ax^2 + bx + c}} dx, \int \sqrt{a^2 \pm x^2} dx \text{ and } \int \sqrt{x^2 - a^2} dx,$$
$$\int \sqrt{ax^2 + bx + c} dx \text{ and } \int (px + q)\sqrt{ax^2 + bx + c} dx$$

to be evaluated.

Definite integrals as a limit of a sum. Fundamental Theorem of Calculus (without proof). Basic properties of definite integrals and evaluation of definite integrals.

4. Applications of the Integrals

Applications in finding the area under simple curves, especially lines, arcs of circles/parabolas/ellipses (in standard form only), and the area between the two above-said curves (the region should be clearly identifiable).

5. Differential Equations

Definition, order and degree, general and particular solutions of a differential equation. Formation of differential equation whose general solution is given. Solution of differential equations by the method of separation of variables, homogeneous differential equations of the first order and first degree. Solutions of linear differential equation of the type –

$$\frac{dy}{dx} + Py = Q, \text{ where } P \text{ and } Q \text{ are functions of } x \text{ or constant}$$

$$\frac{dx}{dy} + Px = Q, \text{ where } P \text{ and } Q \text{ are functions of } y \text{ or constant}$$

Mathematics/Applied Mathematics (319)

UNIT IV: VECTORS AND THREE-DIMENSIONAL GEOMETRY

1. Vectors

Vectors and scalars, magnitude and direction of a vector. Direction cosines/ratios of vectors. Types of vectors (equal, unit, zero, parallel and collinear vectors), position vector of a point, negative of a vector, components of a vector, the addition of vectors, multiplication of a vector by a scalar, position vector of a point dividing a line segment in a given ratio. Scalar (dot) product of vectors, projection of a vector on a line. Vector (cross) product of vectors, scalar triple product.

2. Three-dimensional Geometry

Direction cosines/ratios of a line joining two points. Cartesian and vector equation of a line, coplanar and skew lines, the shortest distance between two lines. Cartesian and vector equation of a plane. The angle between (i) two lines, (ii) two planes, (iii) a line and a plane. Distance of a point from a plane.

Unit V: Linear Programming

Introduction, related terminology such as constraints, objective function, optimization, different types of linear programming (L.P.) problems, mathematical formulation of L.P. problems, graphical method of solution for problems in two variables, feasible and infeasible regions, feasible and infeasible solutions, optimal feasible solutions (up to three non-trivial constraints).

Unit VI: Probability

Multiplications theorem on probability. Conditional probability, independent events, total probability, Baye's theorem. Random variable and its probability distribution, mean and variance of haphazard variable. Repeated independent (Bernoulli) trials and Binomial distribution.

Mathematics/Applied Mathematics (319)

Section B2: Applied Mathematics

Unit I: Numbers, Quantification, and Numerical Applications

A. Modulo Arithmetic

- Define the modulus of an integer
- Apply arithmetic operations using modular arithmetic rules

B. Congruence Modulo

- Define congruence modulo
- Apply the definition to various problems

C. Allegation and Mixture

- Understand the rule of allegation to produce a mixture at a given price
- Determine the mean price of a mixture
- Apply the rule of the allegation

D. Numerical Problems

- Solve real-life problems mathematically

E. Boats and Streams

- Distinguish between upstream and downstream
- Express the problem in the form of an equation

F. Pipes and Cisterns

- Determine the time taken by two or more pipes to fill or

G. Races and Games

- Compare the performance of two players w.r.t. time,
- distance taken/distance covered/ Work done from the given data

H. Partnership

- Differentiate between active partner and sleeping partner
- Determine the gain or loss to be divided among the partners in the ratio of their investment with due
- consideration of the time volume/surface area for a solid formed using two or more shapes

I. Numerical Inequalities

- Describe the basic concepts of numerical inequalities
- Understand and write numerical inequalities

UNIT II: ALGEBRA

A. Matrices and types of matrices

- Define matrix
- Identify different kinds of matrices

B. Equality of matrices, Transpose of a matrix, Symmetric and Skew symmetric matrix

- Determine the equality of two matrices
- Write transpose of a given matrix
- Define symmetric and skew symmetric matrix

Mathematics/Applied Mathematics (319)

UNIT III: CALCULUS

A. Higher Order Derivatives

- Determine second and higher-order derivatives
- Understand the differentiation of parametric functions and implicit functions Identify dependent and independent variables

B. Marginal Cost and Marginal Revenue using derivatives

- Define marginal cost and marginal revenue
- Find marginal cost and marginal revenue

C. Maxima and Minima

- Determine critical points of the function
- Find the point(s) of local maxima and local minima and the corresponding local maximum and local minimum values
- Find the absolute maximum and absolute minimum value of a function

UNIT IV: PROBABILITY DISTRIBUTIONS

A. Probability Distribution

- Understand the concept of Random Variables and their Probability Distributions
- Find the probability distribution of the discrete random variable

B. Mathematical Expectation

- Apply arithmetic mean of frequency distribution to find the expected value of a random variable

C. Variance

- Calculate the Variance and S.D. of a random variable

UNIT V: INDEX NUMBERS AND TIME-BASED DATA

A. Index Numbers

- Define Index numbers as a special type of average

B. Construction of Index numbers

- Construct different types of index numbers

C. Test of Adequacy of Index Numbers

- Apply time reversal test

UNIT VI: UNIT V: INDEX NUMBERS AND TIME-BASED DATA

A. Population and Sample

- Define Population and Sample
- Differentiate between population and sample
- Define a representative sample from a population

B. Parameter and Statistics and Statistical Inferences

- Define Parameter with reference to Population
- Define Statistics with reference to Sample

Mathematics/Applied Mathematics (319)

- Explain the relation between Parameter and Statistic
- Explain the limitation of Statistics to generalize the estimation of the population
- Interpret the concept of Statistical Significance and Statistical Inferences
- State Central Limit Theorem
- Explain the relation between Population-Sampling Distribution-Sample

UNIT VII: INDEX NUMBERS AND TIME-BASED DATA

A. Time Series

- Identify time series as chronological data

B. Components of Time Series

- Distinguish between different components of the time series

C. Time Series analysis for univariate data

- Solve practical problems based on statistical data and Interpret

UNIT VIII: FINANCIAL MATHEMATICS

A. Perpetuity, Sinking Funds

- Explain the concept of perpetuity and sinking fund
- Calculate perpetuity
- Differentiate between sinking funds and saving account

B. Valuation of Bonds

- Define the concept of valuation of bonds and related terms
- Calculate the value of the bond using the present value approach

C. Calculation of EMI

- Explain the concept of EMI
- Calculate EMI using various methods

D. Linear Method of Depreciation

- Define the concept of the linear method of Depreciation
- Interpret the cost, residual value, and useful life of an asset from the given information
- Calculate depreciation

UNIT IX: LINEAR PROGRAMMING

A. Introduction and related terminology

- Familiarize with terms related to Linear Programming Problem

B. Mathematical Formulation of Linear Programming Problem

- Formulate Linear Programming Problem

C. Different Types of Linear Programming Problems

- Identify and formulate different types of LPP

D. Graphical Method of Solution for Problems in Two Variables

Mathematics/Applied Mathematics (319)

- Draw the Graph for a system of linear inequalities involving two variables and to find its solution graphically

E. Feasible and Infeasible Regions

- Identify feasible, infeasible, and bounded regions

F. Feasible and infeasible solutions, optimal feasible solution

- Understand feasible and infeasible solutions
- Find the optimal feasible solution

**Physical Education/
National Cadet
Corps(NCC)/ Yoga
(321)
Syllabus**

Physical Education/National Cadet Corps(NCC)/Yoga (321)

Note:

There will be one Question Paper which will have 28 questions out of which 25 questions need to be attempted.

Unit I Sociological Aspects of Physical Education

- (i) Games and sports as man's cultural heritage.
An understanding that sports have been a part of our culture and tradition since time immemorial.
- (ii) Development of the individual through games and sports.
Understanding how games and sports contribute in various ways towards the development of an individual.
- (iii) Role of Physical Education in promoting national integration.
How Physical Education Helps in Promoting National Integration.
- (iv) Physical Education and personality development.
The role of Physical education in the development of personal qualities like an individual attitude, discipline, helpfulness, team spirit, patience, unity, friendship, etc.

Unit II Training Methods

- (a) *Meaning and importance of Sports Training.*
Definition of Sports Training and its importance.
- (b) *Methods of training.*
Methods of Training: Repetition, continuous & fartlek, and interval - Definition, purpose, advantages, and procedure of each.

Advantages of warming up, conditioning, and cooling/limbering.

- (c) *Isometric and Isotonic exercises.*
Meaning, advantages, and examples of each.
- (d) *Circuit Training.*
Meaning and advantages of circuit training; procedure of conducting circuit training.
- (e) *Weight Training.*
Meaning and advantages of weight training.

An understanding of how the above training methods help an individual in different sports and help develop strength, speed, stamina, skill, and endurance.

Unit III: Career Aspects in Physical Education

- (i) *Career options in Physical Education.*
Professional sportsmen, sports managers, teachers/lecturers, sports coaches, gym instructors, sports officials, sports events coordinators, sports journalists and commentators, sports software engineers, marketing and manufacturing of sports equipment.

Physical Education/National Cadet Corps(NCC)/Yoga (321)

(ii) **Important institutions of Physical Education in India.**

Functions and objectives of Netaji Subhash National Institute of Sports (N.S.N.I.S.), Sports Authority of India (S.A.I), International Olympic Committee (I.O.C), Indian Olympic Association (IOA), YMCA College of Physical Education (Chennai), Lucknow Christian College of Physical Education (LCCPE), Luxmibai National University of Physical Education (LNUPE).Development of training facilities, coaching systems, and influence of media and sponsors.

Unit IV: Career Aspects in Physical Education

(i) **Tournaments and types of tournaments.**

Candidates should be fully aware of:

- (a) *the definition of 'tournament'.*
- (b) *the types of tournaments: Fixtures, Knock-out, league matches (seeding and byes).*
- (c) *merits and demerits of tournaments.*
- (d) *objectives and importance of intramural and extramural competitions.*
- (e) *Names of the National and International Federations/Bodies controlling the various tournaments/competitions.*

(ii) **Difference between Professional and Amateur Players.**

Unit V: Health Education & Health Problems

(a) **Meaning and definition of 'Health' and 'Health Education'.**

Meaning and definition of 'Health' (mental health and physical health) and 'Health Education'.

(b) **Principles and importance of Health Education. Health problems and the role of Health Education in solving them.**

Principles and Objectives of Health Education. Importance of Health Education for adults and the younger generation through formal and non-formal channels of education. Various prevalent Health Problems: Communicable diseases – meaning, examples, and common mode of spread. Epidemics – meaning and examples; Water, noise, and air pollution – causes and prevention; Occupational Health Hazards – meaning and examples.

(c) **Disability and Rehabilitation.**

Causes of disability. General principles for prevention of disability;

Meaning and scope of Rehabilitation; services available for rehabilitation; the role of the community and government organizations in rehabilitation programmes.

(d) **Posture**

Meaning of posture.

Correct posture – meaning, the importance of correct posture (standing, sitting, walking).

Common postural deformities: kyphosis, scoliosis, lordosis, flat foot, knock-knees, bowlegged, hunch back, round shoulders – meaning, causes, and corrective measures for each.

Physical Education/National Cadet Corps(NCC)/Yoga (321)

(e) **Personal hygiene and sleep requirements.**

Personal hygiene: Meaning of personal hygiene, the importance of personal hygiene for a healthy lifestyle. Care of eyes, ears, feet, hair, skin, oral hygiene, nose, and clothing. Foot care: causes of corns, broken nails due to tight footwear; Causes of diseases like ringworm, athletes foot due to walking in wet areas; proper care of feet.

Sleep requirements: Sleep requirements for different age groups. Effects of insufficient sleep on the human body.

(f) **Substance Abuse.**

Effects of use of alcohol and smoking on the individual and society.

Drugs: Meaning of 'drugs' and 'drug abuse'; Stimulants and Narcotics – Analgesics.

Awareness of the fact that the use of certain drugs has been banned by the World Anti-Doping Agency (WADA) and the National Anti-Doping Agency (NADA) and the reasons for the same.

Unit VI: Sports Injuries and First Aid

(a) **Sports-related injuries.**

Types of sports-related injuries: Soft tissue injuries (contusion, abrasion, strain, and sprain) bone injuries (fracture), and joint injuries (dislocation): cause and prevention of each

(b) **Role of a sportsperson in the prevention of sports-related accidents.**

Types of injuries due to: sudden movement; environment (hot, cold, wet, and dry); lack of preparation (warm up, cool down); inadequate clothing, body protection; not following instructions; surface and facilities, equipment being unsafe. Role of individuals in the prevention of sports-related accidents

(c) **First Aid.**

Meaning and importance of 'First Aid'. First Aid for various sports-related injuries.

First Aid for cuts, grazes, strains, sprains, cramps, blisters, bruises, and injuries of bone (fracture and dislocation); application of splints and Thomas splint; First Aid in drowning; Cardio Pulmonary Resuscitation (CPR) and Rest, Ice, Compression and Elevation (RICE).

Unit VII: Test & Measurement in Sports

- **Motor Fitness Test** – 50 M Standing Start, 600 M Run/Walk, Sit & Reach Partial Curl Up, Push Ups (Boys), Modified Push-Ups (Girls), Standing Broad Jump, Agility – 4x10 M Shuttle Run
- **General Motor Fitness** – Barrow three-item general motor ability (Standing Broad Jump, Zig Zag Run, Medicine Ball Put – For Boys: 03 Kg & For Girls: 01 Kg)
- **Measurement of Cardio-Vascular Fitness** – Harvard Step Test/Rockport Test - Computation of Fitness Index:
Duration of the Exercise in Seconds x 1005.5 x Pulse count of 1-1.5 Min after Exercise

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Rikli & Jones - Senior Citizen Fitness Test

1. Chair Stand Test for lower body strength 2. Arm Curl Test for upper body strength
3. Chair Sit & Reach Test for lower body flexibility 4. Back Scratch Test for upper body flexibility
5. Eight Foot Up & Go Test for agility 6. Six-Minute Walk Test for Aerobic Endurance

Unit VIII Biomechanics & Sports

- *Meaning and Importance of Biomechanics in Sports*
- *Types of movements (Flexion, Extension, Abduction & Adduction)*
- *Newton's Law of Motion & its Application in Sports*
- *Friction & Sports*

Unit IX Psychology & Sports

- *Personality; its definition & types – Trait & Types (Sheldon & Jung Classification) & Big Five Theory*
- *Motivation, its type & techniques*
- *Exercise Adherence; Reasons to Exercise, Benefits of Exercise*
- *Strategies for Enhancing Adherence to Exercise*
- *Meaning, Concept & Types of Aggressions in Sports*

PHYSICS-322

PHYSICS-322

Syllabus of Class 12

PHYSICS-322

Note:

There will be one Question Paper which will have 28 questions out of which 25 questions need to be attempted.

PHYSICS

Unit I: Electrostatics

Electric charges and their conservation. Coulomb's law – force between two point charges, forces between multiple charges; superposition principle, and continuous charge distribution.

Electric field, electric field due to a point charge, electric field lines; electric dipole, electric field due to a dipole; torque on a dipole in a uniform electric field.

Electric flux, statement of Gauss's theorem and its applications to find field due to infinitely long straight wire, uniformly charged infinite plane sheet, and uniformly charged thin spherical shell (field inside and outside).

Electric potential, potential difference, electric potential due to a point charge, a dipole, and system of charges; equipotential surfaces, the electrical potential energy of a system of two point charges, and electric dipoles in an electrostatic field.

Conductors and insulators, free charges, and bound charges inside a conductor. Dielectrics and electric polarization, capacitors, and capacitance, the combination of capacitors in series and in parallel, the capacitance of a parallel plate capacitor with and without dielectric medium between the plates, energy stored in a capacitor, Van de Graff generator.

Unit II: Current Electricity

Electric current, the flow of electric charges in a metallic conductor, drift velocity and mobility, and their relation with electric current; Ohm's law, electrical resistance, V-I characteristics (linear and non-linear), electrical energy and power, electrical resistivity, and conductivity.

Carbon resistors, colour code for carbon resistors; series and parallel combinations of resistors; temperature dependence of resistance.

The internal resistance of a cell, potential difference, and emf of a cell, a combination of cells in series and in parallel.

Kirchhoff's laws and simple applications. Wheatstone Bridge, Metre Bridge.

Potentiometer – principle, and applications to measure potential difference, and for comparing emf of two cells; measurement of internal resistance of a cell.

Unit III: Magnetic Effects of Current and Magnetism

Concept of the magnetic field, Oersted's experiment. Biot - Savart law and its application to the current carrying circular loop.

Ampere's law and its applications to an infinitely long straight wire, straight and toroidal solenoids. Force on a moving charge in uniform magnetic and electric fields. Cyclotron.

Force on a current-carrying conductor in a uniform magnetic field. The force between two parallel current-

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carrying conductors – definition of ampere. Torque experienced by a current loop in a magnetic field; moving coil galvanometer – its current sensitivity and conversion to ammeter and voltmeter.

Current loop as a magnetic dipole and its magnetic dipole moment. The magnetic dipole moment of a revolving electron. Magnetic field intensity due to a magnetic dipole (bar magnet) along its axis and perpendicular to its axis. Torque on a magnetic dipole (bar magnet) in a uniform magnetic field; bar magnet as an equivalent solenoid, magnetic field lines; Earth's magnetic field and magnetic elements.

Para-, dia- and ferromagnetic substances, with examples. Electromagnets and factors affecting their strengths. Permanent magnets.

Unit IV: Electromagnetic Induction and Alternating Currents

Electromagnetic induction; Faraday's law, induced emf and current; Lenz's Law, Eddy currents. Self and mutual inductance.

Alternating currents, peak and RMS value of alternating current/voltage; reactance and impedance; LC oscillations (qualitative treatment only), LCR series circuit, resonance; power in AC circuits, wattless current. AC generator and transformer.

Unit V: Electromagnetic Waves

Need for displacement current. Electromagnetic waves and their characteristics (qualitative ideas only). Transverse nature of electromagnetic waves.

Electromagnetic spectrum (radio waves, microwaves, infrared, visible, ultraviolet, x-rays, gamma rays) including elementary facts about their uses.

Unit VI: Optics

Reflection of light, spherical mirrors, mirror formula. Refraction of light, total internal reflection, and its applications, optical fibers, refraction at spherical surfaces, lenses, thin lens formula, lens maker's formula. Magnification, power of a lens, combination of thin lenses in contact combination of a lens and a mirror. Refraction and dispersion of light through a prism.

Scattering of light—blue colour of the sky and reddish appearance of the sun at sunrise and sunset.

Optical instruments: Human eye, image formation, and accommodation, correction of eye defects (myopia and hypermetropia) using lenses.

Microscopes and astronomical telescopes (reflecting and refracting) and their magnifying powers.

Wave optics: Wave front and Huygens' Principle, reflection, and refraction of plane wave at a plane surface using wave fronts.

Proof of laws of reflection and refraction using Huygens' Principle.

Interference, Young's double hole experiment and expression for fringe width, coherent sources, and sustained interference of light.

Diffraction due to a single slit, width of central maximum.

Resolving the power of microscopes and astronomical telescopes. Polarization, plane polarized light; Brewster's law, uses of plane polarized light and Polaroids.

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Unit VII: Dual Nature of Matter and Radiation

Photoelectric effect, Hertz and Lenard's observations; Einstein's photoelectric equation – particle nature of light.

Matter waves – wave nature of particles, de Broglie relation. Davisson-Germer experiment (experimental details should be omitted; only the conclusion should be explained.)

Unit VIII: Atoms and Nuclei

Alpha-particle scattering experiment; Rutherford's model of atom; Bohr model, energy levels, hydrogen spectrum. Composition and size of nucleus, atomic masses, isotopes, isobars; isotones.

Radioactivity – alpha, beta, and gamma particles/rays, and their properties; radioactive decay law. Mass-energy relation, mass defect; binding energy per nucleon and its variation with mass number; nuclear fission and fusion.

Unit IX: Electronic Devices

Energy bands in solids (qualitative ideas only), conductors, insulators, and semiconductors; semiconductor diode – I - V characteristics in forward and reverse bias, diode as a rectifier; I - V characteristics of LED, photodiode, solar cell, and Zener diode; Zener diode as a voltage regulator. Junction transistor, transistor action, characteristics of a transistor; transistor as an amplifier (common emitter configuration) and oscillator. Logic gates (OR, AND, NOT, NAND, and NOR). Transistor as a switch.

Unit X: Communication Systems

Elements of a communication system (block diagram only); bandwidth of signals (speech, TV, and digital data); bandwidth of transmission medium. Propagation of electromagnetic waves in the atmosphere, sky, and space wave propagation. Need for modulation. Production and detection of an amplitude-modulated wave.

POLITICAL SCIENCE-323

Political Science - 323 Syllabus

Note:

There will be one Question Paper which will have 28 questions out of which 25 questions need to be attempted.

Political Science – 323

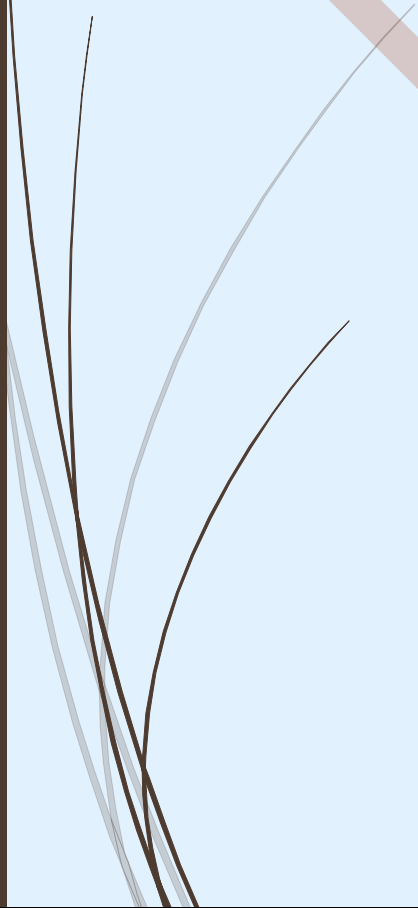
Politics in India Since Independence

1. *The era of One-Party Dominance:* First three general elections, nature of Congress dominance at the national level, uneven dominance at the state level, coalitional nature of Congress. Major opposition parties.
2. *Nation-Building and Its Problems:* Nehru's approach to nation-building: Legacy of partition: the challenge of 'refugee' resettlement, the Kashmir problem. Organization and reorganization of states; Political conflicts over language.
3. *Politics of Planned Development:* Five-year plans, expansion of state sector, and the rise of new economic interests. Famine and suspension of five-year plans. Green Revolution and its political fallouts.
4. *India's External Relations:* Nehru's foreign policy. Sino-Indian War of 1962, Indo-Pak War of 1965 and 1971. India's nuclear programme and shifting alliances in world politics.
5. *Challenge to and Restoration of Congress System:* Political succession after Nehru. Non-Congressism and electoral upset of 1967, Congress split and reconstitution, Congress' victory in 1971 elections, politics of 'garibi hatao'.
6. *Crisis of the Constitutional Order:* Search for 'committed' Bureaucracy and Judiciary. Navnirman movement in Gujarat and the Bihar movement. Emergency: context, constitutional and extra-constitutional dimensions, resistance to an emergency. 1977 elections and the formation of the Janata Party. Rise of civil liberties organizations.
7. *Regional Aspirations and Conflicts:* Rise of regional parties. Punjab crisis and the anti-Sikh riots of 1984. The Kashmir situation. Challenges and responses in the North East.
8. *Rise of New Social Movements:* Farmers' movements, Women's movements, Environment, and Development-affected people's movements. Implementation of Mandal Commission report and its aftermath.
9. *Democratic Upsurge and Coalition Politics:* Participatory Upsurge in the 1990s. Rise of the JD and the BJP. The increasing role of regional parties and coalition politics. UF and NDA governments. Elections 2004 and UPA government.
10. *Recent Issues and Challenges:* Challenge of and responses to globalization: new economic policy and its opposition. Rise of OBCs in North Indian politics. Dalit politics in the electoral and non-electoral arena. The challenge of communalism: Ayodhya dispute, Gujarat riots.

Contemporary World Politics

1. *Cold War Era in World Politics*: Emergence of two power blocs after the Second World War. Arenas of the Cold War. Challenges to Bipolarity: Non-Aligned Movement, the Quest for new international economic order. India and the Cold War.
2. *The disintegration of the 'Second World' and the Collapse of Bipolarity*: New entities in world politics: Russia, Balkan states, and, Central Asian states, Introduction of democratic politics and capitalism in post-communist regimes. India's relations with Russia and other post-communist countries.
3. *US Dominance in World Politics*: Growth of unilateralism: Afghanistan, first Gulf War, response to 9/11 and attack on Iraq. Dominance and challenge to the US in economy and ideology. India's renegotiation of its relationship with the USA.
4. *Alternative Centres of Economic and Political Power*: Rise of China as an economic power in post- Mao Era, creation, and expansion of European Union, ASEAN. India's changing relations with China.
5. *South Asia in the Post-Cold War Era*: Democratisation and its reversals in Pakistan and Nepal. Ethnic conflict in Sri Lanka. Impact of economic globalization on the region. Conflicts and efforts for peace in South Asia. India's relations with its neighbours.
6. *International Organisations in a Unipolar World*: Restructuring and the future of the UN. India's position in the restructured UN. Rise of new international actors: new international economic organizations, NGOs. How democratic and accountable are the new institutions of global governance?
7. *Security in Contemporary World*: Traditional concerns of security and politics of disarmament. Non-traditional or human security: global poverty, health, and education. Issues of human rights and migration.
8. *Environment and Natural Resources in Global Politics*: Environment movement and evolution of global environmental norms. Conflicts over traditional and common property resources. Rights of Indigenous people. India's stand-in global environmental debates.
9. *Globalization and Its Critics*: Economic, cultural and political manifestations. Debates on the nature of consequences of globalization. Anti-globalization movements. India as an arena of globalization and struggles against it.

*Syllabus of Performing
Arts-320*



Performing Arts-320

Section A- Vocal & Instrumental Melodic Hindustani & Karnataka Music.

Section B-Dance

Section C- Percussion Music Hindustani & Karnataka

Section D- Drama/Theatre

Instruction:

This paper shall have two parts: Part I is compulsory for all which will have 10 Questions.

Part II shall have four sections- A, B, C, D. Each Section will have 18 Questions out of which 15 questions are to be attempted.

Candidates are required to choose any one section according to their choice. In total, candidate has to attempt 25 questions.

Syllabus for Vocal- Instrumental Melodic

UNIT I- Definition of the following:

Sangeet, Nad, Shruti, Swara- Shuddha, Komal, Teevra, Pitch-Intensity – Timbre, Gram-Murcchana, Varna, Alankar, Raga, Alap Tana, Gamak, Meend, Kan.

UNIT II- Basic knowledge of the following concepts:

Vadi, Samvadi, Anuvadi, Vivadi, Uttarang, Puravang, Aroh, Avroh, Pakad, Thata(Mela) Jati-Audav, Shadav, Sampurna and its varieties.

UNIT III- Laya & Tala

Laya – Vilambit, Madhya, Drut

Layakari- Dagon, Tigun, Chaugun, Chegun, Tala, Matra, Tali, Khali, Sam, Vibhag, Avartan, Knowledge of prominent Talas:

Teental, Ektala, Dadra, Keharwa, Jhaptala, Rupak, Adi, Saptala, Chaputala, Rupakam.

UNIT IV- Knowledge of Musical Forms

Prabandh, Drupad, Khayal, Thumri, Tarana, Maseet Khani-Razakhani Gat, Kriti, Pallavi, Padam, Tillana

UNIT V- Contribution of musicians & composers:

V.N Bhatkhande, Omkar Nath thakur, Allaudin Khan, Mushtaq Ali Khan, Tyagraja, Purandardas, Ravindra Nath tagore, Kazi narrul Islam.

UNIT VI- Musical Instruments & its Classification: string (Tatta)- Sitar, Tanpura, Saraswati Veena, Sarod, sarangi

Violon percussion (Avnadh) Tabla, Pakhawaj, Mrindangam, Khatam, Khanjira, Dholak Wind (Sushir) – Flute, Shehnai, Nagaswaram, Harmonium

Metallic (Ghan)- Chimta, Cymbal, Ghungaroo, Khadtala, Chipla, Morchung

UNIT-VII- Knowledge of Salient features of the following ragas: -

1. Yaman/Kalyani, 2. Bhairav/ Mayamalavgaula, 3. Alhaiya Bilwal/Shankra bharnam,
4. Malkaun/Hindolam, 5. Bageshree/Shri Ranjani, 6. Bhupali/Mohnam

Section A- Hindustani- Karnatak Music

UNIT I – Brief knowledge of classical dances of India.

(Kathak, Bharatnatyam, Manipuri, Kathakali, Odissi, Kuchipudi, Mohiniattam, Sattriya)

- I. History
- II. Dance repertoire
- III. Music both vocal and instrumental
- IV. Costume and makeup

UNIT II- Life sketches of chief exponents and contributors of different dance forms, past and present.

UNIT III- Knowledge of the following terms:

- I. Sangeet, Natan Bheda (Natya,Nritta, Nritya)
- II. Tandav, Lasya
- III. Lokdharmi, Natyadharmi

UNIT IV- Basic knowledge of the following: -

- I. Texts: Abhinaya Darpan, Natya Shastra, Abhinaya Chandrika, Hasta Lakshana deepika.
- II. Major folk dances of India.

UNIT V- Basic knowledge of Abhinaya and Rasa theory.

- I. Aangika, Vachika, Aaharya, Satwika
- II. Nav rasa and sthayi bhaav.
- III. Bhaav, Vibhaav, Anubhaav, Sanchari.

UNIT VI- Survey of classical dance practice:

- I. Elementary information and knowledge of premier classical dance gharanas/ organisations/ institutions/ University-departments.
- II. Major dance festivals.

Performing Arts-320: Dance (Section B)

- UNIT V- a) Brief study of origin of Tabla, Pakhawaj and Mridangam.
b) Brief study of Gharana of Tabla and Pakhawaj

UNIT VI- Knowledge of prescribes Talas:

- a) Teentala, Jhaptala, Ektala, Rupak, Keharwa & Dadra
- b) Chautala, Sooltala, Khemtas, Dhamar
- c) Dhurva, Mathya Rupak, Jhampa, Triput, Ata, Eka.

UNIT VII Biographies: -

- a) Pt. Kishan Mharaj, Ustad Zakir Hussain.
- b) Raja Chatrapati Singh, Guru Purushotam Das.
- c) Palani Subramanya Pillai, Palghat Mani Iyer.

Section-C-Syllabus for Percussion Music- Hindustani & Karnataka

Section D: Drama- Theatre

UNIT I- Introduction to Indian Classical and Traditional Theatre

- I. Leading Sanskrit Playwrights
- II. Bhasa, Kalidasa, Sudraka, Bhavabhuti [The student can identify and study one text (one play) of the above-mentioned Playwrights]
- III. Major Traditional Theatre forms

UNIT II- Modern/ Contemporary Indian Theatre

- I. Survey of major modern and contemporary styles and works in Hindi/ English
- II. Rabindranath Tagore, Bhartendu Harishchandra, Vijay Tendulkar, Mohan Rakesh, Dharamveer Bharti, Badal sarcar, Shankar Shesh, Girish Karnad, Chandrasekhar Kambar, Madhu Rye.
[The student can identify and study one text (one play) of the above-mentioned playwrights]
- III. Partitioners of modern Indian Theatre Shambhu Mitra, B.V.Karant, Habib Tanvir, K.N.Panikkar, Ratan Thiyam, Utapal Dutt, Rajender Nath, Jabbar Patel, Vijaya Mehta, Satyadev Dubey, E.Alkazi, Pravin Joshi.

UNIT III- Introduction to western classical and Medieval Drama

- I. Leading Greek Playwrights
- II. Aeschylus, Sophocles, Euripedese
[The student can identify and study one text (one play) of the above-mentioned playwrights]
- III. Shakesperean Dramas
[The student can identify and study one text (one play) of the Shakespeare]

UNIT IV- Modern/Contemporary Western Theatre

- I. Survey of major contemporary styles and works in English or English Translation
- II. Chekov, Ibsen, Strindberg, Shaw, O’Neil, Miller, Ionesco, Beckett, Pinter
Stoppard, Pirandello
[The student can identify and study one text (one play) of the playwrights above-mentioned]
- III. Practitioners of Modern Western Drama
 - a. Stanislavsky, Lee Strasberg, Bertolt Brecht, Meyerhold, Peter Brook
 - b. Marlin Brando, Lawrence Olivier, John Grilgood

UNIT V- Theatre Production/Architecture/ Design

- I. Types of Theatres: Proscenium, Arena, Theatre in Round, Thrust.
- II. Elements of play production: Set, Light, Costume, Make up, Sound- Music.

UNIT VI-

- I. Review of Indian Theatre Organizations-NSD, University Theatre Deptts, Sangeet Natak academy, Zonal Cultural Centres.
- II. Developing and Documenting the Research project – Examples of research projects in different aspects of theatre; using media and sources for the project.

Sanskrit (Domain) - 325

**संस्कृतम् पाठ्यक्रमः
(Domain)**

Sanskrit - 325

Sanskrit (Domain) - 325

Note:

There will be one Question Paper which will have 28 questions out of which 25 questions need to be attempted.

1. शब्दरूपाणि - वाक्येषु विभक्तिप्रयोगाः

■ अजन्ताः

बालक, फल, रमा, कवि, मति, वारि, नदी, शिशु, धेनु, मधु, पितृ, मातृ, द्वितीय, सखि, दातृ, नृ, स्वस्, अक्षि ।

■ हलन्ताः

राजन्, भवत्, आत्मन्, विद्वस्, वाच्, पथिन्, मरुत्, तादृक्, दिश्, धनिन्, पञ्चन्, अष्टन्, नवन्, दशन् ।

■ सर्वनामानि

सर्व, तत्, यत्, किम्, इदम् (त्रिषु लिङ्गेषु), अस्मद्, युष्मद् ।

2. धातुरूपाणि

■ परस्मैपदिनः

गम्, नम्, अस्, हस्, श्रु, नश्, आप्, शक्, इष्, प्रच्छ्, कृ, ज्ञा, भक्ष्, चिन्त्, नृत्, कथ्, नी, पच्
(लट्, लृट्, लोट्, लङ्, विधिलिङ् इति पञ्चलकारेषु प्रयोगाः)

■ आत्मनेपदिनः

लभ्, सेव्, वन्द्, याच् (लट्-लृट्-लङ् लकारेषु)

3. सन्धयः सन्धिविच्छेदाः च

■ स्वरसन्धिः

दीर्घः, गुणः, वृद्धिः, यण्, अयादिः, पूर्वरूपम् ।

■ व्यञ्जनसन्धिः

श्रुत्वम्, ष्टुत्वम्, जश्त्वम्, अनुनासिकः, अनुस्वारः, परसवर्णः।

■ विसर्गसन्धिः

उत्वम्, रत्वम्, लोपः, विसर्गस्थाने स्, श्, ष् ।

4. समासाः विग्रहाः च

■ अव्ययीभावः

यथा, प्रति, उप, अनु, निर्, सह, अधि ।

■ द्वन्द्वः

इतरेतरद्वन्द्वः, समाहारः, एकशेषः ।

■ तत्पुरुषः

विभक्तितत्पुरुषः, कर्मधारयः, द्विगुः, उपपदतत्पुरुषः ।

■ बहुव्रीहिः

Sanskrit (Domain) - 325

5. प्रत्ययाः

- कृत्-प्रत्ययाः
क्त, क्तवतु, तव्य, अनीयर्, शतृ, शानच्, क्तिन् ।
- तद्धित-प्रत्ययाः
मतुप्, इन्, ठक्, ठञ्, त्व, तल् ।
- स्त्री-प्रत्ययौ
टाप्, डीप् ।

6. उपपदविभक्तिप्रयोगाः

7. भाषिककार्यम्

- विशेषण-विशेष्यपदचयनम्
- कर्तृक्रिया-पदचयनम्
- पर्याय/विलोमपदचयनम्

8. छन्दसां सोदाहरणलक्षणपरिचयः/श्लोकेषु छन्दोऽभिज्ञानम्

- छन्दांसि – अनुष्टुभ्, उपजातिः, वंशस्थम्, वसन्ततिलका, मालिनी, शिखरिणी, शार्दूलविक्रीडितम्, मन्दाक्रान्ता ।

9. शब्दालङ्काराः अर्थालङ्काराः च

- शब्दालङ्काराः - अनुप्रासः, यमकः, श्लेषः ।
- अर्थालङ्काराः - उपमा, रूपकम्, उत्प्रेक्षा, अर्थान्तरन्यासः ।

10. संस्कृतसाहित्यस्य सामान्यपरिचयः

SOCIOLOGY (326)

SYLLABUS FOR CLASS 12

SOCIOLOGY

Note:

There will be one Question Paper which will have 28 questions out of which 25 questions need to be attempted.

Unit I: Structure of Indian Society

- Introducing Indian Society: Colonialism, Nationalism, Class, and Community
- Demographic Structure
- Rural-Urban Linkages and Divisions

Unit II: Social Institutions: Continuity and Change

- Family and Kinship
- The Caste System
- Tribal Society
- The Market as a Social Institution

Unit III: Social Inequality and Exclusion

- Caste Prejudice, Scheduled Castes, and Other Backward Classes
- The marginalization of Tribal Communities
- The Struggle for Women's Equality
- The Protection of Religious Minorities
- Caring for the Differently Abled

Unit IV: The Challenges of Unity in Diversity

- Problems of Communalism, Regionalism, Casteism, and Patriarchy
- Role of the State in a Plural, and Unequal Society
- What We Share

Unit V: Process of Social Change in India

- Process of Structural Change: Colonialism, Industrialisation, Urbanisation
- Process of Cultural Change: Modernization, Westernisation, Sanskritisation, Secularisation
- Social Reform Movements and Laws

Unit VI: Social Change and the Polity

- The Constitution as an Instrument of Social Change
- Parties, Pressure Groups, and Democratic Politics
- Panchayati Raj and the Challenges of Social Transformation

Unit VII: Social Change and the Economy

- Land Reforms, the Green Revolution, and Agrarian Society
- From Planned Industrialisation to Liberalisation
- Changes in the Class Structure

Unit VIII: Arenas of Social Change

- Media and Social Change
- Globalization and Social Change

Unit IX: New Arenas of Social Change

- Media and Social Change
- Globalization and Social Change

Unity X: Social Movements

- Class-Based Movements: Workers, Peasants
- Caste-Based Movements: Dalit Movement, Backward Castes, Trends in Upper Caste Responses
- Women's Movements in Independent India
- Tribal Movements
- Environmental Movements