BUSINESS STUDIES (BSTD)

CLASS-XI

Full Marks 100

PART A: FOUNDATION OF BUSINESS

Unit-1: Nature and Purpose of Business (6 marks)

- Concept and characteristic of business.
- Business profession and employment – distinctive features and scope.
- Objectives of business – economic and social, role of profit in business.
- Classification of business activities: Industry and commerce.
- Industry – types: primary, secondary, tertiary.
- Commerce – Trade: Types (internal, external/ foreign, wholesale, and retail) and auxiliaries to trade: banking, insurance, transportation, warehousing, communication and advertising.
- Business risks – Nature and Causes.

Unit- 2: Forms of Business Organizations (10 marks)

- **Sole proprietorship:** Meaning, features, Merits and Limitations.
- **Partnership:** Meaning, features, merits and limitations, types of partnership and types of partners, registration of a partnership firm, partnership deed.
- **Limited liability partnership**
- **Cooperative Societies:** Features, merits and limitations, types.
- **Company:** Private company, public ltd. Company – features, merits and limitations.
- **Stages in the Organisation of a company**
- **Starting a Business:** Basic factors/ steps.

Unit-3: Public, Private and Global Enterprises (8 marks)

- Private sector and public sector**.**
- **Forms of Public Sector Enterprises:** Departmental Undertakings, statutory corporation, government company (features, merits and Limitation).
- Global enterprises, joint ventures, public private partnership, features.

Unit- 4: Business Services (8 marks)

- **Banking:** Types of bank accounts – savings, current, recurring, fixed deposit accounts.
- Banking services with particular reference to – Issue of bank draft, banker's cheque (pay order), RTGS (Real Time Gross Settlement) NEFT (National Electronic Funds Transfer). Bank overdraft, cash credits, E-Banking.
- Insurance: Principles, concept of life, Health, Fire and Marine insurance.
- Postal and telecom Services: Mail (UCP Registered Post, parcel speed post courier).

Unit- 5: Emerging Modes of Business (6 marks)

- **E-Business –** Scope and benefits, Resources required for successful e- business implementation, online transactions, payment mechanism, security and safety of business transactions.
- **Outsourcing -** Concept, need and scope of BPO (Business Process Outsourcing) and KPO (Knowledge Process Outsourcing).

Unit- 6: Social Responsibility of Business and Business Ethics (6 marks)

- Concept of social responsibility.
- Case for social responsibility
- Responsibility towards owner, investors, consumers, employees, Government and Community.
- Environmental protection and business.
- Business ethics – concept and elements.

PART B: FINANCE AND TRADE

Unit- 7: Sources of Business Finance (12 marks)

- Concept of Business Finance.
- **Owner's Funds** – Equity shares, preference shares, and retained earnings.
- **Borrowed funds -** Debentures and bonds, loan from Financial Institutions, loan from Commercial banks, public deposits, trade credit, ICD (Inter Corporate Deposits), factoring.

Unit- 8: Small Business (6 marks)

- Small scale enterprise' As defined by MSMED Act 2006, (Micro small and medium Enterprises Development Act).
- Role of small business in India - With special reference to Rural Areas.
- Government Schemes and Agencies for small scale Industries: NSIC (National Small Industries Corporation) and DIG (District Industries Centre) with special reference to Rural & Hilly Areas.

Unit- 9: Internal Trade (10 marks)

- Services of a wholesaler and retailer.
- Types of retail trade – Itinerants and small scale fixed shops.
- Large scale retailers – Departmental stores, chain stores, mail order business, concept of automatic vending Machine.
- Chambers of Commerce and Industry: Basic functions
- Main Documents used in Internal trade: Proforma Invoice, Invoice, Debit Note, Credit Note, LR (Lorry Receipt) RR (Railway Receipt)
- Terms of Trade: COD (cash on delivery), FOB (Free on Board), CIF (cost, insurance and freight), E&OE Errors and Omission Expected).

Unit- 10: International Trade (8 marks)

- Concept and complexities of International Trade.
- Export Import Procedure and Documents Required.
- World trade Organisation (WTO): Historical perspective, functions of WTO and agreements.

Unit- 11: Project work (20 marks)

File – 04 marks
Written – 12 marks
Viva – 04 marks

List of project: (this list is only exemplary not exhaustive)

I. Auxiliaries to Trade

Find out names of five companies each related to different auxiliaries, i.e. banking, insurance, warehousing, transportation, communication and advertising from real life .

II. Cooperative Society

Find out names of five different types of co-operative societies around you. Also, give details of business activities of any one of them.

III. Private, Pubic & Global Enterprises

Give names each of different types of Public Sector Enterprises (including all 3 types), global enterprises, Joint Ventures and Public Private Partnerships. Also, give details of business activities of any one of them.

IV. Banking-SB account

Visit a nearby bank to find out the procedure for opening a saving bank account. Collect the required documents and prepare a report on the same.

V. Banking – Remittance

Visit a bank and remit Rs.100 to any of your relatives. Write the formalities completed by you for the same.

VI. E- Banking

Find out the procedure for transferring funds through RTGS or NEFT.

VII. External Trade

Imagine yourself to be an exporter or an importer. Collect documents used in your trade, fill them and present them in a file.

VIII. Insurance

Compare life insurance policies targeting children (children policies) of any two insurance companies.

IX. Social Responsibilities

Select any two companies/firms and give an account of the steps taken by them for discharging there social responsibilities

BUSINESS STUDIES (BSTD)

CLASS-XII

Full Marks 100

PART A: PRINCIPLES AND FUNCTIONS OF MANAGEMENT

Unit-1: Nature and Significance of Management (5 marks)

- Management – concept, objectives, importance.
- Management as Science, Arts, Profession.
- Levels of Management.
- Management Functions – Planning, Organising, Staffing, Directing, Controlling.
- Coordination – Characteristics and Importance

Unit-2: Principles of Management (5 marks)

- Principles of Management – Concept, Nature and Significance.
- Fayol's Principles of Modern Management.
- Taylor's scientific Management – Principles and Techniques.

Unit-3: Business Environment (5 marks)

- Business Environment – Concept, Importance.
- Dimensions of Business Environment – Economic, Social, Technological, Political and Legal.
- Concept of Liberalisation, Privatisation and Globalisation.
- Impact of Government Policy changes on Business and Industry with special reference to liberalisation, privatization and globalization.

Unit-4: Planning (6 marks)

- Concept, Importance, Limitations.
- Planning process.
- Types of plans – Objective, Strategy, Policy, Procedure, Method, Rule, Budget, Programme.

Unit-5: Organising **(6 marks)**

- Concept and Importance.
- Steps in the process of organising.
- Structure of Organisation – Functional and Divisional.
- Formal and Informal Organisation.
- Delegation: Concept, Elements and Importance.
- Decentralization: Concept and Importance.

Unit-6: Staffing **(6 marks)**

- Concept and Importance of staffing
- Staffing as a part of human resource Management
- Staffing process –
    - ✓ Recruitment – Meaning and Sources
    - ✓ Selection – Process
- Training and Development – Concept and Importance.

Unit-7: Directing **(6 marks)**

- Concept and Importance
- Elements of Directing
    - ✓ Supervision – concept, functions of a supervisor.
    - ✓ Motivation – concept, Maslow's Hierarchy of needs.
    - ✓ Financial and Non Financial Incentives.
    - ✓ Leadership – concept, qualities of a good leader.
    - ✓ Communication – concept, formal and informal communication, barriers to effective communication, How to overcome the barriers.

Unit-8: Controlling **(6 marks)**

- Concept and Importance.
- Relationship between Planning and Controlling.
- Steps in the process of Control.

PART B: BUSINESS FINANCE AND MARKETING

Unit-9 : Financial Management **(10marks)**

- Concept, Objective of Financial Management

- Decisions relating to Investment, Financing and Dividend.
- Financial Planning: Concept and Importance.
- Financial Structure: Concept and Factors affecting Structure.
- Fixed and Working Capital: Concept and Factors affecting its Requirements.

Unit-10: Financial Markets (8 marks)

- Financial Markets: Concepts and types.
- Money market and its Instruments.
- Capital market and its types (primary and secondary).
- Stock Exchange – Functions, Trading & Settlement Procedure.
- Dematerialisation and Depositories (NSDL and CDSL).
- NSEI: Objectives, BSE: Objectives.
- Securities Exchange Board of India (SEBI): Objectives and Functions.

Unit-11: Marketing Management (12 marks)

- Marketing – Meaning, Functions, Marketing vs Selling.
- Marketing Management Philosophies.
- Marketing Mix – Concept
    - ✓ Product – Concept, Branding, Labelling and Packaging.
    - ✓ Price – factors determining price.
    - ✓ Physical Distribution – Concept, Channels of distribution: types, Choice of channels.
    - ✓ Promotion – Concept and Elements; Advertising – Concept, role, objections against Advertising, Personal selling – Concept and qualities of a good salesman, sales promotion – Concept and Techniques, Publicity – concept and role.

Unit-12: Consumer Protection (5 marks)

- Concept and Importance of Consumer Protection.
- Consumer Protection Act 1986
    - ✓ Consumer and consumer protection
    - ✓ Rights and Responsibilities of consumers.

- ✓ Redressal Machinery
- ✓ Remedies available.

- Consumer awareness – Role of Consumer organizations and NGO's

Unit-13: Project Work (20 marks)

File – 04 marks

Written – 12 marks

Viva – 04 marks

1. File at least 10 complaints of consumer exploitation of different types (defective goods & deficient services). Also mention the decisions thereof.
2. Marketing – Objectionable advertisements
   Collect information related to five objectionable advertisements presented through any media and explain the objections.
3. Marketing – useful Advertisements
   Collect five printed advertisements and interpret their message.
4. Marketing – Physical distribution
   Observe the marketing plan of any two companies and find the levels adopted by them for distribution of their products.
5. Consumer protection – Role of NGOs
   As a consumer, Contact an NGO for a complaint against any defective good or deficient service and report the assistance provided by them.
6. Marketing – sales promotion
   Select any two famous firms/companies and find out the sales promotion techniques generally adopted by them.

CHEMISTRY (CHEM)

CLASS - XI

Full Marks 100

THEORY - 70 Marks

		Marks
Unit – I	Some Basic Concepts of chemistry	03
Unit – II	Structure of Atom	06
Unit – III	Classification of Elements and Periodicity in properties	04
Unit- IV	Chemical bonding and Molecular Structure	05
Unit – V	State of Matter; Gases and Liquids	04
Unit- VI	Thermodynamics	06
Unit- VII	Equilibrium	06
Unit- VIII	Redox Reactions	03
Unit- IX	Hydrogen	03
Unit- X	s-Block Elements	05
Unit- XI	Some p-Block Elements	07
Unit- XII	Organic Chemistry: some basic Principles and Techniques	07
Unit- XIII	Hydrocarbons	08
Unit- XIV	Environmental Chemistry	03
	Total-	**70**

Unit – I: Some Basic Concepts of chemistry

General Introduction: Importance and scope of chemistry.
Historical approach to particulate nature of matter, laws of chemical combination. Dalton's atomic theory: concept of elements, atoms and molecules.

Atomic and molecular masses. Mole concept and molar mass: percentage composition, empirical and molecular formula; chemical reactions, stoichiometry and calculations based on stoichiometry.

Unit – II: Structure of atoms

Discovery of electrons, proton and neutron; atomic number, isotopes and isobars.
Rutherford's model and its limitations. Bohr's model and its limitations, concept of shell and sub shells, dual nature of matter and light , De Broglie's relationship. Heisenberg uncertainty principle, concept of orbitals, quantum numbers, shapes of s,p, and d orbitals, rules for filling electrons in orbitals - Aufbau principle, Pauli exclusion principle and Hund's rule, electronic configuration of atoms, stability of half filled, completely filled orbitals.

Unit – III: Classification of elements and Periodicity in Properties

Significance of classification, brief history of the development of periodic table. Modern periodic law and the present form of periodic table, periodic trends in properties of elements – atomic radii, ionic radii, Ionization enthalpy, election gain enthalpy, electronegativity valency, nomenclature of elements with atomic number greater than 100.

Unit – IV: Chemical Bonding and Molecular Structure

Valence electrons, ionic bond, bond parameters, covalent bond: Born Haber Cycle. Lewis structure, polar character of covalent bond, covalent character of ionic bond, valence bond theory, resonance, geometry of covalent molecules. VSEPR theory, concept of hybridization, involving s, p and d orbitals and shapes of some simple molecules, Molecular orbital theory of homonuclear diatomic molecules and hydrogen bond.

Unit – V: States Of Matter: Gases and Liquids

Three states of matter. Intermolecular interactions, types of bonding, melting and boiling points. Role of gas laws in elucidating the concept of the molecule. Boyle's law, Charles'law, Gay Lussac's Law, Avogadro's Law, Ideal Behaviour, empirical derivation of gas equation. Avogadro's number, Ideal gas equation. Derivation from ideal behaviour, Liquefaction of gases, critical temperature, kinetic energy and molecular speeds (elementary idea)
Liquid state – vapour pressure, viscosity and surface tension (qualitative idea only, no mathematical derivations).

Unit – VI: Chemical Thermodynamics

Concepts of system, types of systems, surroundings. Work, heat, energy, extensive and intensive properties, state functions.

First law of thermodynamics – internal energy change (U) and enthalpy change (H). Hess's law of constant heat summation, enthalpy of bond dissociation, combustion, formation, atomization, sublimation, Phase transformation, ionization, and solution.

Introduction of entropy as a state function, Gibbs energy change for spontaneous and non spontaneous processes, criteria for equilibrium.

Second and third laws of thermodynamics.

Unit – VII: Equilibrium

Equilibrium in physical and chemical processes, dynamic nature of equilibrium, law of mass action, equilibrium constant, factors affecting equilibrium – Le chatelier's principle; ionic equilibrium – ionization of acids and bases, strong and weak electrolytes, degree of ionization of polybasic acids, acid strength, concept of pH Henderson Equation. Hydrolysis of salts (elementary idea). Buffer solutions, solubility product, common ion effect (with illustrative examples).

Unit – VIII: Red ox Reactions

Concept of oxidation and reduction, red ox reactions, oxidation number, balancing redox reactions in terms of loss and gain of electrons and change in oxidation number.

Unit – IX: Hydrogen

Position of hydrogen in periodic table, occurrence, isotopes, preparation, properties and uses of hydrogen; hydrides – ionic, covalent and interstitial; physical and chemical properties of water, heavy water; hydrogen peroxide-preparation, properties, structure and use; hydrogen as a fuel.

Unit – X: s-Block Elements (alkali and Alkaline earth metals)

Group 1 and Group 2 elements:

General introduction, electronic configuration, occurrence, anomalous properties of the first element of each group, diagonal relationship, trends in the variation of properties (such as ionization enthalpy, atomic and ionic radii), trends in chemical reactivity with oxygen, water, hydrogen and halogens; uses.

Preparation and properties of some important compounds:

Sodium carbonate, sodium hydroxide and sodium hydrogen carbonate, biological importance of sodium and potassium.
CaO, CaCO3 and industrial use of lime and limestone, biological importance of Mg and Ca

Unit –X I: Some p-Block Elements

General Introduction to p-Block Elements

Group 13 elements: General introduction, electronic configuration, occurrence. Variation of properties, oxidation states, trends in chemical reactivity, anomalous properties of first element of the group; Boron – physical and chemical properties, some important compounds: borax, boric acid, boron hydrides, Aluminium: reactions with acids and alkalis and uses.

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

Unit –XII: Organic chemistry – Some Basic Principles and Techniques

General introduction, methods of qualitative and quantitative analysis, classification and IUPAC nomenclature of organic compounds
Electronic displacements in a covalent bond: inductive effect, electrometric effect, resonance and hyper conjugation.
Homolytic and Heterolytic fission of a covalent bond: free radicals, carbocations, carbanions, electrophiles and nucleophiles, types of organic reactions.

Unit –XIII: Hydrocarbons

Classification of hydrocarbons

Alkanes – Nomenclature, isomerism, conformations (ethane only), physical properties, chemical reactions including halogenations, free radical mechanism, combustion and pyrolysis.
Alkenes – Nomenclature, structure of double bond (ethene), geometrical isomerism, physical properties, methods of preparation; chemical reactions; addition of hydrogen, halogen, water, hydrogen halides (markovnikov's addition and peroxide effect), ozonolysis, oxidation, mechanism of electrophilic addition.

Alkynes – Nomenclature, structure of triple bond (ethyne), physical properties. Methods of preparation, chemical reactions; acidic character of Alkynes, addition reaction of – hydrogen, halogens, hydrogen halides and water.

Aromatic hydrocarbons; Introduction, IUPAC nomenclature; Benzene; resonance aromaticity; chemical properties; mechanism of electrophilic substitution – nitration, sulphonation, halogenation, Friedel craft's alkylation and acylation, carcinogenicity and toxicity.

Unit –XIV: Environmental chemistry

Environmental pollution – air, water and soil pollution, chemical reactions in atmosphere, smog, major atmospheric pollutants; acid rain, ozone and its reactions, effects of depletion of ozone layer, greenhouse effect and global warming – pollution due to industrial wastes; green chemistry as an alternative tool for reducing pollution, strategy for control of environmental pollution.

Practical

Marks - 30

Evaluation Scheme for Examination	Marks
Volumetric analysis	10
Salt Analysis	08
Content Based Experiment	06
Class Record and Viva	06
Total	**30**

Practical Syllabus

A. Basic Laboratory Techniques

I. Cutting glass tube and glass rod
II. Bending a glass tube
III. Drawing out a glass jet
IV. Boring a cork

B. Characterization and purification of chemical substances

I. Determination of melting point of an organic compound
II. Determination of boiling point of an organic compound
III. Crystallization of impure sample of anyone of the following: Alum, copper sulphate, Benzoic acid.

C. Experiments related to pH change

a. Anyone of the following experiments:

- ✓ Determination of pH of some solutions obtained from fruit juices, varied concentrations of acids, bases and salts using pH paper or universal indicator.

- ✓ Comparing the pH of solutions of strong and weak acid of same concentration.
- ✓ Study the pH change in the titration of a strong base using universal indicator.

b. Study of pH change by common- ion effect in case of weak acids and weak bases.

D. Chemical equilibrium

One of the following experiments:

a) Study the shift in equilibrium between ferric ions and thiocyanate ions by increasing/decreasing the concentration of either ions.

b) Study the shift in equilibrium between $[Co(H_2O)_6]^{2+}$ and chloride ions by changing the concentration of either of the ions.

E. Quantitative estimation

- Using a chemical balance.
- Preparation of standard solution of oxalic acid.
- Determination of strength of a given solution of sodium hydroxide by titrating it against standard solution of oxalic acid.
- Preparation of standard solution of sodium carbonate.
- Determination of strength of a given solution of hydrochloric acid by titrating it against standard sodium carbonate solution.

F. Qualitative analysis

Determination of one anion and one caution in a given salt

Cautions:- Pb^{2+}, Cu^{2+}, As^{3+}, Al^{3+},Fe^{3+},Mn^{2+},Ni^{2+},Zn^{2+}, Co^{2+},Ca^{2+},Sr^{2+},Ba^{2+},Mg^{2+},NH_4^+

Anions:-CO_3^{2-},S^{2-},SO_3^{2-},SO_4^{2-},NO_2^{-1},NO_3^{-1},Cl^{-1},Br^{-1},I^{-1},PO_4^{3-},$C_2O_4^{2-}$,CH_3COO^-

(Note: Insoluble salts excluded)

G. Detection of nitrogen, sulphur, chlorine

CHEMISTRY (CHEM)

CLASS - XII

Full Marks 100

THEORY - 70 Marks

		Marks
Unit – I	Solid State	04
Unit – II	Solutions	05
Unit – III	Electrochemistry	05
Unit- IV	Chemical Kinetics	05
Unit – V	Surface Chemistry	04
Unit- VI	General principles and processes of Isolation of Elements	03
Unit- VII	p-Block Elements	08
Unit- VIII	d-and f- Block Elements	05
Unit- IX	Coordination Compounds	03
Unit- X	Haloalkanes and Haloarenes	04
Unit- XI	Alcohols, Phenols and Ethers	04
Unit- XII	Aldehydes, Ketones and Carboxylic acids	06
Unit- XIII	Organic Compounds containing Nitrogen	04
Unit- XIV	Bio molecules	04
Unit-XV	Polymers	03
Unit-XVI	Chemistry in Everyday Life	03
	Total-	**70**

Unit – I: Solid State

Classification of solids based on different binding forces: molecular, ionic, covalent and metallic solid, amorphous and crystalline solids (elementary idea), unit cell in two dimensional and three dimensional lattices, packing efficiency, calculation of density of unit cell, packing in solids, 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 & p type semiconductors.

Unit – II: Solutions

Types of solutions, expression of concentration of solution of solids in liquids, solubility of gases in liquids, solid solutions, colligative properties – relative lowering of vapour pressure, Raoult's law, elevation of boiling point, depression of freezing point, osmotic pressure, determination of molecular masses using colligative properties, abnormal molecular mass, van't Hoff factor and calculations involving it.

Unit – III: Electrochemistry

Red ox 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. Reaction 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 reactions; 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); 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, distinction between true solutions, colloids and suspensions; lyophillic, lyophobic, multimolecular colloids; properties of collioids; tyndall effect, Brownian movement, electro phoresis, coagulation; emulsion – types of emulsions. Elementary idea of nanomaterials.

Unit – VI: General Principles and Processes of Isolation of Elements

Principles and methods of extraction – concentration, oxidation, reduction electrolysis method and refining; occurrence and principles of extraction of aluminium, 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); Phosphorus – allotropic forms; compounds of phosphorus; preparation and properties of phosphine, halides (PCL_3, PCL_5) 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 dioxide; sulphuric acid: industrial process of manufacture, properties and uses, other oxides and 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 (structure only).

Group 18 elements: General introduction, electronic configuration. Occurrence, trends in physical and chemical properties 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 shape, IUPAC nomenclature of mononuclear coordination compounds. Bonding (Werner's

theory, VBT and CFT); structural and stereo isomerism, importance of coordination compounds (in qualitative inclusion of 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. Stability of carbonations, R-S and d-I configurations

Haloarenes:

Nature of C-X bond, substitutions reactions (directive influence of halogen for monosubstituted compound only, stability of carbocations R-S and d-I configurations)

Uses and environmental effects of – dichloromethane, trichloromethane, tetrachloromethane, iododorm, 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 of methanol and ethanol.

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

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 nucleophillic addition, 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

Nitro compounds: General methods of preparation and chemical reactions.

Amines: Nomenclature, classification, structure, methods of preparation, physical and chemical properties, uses, 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: Bio molecules

Carbohydrates - Classification (aldoses and Ketoses), monosaccharides (glucose and fructose), D-L configuration, oligosaccharides (sucrose, lactose,maltose), polysaccharides (starch, cellulose, glycogen); importance.

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

Lipids and hormones, their classification and functions.

Vitamins: Classification and functions.

Nucleic Acids: DNA & RNA.

Unit – XV: Polymers

Classification – natural and synthetic, methods of polymerization (addition and Condensation), copolymerization. Some important polymers: natural and synthetic like poly, nylon, polyesters, Bakelite, rubber, biodegradable and non-biodegradable polymers.

Unit – XVI: Chemistry in Everyday Life

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

Practical

Marks 30

Evaluation Scheme for Examination	Marks
Volumetric analysis	10
Salt Analysis	08
Content Based Experiment	06
Class Record ,Viva and Project work	06
Total	**30**

Practical Syllabus

A. Surface Chemistry.

a) Preparation one lyophilic and one lyophobic sol. Lyophilic sol – starch albumin and gum, Lyophobic sol – aluminium hydroxide, ferric hydroxide, arsenious sulphide.

b) Study of the role of emulsifying agents in stabilizing the emulsions of different oils.

B. Chemical kinetics

a) Effect of concentration and temperature on the rate of reaction between sodium thiosulphate and hydrochloric acid.

b) Study of reaction rates of any one of the following:

i. Reaction of iodide ion with hydrogen peroxide at room temperature using different concentrations of iodide ions.

ii. Reaction between potassium iodide, KIO_3 and sodium sulphate: (Na_2So_3) using starch solution as indicator (clock reaction).

C. Thermo chemistry

Any of the following experiments

i. Enthalpy of dissolution copper sulphate or potassium nitrate.

ii. Enthalpy of neutralization of strong acid (HCl) and strong base (NaOH)

iii. Determination of enthalpy change during interaction (hydrogen bond formation) between acetone and chloroform

D. Electro chemistry

Variation of cell potential in $Zn/Zn^{2+}//Cu^{2+}/Cu$ with change in concentration of electrolytes ($CuSO_4$ or $ZnSO_4$) at room temperature.

E. Chromatography

i. Separation of pigments from extracts of leaves and flowers by paper chromatography and determination of Rf Values.

ii. Separation of constituents present in an inorganic mixture containing two cations only (constituents having large difference in Rf values to be provided).

F. Preparation of Inorganic Components

i. Preparation of double salt of ferrous ammonium sulphate or potash alum

ii. Preparation of potassium ferric oxalate

G. Preparation of Organic compounds

Preparation of any two of the following compounds

i. Acetanilide

ii. Di benzal acetone

iii. p-Nitroacetanilide

iv. Aniline yellow or 2- Napthal aniline dye.

v. Iodoform

H. Tests for the functional groups present in organic compounds:

Unsaturation, alcoholic, phenolic, aldehydic, ketonic, carboxylic and amino (primary) groups.

I. Characteristic test of carbohydrates, fats and proteins in pure samples and their detection in given food stuffs.

J. Determination of concentration/ minority of $KMnO_4$ solution by titrating it against a standard solution of:

i. Oxalic acid

ii. Ferrous ammonium sulphate

(students will be requied to prepare standard solution by weighing themselves)

K. Qualitative analysis

Determination of one cation and one anion in a given salt.

Cations – Pb^{2+}, Cu^{2+},As^{3+},Al^{3+},Fe^{3+},Mn^{2+},Ni^{2+},Zn^{2+},Co^{2+},Ca^{2+},Sr^{2+},Ba^{2+},Mg^{2+},NH_4^+

Anions – CO_3^{2-},S^{2-},SO_3^{2-},NO_{2-}^{-},NO_{3-}^{-},Cl^-,Br^-,I^-,PO_4^{3-},$C_2O_4^{2-}$,CH_3COO^-

(Note; Insoluble salts excluded)

Project work- where feasible may include

i. Model preparation

ii. Investigatory project

iii. Science exhibits

iv. Participation in science fairs

v. Testing of purity of food articles like butter, pulse and milk etc.

ECONOMICS (ECON)

Class - XI

Full Marks 100

a. **Group A** 40

b. **Group B** 40

c. **Project** 20

GROUP-A

DEFINITION OF ECONOMICS AND INTRODUCTION TO VARIOUS CONCEPTS OF ECONOMICS

SECTION1. BASIC ECONOMIC CONCEPTS

Chapter 1. Economics, Scarcity, Choice, Opportunity Cost, Production, Production Possibilities, Factors of Production

Start with students' prevailing understanding of economics by discussing what students already know about economics.

Proceed to emphasize that scarcity and choice are basic problems of economics
Introduce land, labour and capital as three factors of production, and also explain the role of entrepreneurs.

Proceed to introduce the concept of opportunity costs for making choices by the consumers and producers to confront scarcity.

Define Economics as a study of Wealth- also as a study of man-man interaction emerging out of production as a man nature interaction

Introduce the concept of production possibilities curve. Explain that a country's production possibilities depend on its available resources and technology.

Chapter 2. Economic Problems, Economic Systems and the Concepts of Development and Underdevelopment

Introduce the followings :

a. Relative scarcity and the economic problem
b. The three fundamental economic questions every society must address
c. The six broad social goals of efficiency, equity, freedom, growth, security, and stability
d. Private property and market economy-features, merits and demerits
e. Discuss Adam Smith as one of the early free market philosopher
f. State Property and planned economy-features, merits and demerits
g. Discuss socialism and communism
h. Discuss Karl Marx as a philosopher in favour of communism and socialism
i. Mixed economy (with the Indian economy as an illustrative example)- features, merits and demerits
j. Discuss how different economic systems solve the most important economic questions
k. Common property resources and their uses/abuses (with the Indian economy as an illustrative example)
l. Developed economy- Industrialized economy
m. Developing economy- less developed economy-underdeveloped economy

Chapter 3. Demand, Supply, Production, Cost of Production, Markets

Introduce the followings :

a. Utility
b. Diminishing marginal utility
c. Price
d. Demand
e. Law of Demand
f. Demand Schedule

g. Demand curve
h. Supply
i. Law of Supply
j. Supply Schedule
k. Supply Curve
l. Equilibrium price
m. Equilibrium quantity
n. Market
o. Competitive market
p. Cost
q. Fixed Cost
r. Variable Cost
s. Marginal cost
t. Average cost

Chapter 4. The Role of Government in the Economy

Introduce the followings:

a. Market Failures
b. Regulation of markets
c. Social Cost
d. Private Cost
e. Public Goods
f. Social Investment
g. Private Investment
h. Public Private Partnership
i. Pollution Tax
j. Income Redistribution

k. Progressive, Regressive Taxes

l. Natural Monopoly

SECTION 2. MACROECONOMIC CONCEPTS

Chapter 5. The Major Macroeconomic Variables: National Income, Consumption, Savings and Investments, Unemployment, and Inflation

Introduce the followings :

a. Index Number- Price Index Number- Simple average method-Weighted average method

b. Consumption Goods

c. Capital Goods

d. Final Goods

e. Intermediate Goods

f. Stocks and Flows

g. Savings and Investment

h. Depreciation

i. National income

j. Gross Domestic Product

k. Gross National Product

l. Net Domestic Product

m. Net National Product

n. Per capita National Income

o. Nominal Gross Domestic Product (NGDP)

p. Real Gross Domestic Product (RGDP)

q. Gross Domestic Product Per Capita (PCGDP)

r. Nominal Gross National Product (NGNP)

s. Real Gross National Product (RGNP)

t. Gross National Product Per Capita (PCGNP)

u. Inflation Rate

v. CPI used to compute changes in Inflation

w. Unemployment Rate- Seasonal Unemployment- Frictional Unemployment- Voluntary Unemployment- Involuntary Unemployment

x. Aggregate Expenditure

y. Net Exports

Chapter 6. Growth and Development

Introduce the followings :

a. Economic growth rates- National income based growth indicators

b. Per capita growth rates- Per capita real GNP growth rate-Per capita real GDP growth rate

c. Economic development and underdevelopment- distinction between growth and development

d. Developed economies- differences among developed economies

e. Underdeveloped economies- differences among the underdeveloped economies

Chapter 7. Explaining Business Cycles

Introduce the followings :

a. Aggregate Demand

b. Aggregate Supply

c. Supply side shocks

d. Demand side shocks

e. The 4 parts of a business cycle

f. Recessions

Chapter 8. Fiscal Policy

Introduce the followings :

a. Taxes- Direct Tax- Indirect Tax- Central Government Taxes and State Government Taxes (In Indian Context)

b. Transfer Payments- Subsidies

c. Budget-Deficit- Surplus

d. Fiscal deficit-Revenue Deficit

e. Government Expenditure- Expansionary Fiscal Policy- Contractionary Fiscal Policy

f. Public Debt

Chapter 9. Money and Banking

Introduce the followings :

a. Money Supply- Components of Money Supply in an economy

b. Bank- Commercial Bank- Central Bank

c. Non Bank Financial Intermediaries

d. Type of Deposits- Current Deposits- Term Deposits- Savings Deposits- Fixed Deposits- Recurring Deposits

e. Interest Rates- Prime Lending Rates- REPO rate-Reverse Repo Rate

f. Variable Reserve ratio.

SECTION3. MICROECONOMIC CONCEPTS

Chapter 10. Business Organizations

Introduce the followings :

a. Sole proprietor

b. Partnership

c. Corporation

d. Shares and stocks

e. Cooperative

SECTION4. INTERNATIONAL TRADE

Chapter 11. International Trade, Exchange Rates, Tariff, Quotas

Introduce the followings :

a. International Trade
b. Absolute Advantage
c. Comparative Advantage
d. Gains from trade
e. Specialization
f. Exchange Rates
g. Tariffs
h. Quotas
i. Export Subsidies
j. Trade liberalization
k. Bilateral trade agreements
l. Regional trade agreements

SECTION5. FACTOR MARKETS

Chapter 12. The Basics of Factor Market

Introduce the followings :

a. Total Product
b. Average Product of a Factor
c. Marginal Product of a Factor
d. Total Revenue Product
e. Average Revenue Product
f. Marginal Revenue Product
g. Total Factor Cost
h. Average Factor Cost
i. Marginal Factor Cost

GROUP B

INDIAN ECONOMY INCLUDING STATISTICAL TOOLS

SECTION.1 STATISTICAL TOOLS

Chapter

1. Statistical Tools for Understanding Indian Economy
   Data- Collection of Data- Presentation of Data- Graphical- Tabular-Frequency Distribution-Measures of Central Tendency- Mean, Median, Mode.

SECTION2. INDIAN ECONOMY WITH SPECIAL REFERENCE TO WEST BENGAL (FEATURES, AGRICULTURE AND INDUSTRIES)

Chapter

2. Changing Features of Indian Economy- Sectoral Composition of National Income- Changes over Time during Plan Period- Changes in Demographic Features- Changes in Occupational Patterns- Human Development- Sectoral Composition of State Domestic Products of West Bengal Economy- Changes in Demographic Features of West Bengal- Human Development in West Bengal.
3. Analysis of the Agricultural Economy of India and West Bengal- Role of Agriculture in India and West Bengal- Cash Crops, Food Crops, Marketable Surplus- Green Revolution in India and West Bengal- Productivity in Agriculture in India and West Bengal- Land Reforms in India and West Bengal-Agricultural Growth in India and West Bengal-Policy of Food procurement in India and West Bengal- Public Distribution System- Mahatma Gandhi National Rural Employment Guarantee Act- Economic Reforms in Agriculture.
4. Analysis of the Industrial economy of India and West Bengal- Role of Industry in India and West Bengal- Industrial Growth and Stagnation in India and West Bengal- Public Sector, Private Sector, Joint Sector- Role of Public Sector in India and West Bengal- Role of Small Scale Industries in India and West Bengal- Changes in Industrial Policy during Plan Period- Economic Reforms, New Industrial Policy, Liberalisation, Privatisation, Globalisation- Impact of Economic Reforms on Industries in India and West Bengal.

5. Indian Economy- A Comparison with Others: Basis of Comparisons: Growth in National Income, Per Capita Income- Literacy and Education- Population- Health Indicators- Sectoral Compositions.

   India and Pakistan- India and China- India and Japan.

PROJECT

There may be 2 types of Project, one based on Field Works and other based on Secondary Data.

Some suggested Field Works are:

1. Visit to village panchayat for agriculture based project
2. Visit to Village panchayat For data on land holdings, crop patterns, occupational patterns, Food procurement.

Suggested Projects on the Basis of Secondary data are:

1. Growth of Industries on the Basis of Annual Survey of Industries
2. Changes in Sectoral Composition of State/ National Income on the basis of National Accounts Data, State Domestic Product data.

ECONOMICS (ECON)

Class - XII

Full Marks 100

a. Group A	50
b. Group B	30
c. Project	20

GROUP - A
ECONOMIC THEORY
SECTION1. MICROECONOMICS

Chapter

1. Concepts of Function, Curves, Straight line, Slopes (non evaluative part)
2. Demand- Factors determining demand- Demand Function-Demand Schedule- Law of Demand- Individual Demand- Market Demand- Demand Curve-Change in Demand and Change in Quantity Demanded-Utility- Marginal Utility- Law of diminishing marginal utility- Law of demand- Explanation to the Law of demand- Income Effect- Substitution Effect- Exceptions to law of Demand- Inferior Goods-Giffen Goods- Consumer Surplus
3. Concept of Elasticity- Elasticity of Demand- Price, Income, Cross- Factors Affecting Elasticity of Demand- Measurement of Elasticity of Demand- Arc, Point- Unitary, Elastic, Inelastic, Perfectly elastic, Completely Inelastic Demand Curves- Implications of Elasticity.
4. Production Function- Short Run- Long Run- Law of variable Proportions- Returns to Scale- Economies, Diseconomies-Shapes of Average Product, Total Product and Marginal Product curves- Relationships among Those.
5. Cost of Production- Long Run- Short Run- Cost Curves- Relationships among AC, AVC, MC, AFC , TC, TVC, TFC- Interrelationship between Short Run Production and

Short Run Cost- Relationship between short run and Long run Costs- Derivation of Long Run Cost Curves from Short Run Cost Curves.

6. Revenue- Total –Average- Marginal- Relationships among them- Relationship between AR MR and E- Revenue Under Variable Price and Fixed Price Situation.

7. Profit Maximization- Producers equilibrium- Shut down condition.

8. Supply- Supply function- Determinants of Supply- Law of Supply- Individual Supply Curve- Market Supply Curve- Elasticity of Supply- Change in Supply and Change in quantity supplied- Supply curve of an individual Firm in case of Fixed Price Situation.

9. Different types of market- Perfect competition, monopoly, monopolistic competition, oligopoly, duopoly, price discrimination, bilateral monopoly, and monophony.

10. Market Equilibrium under Perfect Competition
Characteristics of Perfect Competition- Firm as a Price taker- Conformity with Fixed Price Situation- Price Determination- Interaction between Market Demand and market Supply-Equilibrium of a Firm- Short Run- Shut down Point- Supply Curve-Supply Curve of Industry-Long Run equilibrium- Normal Profit.

11. Equilibrium under Monopoly.

12. Cost Determined Pricing
Mark Up-Arbitrage.

13. Factor Market-
Land market- Rent- Ricardian Theory- Modern Theory-Labour- Labour Demand Curve-Labour Supply Curve-Marginal Productivity Theory of Distribution-Capital- Liquidity Preference theory of interest.

SECTION2. MACROECONOMICS

Chapter

14. National Income and Related Aggregates
Circular Flow of Income- Calculation of National Income- Value Added or product method, Expenditure method- Income method.

15. Determination of Income and Employment

Keynesian Approach- Aggregate Demand and its Components-Consumption and Consumption Function- Propensity to consume- Savings and Savings Function- Propensity to Save- Equilibrium level of Income- Investment Multiplier
Concept of Full Employment-Problem of deficient demand- Excess Demand – Inflation- Demand Pull- Cost Push

16. Money and Banking
Functions of Commercial Banks- Creation of Money or Credit or Deposit by Commercial Bank- Credit/Deposit/ Money Multiplier
Functions of Central bank- Credit Control Tools and Methods of Credit Control

17. Fiscal Policy
Expansionary Fiscal Policy- Government Expenditure Multiplier
Deficit Financing.
Recession- Fiscal Policy to Correct Recession
Inflation- Fiscal Policy to Correct Inflationary Pressure.

18. International Trade and Balance of Payments
Balance of Trade- Surplus- Deficit- Balance of Payments- Current Account- Capital account- Unilateral Transfer- Deficit BOP- Method to Correct Imbalance in BOP- Foreign Exchange Rate- Flexible Exchange Rate- Floating Exchange rate-Managed Floating Exchange rates.

GROUP B

INDIAN ECONOMY INCLUDING STATISTICAL TOOLS

SECTION1. STATISTICAL TOOLS

1. Measures of dispersion- Range- Standard Deviation- Lorenz Curve- Gini Coefficient

SECTION 2.INDIAN ECONOMY WITH SPECIAL REFERENCE TO WEST BENGAL (Poverty, Inequality, Unemployment and Financial Sector)

2. Poverty, Inequality and Unemployment in Indian Economy- Measures and Extent of Inequality- Policies regarding inequality- Different Measures of Poverty- Poverty situation in India and West Bengal- Government efforts to combat poverty- Prevailing Unemployment Situation in India and West Bengal- Different Unemployment reducing Programme- Impact of Economic Reforms.

3. Impact of Economic Reforms on Banking, Insurance and International Trade- Banking Sector reforms- Private Initiatives in Insurance and Insurance Regulatory and Development Authority- GATT, WTO, TRIPS and TRIMS- Trade Liberalisation in India.

PROJECT (20 marks)

There may be 2 types of Project, one based on Field Works and other based on Secondary Data.

Some suggested Field Works are:

1. Survey on Unemployment Situation in a Locality.
2. Survey of Poor People to Understand the Impact of Poverty.
3. Survey of Households to Assess the Impact of Private Banks/ Public Sector Banks.

Suggested Projects on the Basis of Secondary data are:

1. Unemployment Situation on the Basis of NSSO Data.
2. Expansion of Banking Sector on the Basis of RBI Data.
3. Export Import on the Basis of Foreign Trade Data.

MATHEMATICS (MATH)

Class - Xl

Full Marks: 100

Units	Title	Marks
I.	SETS AND FUNCTIONS	18
II.	ALGEBRA	25
III.	COORDINATE GEOMETRY	I7
IV.	CALCULUS	08
V.	MATHEMATICAL REASONING	04
VI.	STATISTICS AND PROBABILITY	08
	TOTAL	**80**

UNIT-I : SETS AND FUNCTIONS

1. Sets :

Sets and their representations. Empty set. Finite & Infinite sets. Equal sets. Subsets. Subsets of the set of real numbers especially intervals (with notations). Power set. Universal Set.

Venn diagrams. Union and Intersection of sets. Difference of sets. Complement of a set. Properties of Complement sets.

2. Relations & Functions

Ordered pairs, Cartesian product of sets. Number of elements in the cartesian product of two finite sets. Cartesian product of the reals with itself (upto Rx Rx R). Definition of relation, pictorial diagrams, domain codomain and range of a relation. Function as a special kind of relation from

one set to another. Pictorial representation of a function, domain, co-domain & range of a function. Real valued function of the real variable, domain and range of these functions, constant, identity, polynomial, rational, modulus, signum and greatest integer functions with their graphs. Sum, difference, product and quotients of functions.

3. Trigonometric Functions :

Positive and negative angles. Measuring angles in radians and in degrees and conversion from one measure to another. Definition of trigonometric functions with the help of unit circle. Truth of the identity $Sin^2X + Cos^2X = 1$, for all X. Signs of trigonometric functions and sketch of their graphs. Expressing Sin (X±Y) in terms of Sin x, Sin y, Cos x & Cos y. Deducing the identities like it following :

$$\tan(x \pm y) = \frac{\tan x \pm \tan y}{1 \mp \tan x \tan y}, \qquad \text{Cot}(x \pm y) = \frac{\text{Cot } x \text{ Cot } y \mp 1}{\text{Cot } y \pm \text{Cot } x}$$

$$\text{Sin } x + \text{Sin } y = 2 \text{ Six}\frac{x+y}{2} \text{ Cos}\frac{x-y}{2}, \qquad \text{Cos } x + \text{Cos } y = 2 \text{ Cos } \frac{x+y}{2} \text{ Cos}\frac{x-y}{2}$$

$$\text{Sin } x - \text{Sin } y = 2 \text{ Cos } \frac{x+y}{2} \text{ Sin}\frac{x-y}{2}, \qquad \text{Cos } x - \text{Cos } y = 2 \text{ Sin } \frac{x+y}{2} \text{ Sin } \frac{x-y}{2}$$

Identities related to sin2x, cos2x, tan2x, sin3x, cos3x and tan 3x. General solution of trigonometric equations of the type $\sin\theta = \sin\alpha$, $\cos\theta = \cos\alpha$ and $\tan\theta = \tan\alpha$.

Prcof and simple application of sine and cosine rules only.

UNIT-II : ALGEBRA

1. Principle of Mathematical Induction:

Process of the proof by induction, motivating the application of the method by looking at natural numbers as the least inductive subset of real numbers. The principle of mathematical induction and simple applications

2. Complex Numbers and Quadratic Equations:

Need for complex numbers, especially $\sqrt{-1}$, to be motivated by inability to solve every quadratic equation. Brief description of algebraic properties of complex numbers. Argand plane and polar representation of complex numbers.

Statement of Fundamental Theorem of Algebra, solution of quadratic equations in the complex number system.

Square-root of a complex number, Cube roots of unity and their properties.

3. Linear Inequalities:

Linear inequalities. Algebraic solutions of linear inequalities in one variable and their representation on the number line. Graphical solution of linear inequalities in two variables.

Solution of system of linear inequalities in two variables - graphically. Inequalities involving modulus function.

4. Permutations & Combinations:

Fundamental Principle of counting. Factorial n. (n!) Permutations and combinations, derivation of formulae and their connections, simple applications.

5. Binomial Theorem:

History, statement and proof of the binomial theorem for positive integral indices. Pascal's triangle, General and middle term in binomial expansion, simple applications.

6. Sequence and Series :

Sequence and Series. Arithmetic progression (A.P.), arithmetic mean (A.M.), Geometric progression (G.P.), general term of G.P., sum of n terms of a G.P., geometric mean (G.M.), relation between A.M. and G.M. Arithmetic/geometric series, infinite G.P. and its sum, Sum to n terms of the special series Σn, Σn^2 and Σn^3.

UNIT-III : COORDINATE GEOMETRY

1. Straight Lines:

Brief recall of 2D from earlier classes. Shifting of origin. Slope of a line and angle between two lines. Various forms of equations of a line : parallel to axes, point-slope form, slope-intercept form, two-point form, intercept form and normal form. General equation of a line. Equation of family of lines passing through the point of intersection of two lines. Distance of a point from a line.

2. Conic Sections:

Sections of a cone: circle, ellipse, parabola, hyperbola, a point, a straight line and pair of intersecting lines as a degenerated case of a conic section.

Standard equation of a circle; General equation of a circle; Standard equations and simple properties of parabola, ellipse and hyperbola. Introduction of directix of an ellipse and hyperbola.

3. Introduction to Three - dimensional Geometry:

Coordinate axes and coordinate planes in three dimensions. Coordinates of a point.

Distance between two points and section formula.

UNIT-IV : CALCULUS

1. Limits and Derivatives:

Derivative introduced as rate of change both as that of distance function and geometrically, intuitive idea of limit. Definition of derivative, relate it to slope of tangent of the curve, derivative of sum, difference, product and quotient of functions. Derivatives of polynomial and trigonometric functions.

UNIT-V : MATHEMATICAL REASONING

1. Mathematical Reasoning:

Mathematically acceptable statements. Connecting words / phrases consolidating the understanding of "if and only if (necessary and sufficient) condition", "implies", "and/or", "implied by", "and", "or", "there exists" and their use through variety of examples related to real life and Mathematics. Validating the statements involving the connecting words difference between contradiction, converse and contrapositive.

UNIT-VI : STATISTICS & PROBABILITY

1. Statistics:

Measure of dispersion; mean deviation, variance and standard deviation of ungrouped/grouped data. Analysis of frequency distributions with equal means but different variances.

2. Probability:

Random experiments outcomes, sample spaces (set representation). Events: occurrence of events, 'not', 'and' and 'or' events, exhaustive events, mutually exclusive events Axiomatic (set theoretic) probability, connections with the theories of earlier classes. Probability of an event, probability of 'not', 'and' & 'or' events.

Project : 20 Marks

MATHEMATICS (MATH)

Class - XlI

Full Marks: 100

I.	RELATIONS AND FUNCTIONS	08
II.	ALGEBRA	11
III.	CALCULUS	36
IV.	VECTORS AND THREE - DIMENSIONAL GEOMETRY	13
V.	LINEAR PROGRAMMING	04
VI.	PROBABILITY	08
	TOTAL	**80**

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, 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 matrix, 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:

Determinant of a square matrix (up to 3 x 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 system of linear equations by examples, solving system of linear equations in two or three variables (having unique solution) using inverse of a matrix. Cramer's Rule and its applications.

UNIT-III : CALCULUS

1. Continuity and Differentiability:

Continuity and differentialiabity, derivative of composite functions, chain rule, derivates of inverse trigonometric functions, derivate of implicit functions, concept of exponential and logarithmic functions to the base e. Logarithmic functions as inverse of exponential functions.

$\lim_{x\to 0} 1/x$, $\lim_{x\to \infty} 1/x$, $\lim_{x\to \infty} (1+1/x)^x$, $\lim_{x\to 0} (1+x)^{1/x}$, $\lim_{x\to 0} \frac{\log(1+x)}{x}$, $\lim_{x\to 0} \frac{e^x-1}{x}$

Derivatives of logarithmic and exponential functions. Logarithmic differentiation, derivative of functions expressed in parametric forms. Second order derivatives. Rolle's and Lagranges's Mean value theorems (without proof) and their geometric interpretation and simple applications.

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),

3. Integrals:

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

$$\int \frac{dx}{x^2 \pm a^2} \quad \int \frac{dx}{\sqrt{x^2 \pm a^2}} \quad \int \frac{dx}{\sqrt{a^2 - x^2}} \quad \int \frac{dx}{ax^2 + bx + c} \quad \int \frac{dx}{\sqrt{ax^2 + bx + c}}$$

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

$$\int \sqrt{ax^2 + bx + c}\, dx \quad \int (px+q)\sqrt{ax^2 + bx + c}\, dx, \int \frac{dx}{a + b\,Cos\,x} \quad \int \frac{dx}{a + b\,Sin\,x}$$

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, areas of circles/parabolas/ ellipses (in standard form only), Area under the curve y=sin x, y=cos x, 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 method of separation of variables, homogeneous, differential equations of first order and first degree. Solutions of linear differential equation of the type:

$\frac{dy}{dx} + py = q$, where p and q are functions of x and

$\frac{dx}{dy} + px = q$, where p and q are function of y

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, 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.

Scalor 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, shortest distance between two lines. Cartesian and vector equation of a plane. 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

1. Linear Programming:

Introduction, definition of 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

1. Probability:

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

Project : 20 Marks

PHYSICS (PHYS)

CLASS - XI

Full Marks 100

Theory Marks: 70

		Marks
Unit – I	Physical World & Measurement	02
Unit – II	Kinematics	10
Unit – III	Laws of motion	10
Unit- IV	Work, energy & Power	05
Unit – V	Motion of System of particles & Rigid Body	06
Unit- VI	Gravitation	07
Unit- VII	Properties of Bulk Matter	10
Unit- VIII	Thermodynamics	05
Unit- IX	Behaviour of perfect Gas & Kinetic theory of Gases	05
Unit- X	Oscillations & waves	10
	Total-	**70**

Unit – I Physical World & Measurement

Physics – scope and excitement; nature of physical laws; physics technology and society.

Need for measurement; unit of measurement; systems of units; SI units, fundamental and derived units. Length, mass and time measurement; accuracy and precision of measuring instruments; errors in measurement; significant figures.

Dimensions of physical quantities, dimensional analysis and its applications.

Unit – II Kinematics

Frame of reference (inertial and non-inertial frames). Motion in a straight line ; position- time graph, speed and velocity.

Elementary concepts of differentiation and integration for describing motion.

Uniform and non- uniform motion, average speed and instantaneous velocity.

Uniformly accelerated motion, velocity – time, position-time graphs, relations for uniformity accelerated motion (graphical treatment).

Scalar and vector quantities; position and displacement vectors, general vectors and notation, equality of vectors, multiplication of vectors by a real number; addition and subtraction of vectors. Relative velocity. Unit vector; resolution of a vector in a plane – rectangular components. Scalar and vector product of vectors. Motion in a plane. Cases of uniform velocity and uniform acceleration- projectile motion. Uniform circular motion.

Unit – III Laws of motion

Intuitive concept of force. Inertia, Newton's first law of motion; momentum and Newton's second law of motion; impulse; Newton's third law of motion. Law of conservation of linear momentum and its applications. Equilibrium of concurrent forces. Static and kinetic friction, laws of friction, rolling friction.

Dynamics of uniform circular motion; centripetal force, examples of circular motion (vehicle on level circular road, vehicle on banked road).

Unit- IV: Work, energy and Power

Work done by a constant force and a variable force; kinetic energy, work-energy theorem, power.

Notion of potential energy, potential energy of a spring; conservative forces: conservation of mechanical energy (kinetic and potential energies); non-conservative forces; motion in a vertical circle, elastic and inelastic in one and two dimensions.

Unit- V: Motion of System of Particles and Rigid body

Centre of mass of a two-particle system, momentum conservation and centre of mass motion. Centre of mass of a rigid body; centre of mass of uniform rod.

Moment of a force, torque, angular momentum, conservation of angular momentum with some examples.

Equilibrium of rigid bodies, rigid body rotation and equations of rotational motion, comparison of linear and rotational motions; moment of inertia, radius of gyration.

Values of moments of inertia for simple geometrical objects (no derivation). Statement of parallel and perpendicular axes theorems and their applications.

Unit-VI: Gravitation

Keplar's laws of planetary motion. The universal law of gravitation.

Acceleration due to gravity and its variation with attitude, depth and rotation of earth.

Gravitational potential energy; gravitational potential. Escape velocity. Orbital velocity of a satellite. Geo-stationary satellites.

Unit-VII: Properties of Bulk Matter

Elastic behaviour, stress-strain relationship, Hooke's law , Young modulus, bulk modulus, shear, modulus of rigidity, poison's ratio; elastic energy

Pressure due to a fluid column; Pascal's law and its applications (hydraulic lift and hydraulic brakes). Effect of gravity on fluid pressure.

Viscosity, stoke's law , terminal velocity Reynold's number, streamline and turbulent flow. Critical velocity Bernoulli's theorem and its applications.

Surface energy and surface tension, angle of contact, excess of pressure, application of surface tension ideas to drops, bubbles and capaillary rise.

Heat temperature thermal expansion; thermal expansion of solids, liquids and gases ideal gas laws, isothermal and adiabatic processes; anomalous expansion and its effect, specific heat capacity; Cp, Cv- calorimetry; change of state – specific latent heat capacity.

Heat transfer – conduction; convection and radiation, blackbody radiation Kirchoff's law, absorptive and emissive powers and green house effect thermal conductivity, Newton's law of cooling, Wein's displacement law, stefan's law.

Unit-VIII: Thermodynamics

Thermal equilibrium and definition of temperature (zeroth law of Thermodynamics). Heat, work and internal energy. First law of thermodynamics.

Second law of thermodynamics; reversible and irreversible processes. Heat engines and refrigerators.

Unit-IX: Behaviour of Perfect Gas and Kinetic Theory

Equation of state of a perfect gas, work done in compressing a gas.

Kinetic theory of gases- assumptions; concept of pressure. Kinetic energy and temperature.

Speed of gas molecules; degrees of freedom, law of equilibrium of energy (statement only) and application to specific heats of gases; concept of mean free path, Avagadro's number.

Unit- X: Oscillation and waves

Periodic motion – period, frequency, displacement as a function of time periodic functions.

Simple harmonic motion (S.H.M) and its equation; phase; oscillations of a spring- restoring force and force constant; energy in S.H.M – kinetic and potential energies simple pendulum – derivation of expression for its time period; free, forced and damped oscillations(qualitative ideas only)resonance.

Wave motion Longitudinal and transverse waves, speed of wave motion.

Displacement relation for a progressive wave. Principle of superposition of waves, reflection of waves in string and organ pipes, fundamental mode and harmonics, beats , Doppler effect.

PHYSICS (PRACTICALS)

Note; Every student will perform 15 experiments (8 from Section A & 7 from Section B). The activities mentioned are for the purpose of demonstration by the teachers only. These are not to be evaluated during the academic year. For evaluation in examination, student would be required to perform two experiments- 1 out of 3 from Section A & 1 out of 3 from Section B.

Total Marks 2x15=30marks

SECTION A

Experiments

(Any 8 experiments out of the following to be performed by the students)

1. To measure diameter of a small spherical/cyclindrical body using Vernier callipers.
2. To measure internal diameter and depth of a given beaker/calorimeter using Vernier Capllipers and hence find its volume.
3. To measure diameter of a given wire using screw guage.
4. To measure thickness of a given sheet using screw guage.
5. To measure volume of an irregular lamina using screw guage
6. To determine radius of curvature of a given spherical surface by a spherometer.
7. To find the weight of a given body using parallelogram law of vectors.
8. Using a simple pendulum plot L-T and L-T2 graphs. Hence find the effective length of second's pendulum using appropriate graph.
9. To study the relationship between force of limiting friction and normal reaction and to find co-efficient of friction between a block and a horizontal surface.
10. To find the downward force, along an inclined plane, acting on a roller due to gravitational pull of the earth and study its relationship with the angle of inclination by plotting graph between force and sinθ

Activities (for the purpose of demonstration only)

1. To make a paper scale of given least count, e.g 0.2cm, 0.5cm.
2. To determine mass of a given body using a metre scale by principle of moments.
3. To plot a graph for a given set of data, with proper choice of scales and error bars.
4. To measure the force of limiting friction for rolling of a roller on a horizontal plane.
5. To study the variation in range of a jet of water with angle of projection.
6. To study the conservation of energy of a ball rolling down on inclined plane (using a double inclined plane)
7. To study dissipation of energy of a simple pendulum by plotting a graph between square of amplitude and time.

SECTION A

Experiments

(Any 7 experiments out of the following to be performed by the students)

1. To determine Young's modulus of elasticity of the material of a given wire.
2. To find the force constant of a helical spring by plotting graph between load and extension.
3. To study the variation in volume with pressure for a sample of air at constant temperature by plotting graphs between P and V, and between P and I/V.
4. To determine the surface tension of water by capillary rise method
5. To determine the coefficient of viscosity of a given viscous liquid by measuring terminal velocity of a given spherical body.
6. To study the relationship between the temperature of a hot body and time by plotting a cooling curve.
7. To determine specific heat of a given (i) solid (ii) liquid by method of mixtures.
8. To study the relation between frequency and length of a given wire under constant tension using sonometer.
9. To study the relation between the length of a given wire and tension for constant frequency using sonometer.
10. To find the speed of sound in air at room temperature using a resonance tube by two – resonance positions.

Activities (for the purpose of demonstration only)

1. To observe change of state and plot a cooling curve for molten wax.
2. To observe and explain the effect of heating on a bi-metallic strip.
3. To note the change in level of liquid in a container on heating and interpret the observations.
4. To study the effect of detergent on surface tension by observing capillary rise.
5. To study factors affecting the rate of loss of heat of a liquid.
6. To study the effect of load on depression of a suitably clamped meter scale loaded
   i. At its end
   ii. In the middle.

PHYSICS (PHYS)

CLASS - XII

Full Marks 100

Theory Marks: 70

		Marks
Unit – I	Electrostatics	08
Unit – II	Current Electricity	08
Unit – III	Magnetic effect of current & Magnetism	08
Unit- IV	Electromagnetic induction and alternating current	08
Unit – V	Electromagnetic waves	03
Unit- VI	Optics	14
Unit- VII	Dual Nature of Matter	04
Unit- VIII	Atoms and Nuclei	06
Unit- IX	Electronic Devices	08
Unit- X	Communication Systems	03
	Total-	**70**

Unit – I: Electrostatics

Electric Charge; conservation of charge, Coulomb's law- force between two point charge, forces between multiple charges; superposition principle and continuous 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 uniform electric field. Electric flux, statement of Guass 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, electrical potential -energy of a system of two point charges and of electric dipole in an electrostatic field.

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

Unit – II: Current Electricity

Electric current, flow of electric charge in a metallic conductor, drift velocity, 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.

Internal resistance of a cell, potential difference and emf of a cell, combination of cells in series and in parallel. Elementary idea of secondary cells.

Kirchoff's laws and simple applications. Wheatstone bridge, metre bridge. Potentiometer – principle and its applications to measure potential difference and for comparing emf of two cells; measurement of internal resistance of a cell.

Unit – III: Magnetic effect of current & Magnetism

Concept of magnetic field, Oersted's experiment.

Biot – Savart law and its application to current carrying circular loop. Ampere's law and its applications to 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 in a uniform magnetic field. Force between two parallel current conductors – definition of ampere. Torque experienced by a current loop in uniform 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. Magnetic dipole moment of a resolving 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 ferro – magnetic substances, with examples. Electromagnets and factors affecting their strengths. Permanent magnets.

Unit- IV: Electromagnetic Induction and Alternating Current

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 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, infrared, visible, ultraviolet, Xrays, 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 fibres, refraction at spherical surfaces, lenses, thin lens formula, lens- maker's formula. Newton's relation: Displacement method to find position of image (conjugate points) 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. Elementary idea of roman effect.

Optical instrument: Human eye, image formation and accommodation, correction of eye defects (myopia, hypermetropia, presbyopia and astigmatism) 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 Huygen's principle. Interference, Young's double slit experience for fringe width, coherent sources and sustained interference of light. Diffraction due to a single slit, width of central maximum. Resolving power of microscopes and astronomical telescopes. Polarisation, plane polarised light; Brewster's law, uses of plane polarised light and Polaroids.

Unit- VII: Dual Nature of Matter and Radiation

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

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

Unit- VIII: Atoms & Nuclei

Alpha – particle scattering experiment: Rutherford's model of atom; Bohr model, energy levels, hydrogen spectrum. Continuous and characteristic X – rays. Composition and size of nucleus, atomic masses, isotopes, isobars; isotones. Radio activity 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, conductors, insulators and Semiconductors; semiconductor diode – I-V characteristics of LED, photodiode, solar cell, and Zener diode;

Zener diode as a voltage regular. Junction transistor, transistor action, characteristics of a 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.

Practical

Every student will perform at least 15 experiments (7 from Section A & 8 from Section B). The activities mentioned here should only be for the purpose of demonstration. One Project of three marks is to be carried out by the students.

B. Evaluation Scheme for Practical Examination

Two experiments one from each section	
(1 out of 3 from Section A & 1 out of 3 from Section B)	8+8 Marks
Practical record (experiments & activities)	6 Marks
Project	3 Marks
Viva on experiments & project	5 Marks
	Total 30 Marks

Section A

Experiments

(Any 7 experiments out of the following to be performed by the students)

1. To find resistance of a given wire using metre bridge and hence determine the specific resistance of its materials.
2. To determine resistance per cm of a given wire by plotting a graph of potential difference versus current.
3. To verify the laws of combination (series/parallel) of resistances using a metre bridge.
4. To compare the emf of two given primary cells using potention meter.
5. To determine the internal resistance of given primary cell using potentiometer.
6. To determine resistance of a galvanometer by half - deflection method and to find its figure of merit.
7. To convert the given galvanometer (of known resistance and figure of merit) into an ammeter and voltmeter of desired range and to verify the same.
8. To find the frequency of the a.c. mains with a sonometer.

Activities (For the purpose of demonstration only)

1. To measure the resistance and impedance of an inductor with or without iron core.
2. To measure resistance, voltage (AC/DC), current (AC) and check continuity of a given circuit using multi meter.
3. To assemble a household circuit comprising three bulbs, three (ON/OFF) switches, a fuse and a power source.

4. To assemble the components of a given electrical circuit.
5. To study the variation in potential drop with length of a wire for a steady current.
6. To draw the diagram of a given open circuit comprising at least a battery, resistor / rheostat, key, ammeter and voltmeter. Mark the components that are not connected in proper order and correct the circuit and also the circuit diagram.

Section B

Experiments

(Any 8 experiments out of the following to be performed by the students)

1. To find the value of *v* for different values of *u* in case of a concave mirror and to find the focal length.
2. To find the focal length of a convex mirror, using a convex lens.
3. To find the focal length of a convex lens by plotting graphs between *u* and *v* between 1/*u* and 1/*v*.
4. To find the focal length of a concave lens, using a convex lens.
5. To determine angle of incidence and angle of deviation.
6. To determine refractive index of a glass slab using a travelling microscope.
7. To find refractive index of a liquid by using (i) concave mirror, (ii) convex-lens and plane mirror.
8. To draw the I-V characteristic curve of a p-n junction in forward bias and reverse bias.
9. To draw the characteristic curve of a Zener diode and to determine its reverse break down voltage.
10. To study the characteristics of a common – emitter npn or pnp transistor and to find out the values of current and voltage gains.

Activities (For the purpose of demonstration only)

1. To identify a diode, an LED, a transistor, and IC, a resistor and a capacitor from mixed collection of such items.
2. Use of multi meter to i) identity base of transistor (ii) distinguish between npn and pnp type transistors. (iii)see the un-directional flow of current in-case of a diode and an ED (iv) check whether a given electronic component (e.g diode, transistor or IC) is in working order.

3. To study effect of intensity of light (by varying distance of the source) on an L.D.R.
4. To observe refraction and lateral deviation of a beam of light incident obliquely on a glass slab.
5. To observe polarization of light using two polaroids.
6. To observe diffraction of light due to a thin slit.
7. To study the nature and size of the image formed by (i) convex lens (ii) concave mirror, on a screen by using a candle and a screen (for different distance of the candle from the Lens/ mirror).
8. To obtain a lens combination with the specified focal length by using two lenses from the given set of lenses.

AGRONOMY (AGNM)

Class - XI

Full Marks 100

Theory-80 marks

1. **Weather, Climate and Seasons**: Factors of weather affecting crop growth, Crop distribution, Crop seasons, broad classification of crops according to their uses.
2. **Soils**: Definition of soil; factors of soil formation, physical properties of soil affecting plant growth – soil texture, structure, bulk density, soil water.
3. **Cultivation:** Land selection, tillage, sowing, cultivation, harvesting and uses of different kinds of farm implements.
4. **Crop production:** fibre (jute), tuber (potato), pulses (gram), oilseed (mustard), fodder (maize & berseem).
5. **Irrigation and Drainage:** sources and different methods of irrigation, role of irrigations and drainage in crop production, important methods of drainage.
6. **Concepts of mixed:** specialized and subsistence farming, crop rotation, inter, multiple and relay cropping.

PRACTICAL (20 marks)

1. Acquaintance with common farm implements and their operations- Dismantling and assembling of mould-board plough, seed drill, wheel-hoe and rotary weeder.
2. Measurement and record of temperature & rainfall.
3. Seed testing and seed dressing.
4. Determination of soil texture by feel method.
5. Familiarity with different crop production operations (seedling raising, transplanting etc.) in the important crops consistent to the theory course.
6. Acquaintance with the cultivation of important crops.
7. Allotment of plots, for growing crops by individual.
8. Visit to important agricultural, horticultural, animal production farms.

AGRONOMY (AGNM)

Class - XII

Full Marks 100

Theory-80 marks

1. Growth of crop; concept of field components; growth stages of crops; preliminary concept of the development physiology related to growth of crops such as rice, wheat, potato and jute.
2. Major and minor plant nutrients and their availability to plants; soil organic matter and soil organisms, soil reaction and ion exchange; saline, sodic and acid soils, soil erosion and its control.
3. Manures and fertilizers: Role of manures and fertilizers in crop production, important manures and fertilizers in crop production, important manures and fertilizers- compost, farm yard manure, green manure, oil cake, ammonium sulphate, urea, calcium ammonium nitrate, super phosphate, potassium sulphate, mixed fertilizers – their properties and uses.
4. Crop production and propagation: cereals (rice and wheat0, sugarcane, banana, tomato, mango, brinjal.
5. Crop protection: nature of damage due to pests, diseases and weeds, insect pests, diseases, weeds and methods of their control; protection against rodents; precautions required to handle pesticidal chemicals.
6. Law of diminishing returns in fertilizer use, special features of rainfed and irrigated agriculture. Cost of production of crops and important farm operations like ploughing, weeding, harvesting, threshing etc.

PRACTICAL (20 marks)

1. Identification of different manures and fertilizers. Acquaintance with different methods of fertilizer application. Study of the effect of fertilizers and other agricultural chemicals on crop growth and yield.
2. Familiarity with different crop production operations (seedling raising, transplanting etc) in the important crops consistent to the theory course.
3. Identification of different farm weeds, important diseases, insect pests and their damages, handling of hand sprayer and duster.
4. Construction of manure pit. Raising of green manure crops for green manuring.
5. Acquaintance with the cultivation of important crops according to the theory course.
6. Students' practice of budding, inarching & Goote making.

ANTHROPOLOGY (ANTH)

CLASS - XI

Full Marks 100

(Theory- 80 Marks)

1. HISTORY, AIM, SCOPE OF ANTHROPOLOGY

i) Definition of Anthropology, branches, interrelationship with other disciplines (Biology, Geology, Psychology, Sociology, Economics, Education, Political Science, Geography and History).

ii) Its major branches: Biological, Archaeological/Prehistoric, Linguistic & social cultural.

iii) The distinctiveness of Anthropology as a separate discipline.

iv) Development of Anthropology in Indian context indicating major stages.

v) Applied areas of Anthropology: Nutrition, Forensic, Development & Welfare.

2. HUMAN MORPHOLOGY & IT'S EVOLUTIONARY STUDY

i) Human's external morphology.

ii) Skeletal morphology: Definition & functions of Human Skeleton name, numbers, position of bones that constitute human skeleton (brief description, details not required)

iii) Anatomical modifications due to erect posture & bipedal gait/erect posture.

3. HUMAN'S PLACE IN ANIMAL KINGDOM

i) Systematic position of man in Animal Kingdom, Primates Definition, Characteristics, Classification (Up to Family Level) according to Simpson.

4. EMERGENCE OF HUMAN: BIO-CULTURAL PERSPECTIVES

i) Environmental background of human evolution- Geological time-scale, Pleistocene environment with it's evidences.

ii) Major Stages of Hominid evolution: Australopithecines (General Features & Examples),*Homo erectus* (Java man) *Homo sapiens neanderthalensis* (La-Chapelle-aux-saints) Archaic Home sapiens (Narmada Man),Modern *Homo sapiens* (Cro-Magnon)

iii) Major Stages of Prehistoric culture: Palaeolithic, Mesolithic, Neolithic (General Features & Examples only)

iv) Typo-technological features of Prehistoric tools:Handaxe, Cleaver, Chopper, Scraper, Point, Blade, Burin & Leaf-point ,Baton-de-commandement, Harpoon, Microliths celt, Ring Stone.

v) Changes in subsistence strategies from hunting-gathering to food production in relation to tool-typo-technology & environment during prehistoric periods.

(Project - 20 Marks)

ANTHROPOLOGY (ANTH)

CLASS - XII

Full Marks - 100

(Theory- 80 Marks)

I. HUMAN VARIATION

i) Concept of Race, racism, UNESCO Statement on race, causes of race formation.

ii) Major division of mankind: Caucasoid Mongoloid, Negroid(Morphology criteria & distribution)

iii) Racial criteria: Definition types (skin colour, nose, Hair, Stature, ABO Blood group antigens)

iv) Racial classification of undivided India according to Risley, Guha & Sarkar.

II. BIOLOGICAL BASIS OF INHERITENCE IN MAN

i) Gametogenesis in man & its significance in man.

ii) Chromosome, Karyotype.

iii) Mendelian inheritance in man (ABO blood group antigen albinism)

III. HUMAN GROWTH

i) Basic concepts of growth, development & maturation & its relevance in Anthropology.

IV. SOCIETY & CULTURE

i) Concept of culture, material, culture, acculturation, enculturation.

ii) Definition & concept of society; features of food gathering, pastoral & agriculture society (with special reference to Indian tribes)

iii) Social stratification: Definition Caste-definition, Features of Caste system in India

iv) Tribe: Definition, Features, Geographical distribution, Economic distribution.

v) Economic Anthropology: Definition, basic concepts: production, distribution & consumption

vi) Family: Definition, Features, Types, Functions (with special reference to tribal & pre-industrial society).

vii)Clan: Definition types (with special reference to tribal India)

viii) Marriage: Definition, types, rules of marriage, ways of acquiring mates in tribal society.

ix) Man, Environment & Culture: interrelationship between ways of life in a particular ecological context & material culture with reference to The Birhors, The Todas, The Gwos & The Santalis.

x) Concept of religion: Animism, Animalism, Magic, Totem & Taboo.

xi) Supernatural beliefs & practices of the above mentioned tribes.

(Project - 20 Marks)

COMMERCIAL LAW AND PRELIMINARIES OF AUDITING (CLPA)

CLASS-XI

Full Marks 100

Commercial Law (40 Marks)

1. Introduction (5 marks)

a) Definition of Law, b) Meaning of Commercial Law, c) Sources of Indian Commercial Law

2. Law of Contract (20 marks)

a) Definition and meaning of agreement and contract - Essential elements of a contract.

b) Offer and acceptance - Definition and meaning of offer, offerer, offeree, promise, promisor, promisee; Rules regarding offer - Definition and meaning of acceptance; Rules regarding acceptance - Methods of communication of offer and acceptance - Revocation of an offer and acceptance.

c) Consideration - Definition and meaning of consideration - Types of consideration - Rules regarding consideration - "No consideration No Contract"; Exceptions to the Rule.

d) Capacity of parties - Definition and meaning of capacity of parties - Definition and meaning of minority, The Law regarding Minor's Agreement - Definition and meaning of persons of unsound mind, effects of agreements made by persons of unsound mind - meaning of disqualified persons.

e) Free consent - Definition and meaning of free consent - coercion, undue Influence, Misrepresentation, Fraud, Mistake; meaning, Rules regarding these.

3. The law relating to Sale of Goods (15 marks)

a) Definition of Buyer, Seller; Meaning and definition of Goods, classification of Goods - Existing, Future, Contingent - Sale and Agreement to sell, difference between these two - The essential dements of a contract for the sale of goods - conditions and warranties, Implied condition and Implied Warranties - The Doctrine of Caveat Emptor

b) Transfer of ownership - when does property pass from the seller to the Buyer - Transfer of title by Non-owner.

Preliminaries of Auditing (40 Marks)

Unit-1 : Introduction to Auditing : (10 marks)

Definition of Auditing - Evolution of Auditing - Nature of Auditing - objectives of Auditing: Primary and Secondary - Importance of Auditing - Advantages of Auditing - Limitations - Relation and Differences between Accounting and Auditing - An Auditor is not an Accountant - Auditor: Professional and General Qualifications.

Unit-2 : Errors and Frauds and Auditor: (5 marks)

Errors in Accounting - Detection of Errors by Auditor - Frauds : Misappropriation and Manipulation - Detection of Frauds by Auditor - Duties of Auditor in relation to Errors and Frauds.

Unit-3 : Different Types of Audit : (15 marks)

On the basis of Law : Statutory Audit - Non-statutory Audit - Government Audit. - On the basis of Time : Continuous Audit - Periodical Audit - Interim Audit. - On the basis of scope of work : Complete Audit - Partial Audit. - Interval Audit - Advantages and Limitations of Each Type of Audit - Distinction between : Continuous Audit and Periodical Audit, Statutory Audit and Non-statutory Audit - Interval Audit and Interim Audit.

Unit-4 : Internal Control System : (10 marks)

Definition, Features, Advantages and Limitations of Internal Control System - Internal Checking System : Definition - Objectives - Advantages - Limitations - Distinctions between Internal Control System and Internal Checking System - Relevance of Interal Control System in Auditing.

PROJECT : (20 marks)

1) Imagine yourself a buyer. Write a report of the steps you should follow in case of breach of contract of Sale of Goods.
2) Visit a big Shopping Mall and prepare a report on its internal control/internal checking system.

COMMERCIAL LAW AND PRELIMINARIES OF AUDITING (CLPA)

CLASS-XII

Full Marks 100

Commercial Law (40 Marks)

1. The Law of partnership (15 marks)

a) Introduction - Definition of partnership firm, essential elements of a partnership - who can be a partner? - Legal status of partnership firms - classification of partnership and partners - partnership Deed.

b) Registration of Partnership firms - The formalities of registration - Consequences of non-registration.

c) Rights and liabilities of partner - Mutual rights and duties u/s 12, 13 - The authority of a partner, Express and Implied authority, Limitations of implied authority, Alteration of authority, Authority in an emergency - Liability of partners to outsiders - Rights and duties of partners - Position of minor in partnership firm.

2. The Law relating to Negotiable Instruments (15 marks)

a) Introduction - Concept of Negotiable Instruments, Essential features of Negotiable Instruments, Types of Negotiable Instruments - Promissory Note: definition and essential elements - Bills of Exchange; definition and essential elements - Cheque: Definition, Features, Types - Difference between promissory Note and Bill of Exchange, Difference between Bill of Exchange and Cheque - Meaning of Holder and Holder in due course, Rights of a Holder in due course.

b) Acceptance, Negotiation, Endorsement - Acceptance : Definition, Types, When acceptance is not necessary; Time and place of presentments for acceptance, - Negotiation: Meaning, Negotiation by delivery, Negotiation by endorsement, Who may negotiate? - Endorsement: Definition, Effect, Types, Rules of endorsement.

3. The Law of Insurance (10 marks)

a) Principles - Objects of insurance - contract of insurance; characteristics - meaning of the terms insurer, insured, insurance policy, premium, risk, cover note.

b) Life insurance - Definition, difference between life insurance and property insurance, types of life insurance, meaning of surrender value, Nomination, procedures, Effects of suicide.

c) Marine Insurance - Definition, features, types, Fire Insurance - Definition, features, types,

Preliminaries of Auditing (40 Marks)

Unit-1 : New Branches of Auditing (15 marks)

i) Cost Audit : Definition - Objectives - Advantages - Limitations

ii) Management Audit : Definition - Objectives - Advantages - Limitation

iii) Performance Audit : Definition - Objectives - Advantages - Limitations

iv) Social Audit : Definition Objectives - Advantages - Limitations

Unit-2 : Pre-Audit Procedure (15 marks)

i) Preparatory Steps before commencement of new audit

ii) Audit Programme : Definition - Objectives - Features - Advantages - Limitations

iii) Audit Memorandum : Definition - General Contents.

iv) Explanation of the Terms : Audit File - Audit planning - Audit working papers (excluding detailed discussion)

v) Routine Checking : Definition - Scope - Objectives - Advantages - Limitations.

vi) Test Checking : Definition - Factors to be considered - Advantages - Limitations

Unit-3 : Vouching of Transactions (10 marks)

i) Vouching : Definition - Features - Objectives - Importance - Important Factors to be considered in vouching.

ii) Voucher : Definition - classification - Features

iii) Comparison between Routing checking and vouching.

PROJECT : (20 marks)

1) Visit an Audit Firm, collect data on the pre-audit procedure and prepare a report.

2) Visit two partnership firms, go through their Partnership Deed and write a report.

COSTING AND TAXATION (CSTX)

CLASS-XI

Full Marks 100

Costing (40 Marks)

Unit-I : **(8 marks)**

Introduction

Definition of Cost - Costing - Cost Accounting - Cost Centre - Cost Unit - Objectives of Cost Accounting - Features of Cost Accounting - Advantages of Cost Accounting - Limitations of Cost Accounting - Steps or Factors Necessary for Installation of a Costing System

Unit-II : **(14 marks)**

A. Classification of Cost

i) Element - based Classification : Raw Materials Cost - Labour Cost - Other Expenses Overhead - Prime Cost.

ii) Function - based Classification : Factory Cost - Administration Cost - Sellin Cost - Distribution Cost - Research and Development Cost.

iii) Behaviour-based Classification : fixed Cost - Variable Cost - Semi-Variable/Semi-Fixed Cost - Distinctions between Fixed Cost and Variable Cost.

B. Preparation of Cost Sheet

Definition of Cost Sheet - Basic Components of Cost Sheet - Practical Problems on Cost Sheet (Simple Problems excluding Cost Estimation).

Unit-III : Cost of Materials-I **(18 marks)**

A. Storing of Materials

i) Bin Card - Definition and Necessity

ii) Stores Ledger - Definition and Necessity

iii) Centralised Stores and Decentralised Stores.

B. Materials Control

i) Necessity of Material Control

ii) Fixation of Stock Levels of Materials : Re-order Stock Level - Maximum Stock Level - Minimum Stock Level - Average Stock Level - Danger Stock Level (with Simple Practical Problems)

iii) Fixation of Economic Order Quantity (EOQ) : Definition and Advantages of EOQ - Simple Problems on Determination FOQ (with the help of Formula)

Taxation (40 Marks)

Unit-I **(10 marks)**

a) A brief history of Income Tax in India, Tax structure in India - Direct Tax, Indirect Tax.

b) Basic Concepts and definitions under income Tax Act :- Previous Year, Assessment year, Assessee, Person, Sources of Income, heads of Income, Gross Total Income, Total Income.

c) Incomes which do not form part of Total Income : Receipts by a member from Hindu Undivided family [Section 10(2)], Share of profits from a partnership firm (Section 10(2A)] Sums received under life insurance policy [Section 10(10D)], Daily allowances to MPs and MLAs [Section 10(17)], Awards [Section 10(17A)], Income of a local authority [Section 10(20)], Income from dividend [Section 10(34)], Income from units [Section 10(35)], Long term capital gains from transfer of equity shares or units [Section 10(38)].

Unit-II **(10 marks)**

Residential Status and Incidence of Tax of individual assessee.

Unit-III **(5 marks)**

Agricultural Income : Definition, Taxability of income from sale of tea and coffee grown and manufactured in India. Very common instances of agricultural incomes and non-agricultural incomes.

Unit-IV **(15 marks)**

Income under the head "Salaries"

A) Basis of Charge (Section 15), Essential norms of salary income, Allowances :- Basic Salary, Dearness Allowance, City Compensatory Allowance, House Rent Allowance [Section 10(13A)], Medical Allowance, Bonus, Children Education Allowance, Transport Allowance,

B) Perquisites [Section 17(2)]

a) Valuation of rent free unfurnished accommodation provided to (i) Central and State Government Employee and (ii) Private Sector Employees [Rule 3(1)] - Valuation of rent free furnished accommodation.

b) Valuation of perquisites in respect of (i) Free education to employee's children : (ii) Payment of school fees by the employer, (iii) Education facility in employee's institute.

c) Very common examples of tax free perquisites.

III. Deduction for professional tax or tax on employment [Section 16(iii)].

Project (20 Marks)

1. Visit any manufacturing firm, collect real data and prepare a detailed Cost Sheet.
2. Collect data from any relative, who is a salaried person and compute his/her income from salary [excluding perquisites].

COSTING AND TAXATION (CSTX)

CLASS-XII

Full Marks 100

Costing (40 Marks)

Unit-I : **(10 marks)**

Cost of Materials-II

Methods of Pricing Materials issues from Stores and Preparation of Stores Ledger Accounts - FIFO Method, LIFO Method, Simple Average Method - Weighted Average Method - Advantages and Limitations of FIFO Method, LIFO Method, Simple Average Method and Weighted Average Method.

Unit-II : **(25 marks)**

I. Cost of Labour

Time Keeping - Methods of Time keeping (Manual and Mechanical) - Features of a Good Time Keeping System.

Time Booking - Methods of Time Booking Idle Time - Causes of Idle Time.

II. Methods of Remuneration

A) Time Rate Wage - Advantages & Limitations

B) Straight Piece Wages and Simple Problems Limitations

C) Differential Price Wage Rate : Taylor's Differential Price Wage Rate - Advantages and Simple Problems Limitation. Merrick's Differential Piece Wage Rate Method - Concept and Simple Problems.

D) Halsey and Rowan Premium Bonus Schemes - Concepts and Simple Problems.

Unit-III **(5 marks)**

Basic Concept of Overhead

Definition of Overhead - Importance of Overhead - Classification of Overhead (only element - based, function - based and behaviour - based classification) - Distinctions between Overhead and Prime Cost.

Taxation (40 Marks)

Unit-I **(20 marks)**

Income from "House Propertys"

i) Chargeability - essential conditions (Section 22), Property income exempt from tax on Annual Value [Section 23(1)]

ii) Computation of income from let out house property : adjustment of vacancy period, standard deduction under Section 24(a), Interest on borrowed capital under Section 24(b) (excluding interest for pre-construction period)

iii) Computation of income from one self occupied house.

Unit-II **(10 marks)**

Income from "Capital Gains" (Theory only)

Basis of charge [Section 45(1)], Meaning of Capital asset ;Section 2(14)], Examples of Assets not treated as capital asset, Short term Capital Asset [Section 2(42A)], Long term Capital Asset [Section 2(29A)], Transfer of Capital Asset [Section 2(47)]

Unit-III **(10 marks)**

Income from Other Sources

Basis of charge (Section 56), Some examples of income generally taxable under this head, Tax treatment of winning from lotteries, horse race, card games, cross word puzzles [Section 56(2)i(b)], Interest on Securities [Section 56(2)i(d)].

Project (20 Marks)

1. Select any manufacturing unit, observe the wage payment system followed there and prepare a report on your observation.
2. Select any house having both let out and self occupied units, take the necessary information from the owner of the house and compute income from house property.

COMPUTER APPLICATION (COMA)

Class - XI

Full Marks 100

THEORY - 70 Marks

PRACTICAL - 30 Marks

A. Brief Review of Computer Systems (40 Marks)

i) Evolution of Computers and Computer Organization :

- **Evolution of Computers**
  - Abacus, Napier's Bone, Pascaline, The Babbage Machine
  - Stored Program Concept, Von Neumann Concept / Architecture
- **Computer Hardware Generations**
  - First, Second, Third, Fourth and Fifth Generation of Computers;
  - Components, Advantages, Disadvantages
- **Concept of Circuit Integration**
  - SSI, MSI, LSI, VLSI, ULSI
- **Classification of Computers**
  - Analogue, Digital, Hybrid Computers
  - Mainframe and Super Computer
  - Mini, Micro, Laptop Computer
- **Computers in Modern Society**
- **Concept of Data and Information, Data Processing**
- **Brief description of each functional block of a computer**
  - Block Diagram of a Computer System
  - Input Devices (Keyboard, Mouse, Scanner, Touch Screen, OMR, OCR, MICR, Graphic Tablet, Barcode Reader, Light Pen, Microphone, Joystick)
  - Output Devices
    - Monitor – CRT, LCD

        - Printer – Impact Printers (Dot Matrix Printer), Non-Impact Printers (Inkjet Printer, Laser Printer)
        - Plotter
    - Central Processing Unit : CU, ALU
    - Storage Devices
        - Primary Memory : RAM (DRAM, SRAM), ROM (PROM, EPROM, EEPROM, UVPROM)
        - Secondary Memory : Magnetic Media (HDD, FDD), Optical Media (CD, DVD, Blue-Ray Disk)
        - Cache Memory
        - Flash Memory

    - Communication Bus
        - System Bus – Address Bus, Data Bus, Control Bus, Power Bus

ii) <u>Data Representation :</u>

- **Number Systems**
    - Concept of Non-Positional Number System
        - Roman Number System
    - Concept of Positional Number System
        - Decimal, Binary, Octal and Hexadecimal Number System
    - Conversion
        - Inter-conversion between Decimal, Binary, Octal and Hexadecimal Numbers (Whole numbers and Fractions, using Double Add and Half Add Methods)
    - Arithmetic
        - Addition, Subtraction – Decimal, Binary, Octal and Hexadecimal Numbers
        - Multiplication, Division – Binary Number System only
    - Different methods of Negative Number Representation
        - Signed Magnitude
        - One’s Complement
        - Two’s Complement

- Subtraction using Complements (1's, 2's complement)

- **Various Binary Coding Schemes**
  - BCD
  - EBCDIC
  - ASCII
  - ISCII

- **Concept of Fixed and Floating Point Numbers**
  - Difference between fixed and floating point numbers

- **Bit map representation of images**

- **Concept of Multimedia**

iii) <u>Boolean Algebra</u>

- Definition and postulates.
- Boolean operations – OR, AND, NOT
- Proof using identities and truth tables
- De' Morgan's Theorems and Basic Principle of Duality
- Deriving truth table from Boolean expression and vice versa
- SOP and POS Expressions (Minterm and Maxterm expressions)
- Canonical form of Boolean expressions and their complements
- Simplifications

B. Software and Languages
(10 Marks)

- Definition of Software
- Programming Languages : Concepts of High Level, Low Level and Assembly language
- Types of Software

- System Software
    - Translator – compiler, interpreter, assembler
    - Operating systems:
        - Definition and Function
        - Types of OS – Single User, Multi-user, Multiprogramming, Multiprocessing, Time Sharing
        - Booting (cold and warm), Spooling, Buffering, Concept of Virtual Memory
        - Directory and file Structure, Path and Pathname
        - Concept of GUI, CUI with examples
        - Using MS DOS (Commands and their use – DIR, MD, RD, CD, COPY, CON, MOVE, REN, DEL, TYPE, MORE, ATTRIB, EDIT, DATE, TIME, CLS)
        - Using MS Windows OS
- Application Software (definition and example)
- Utility Software (definition and example)

C. Programming using Visual Basic
(10 Marks)

- **Introduction to Visual Basic (Version 6 or compatible)**
- **Getting familiar with VB user interface**
    - Standard exe, pull-down menus, toolbar, toolbox, project explorer, properties window, form layout window, form immediate window, opening and closing windows, resizing and moving windows, quitting VB
- **VB Tool Box**
    - Standard window controls, label, textbox, command-button, frame, check-box, option-button, list-box, combo-box, picture box, timer control, shapes
    - Basic properties of controls
- **Programming Fundamentals**
    - Date types in VB (integer, long, single, double, currency, string)
    - Variable and Constants

- Input / Output operations
- Control Statements
  - Branching: If-Then-Else, Switch
  - Looping: For-Next, While, Do-While

- **Simple problem solving**

D. Word Processing using MS Word (MS Office 2007 or compatible) (05 Marks)

- Introduction to Word Processing
- Creating, Opening, Editing and Saving a document
- Copy, Cut, Paste operations
- Page Setup, Headers and Footers
- Formatting Texts, Paragraph, Page Borders
- Inserting Clip-Art, Word-Art, Auto-Shapes, Picture, Symbol, Equation
- Table insertion
- Mail Merge
- Macros
- Spelling and Grammar check
- Printer Setup and Document Printing

E. Power Point Presentation using MS Word (MS Office 2007 or compatible) (05 Marks)

- Introduction of Power Point
- Creating, Opening, Editing and Saving a PowerPoint presentation
- Use of Wizards

- Different styles and background
- Formatting Texts
- Inserting Clip-Art, Word-Art, Auto-Shapes, Picture
- Applying slide-transition, applying animation to text and objects
- Inserting sound and video-clips
- Slide Show
- Printing of slides

F. Practical
(30 Marks)

- **One program on Visual Basic** **(10 Marks)**
- **Laboratory Copy (Minimum 10 programs)** **(5 Marks)**

  (Suggestive programs on VB are given below)

  - To display a message using Label, Textbook, Message Dialogue
  - To concatenate two text entries and display
  - To perform a simple arithmetic operation (+,-,*,/) and display the result in message dialogue or textbox
  - To make simple decision making (IF statement) solution and display relevant message (example: problems related to eligibility for a given value of age, profit/loss messages for given values of cost price and sale price, grade display for given values of marks of students etc.)

- To create a simple GUI application to perform both arithmetic and logical operations together (Total, Average, Grade calculation of given set of marks, salary calculations on different criteria)
- To create a simple GUI application to perform an operation based on the criteria input by the user in a checkbox/radio button

  (ex1: Find the discount of an item on the basis of category of item [electrical appliance / electronic gadget/stationery specified using a radio button] and its cost [below 1000/above 1000/equal 1000 specified using radio button])

  (ex2: Calculate the incentive of a sales person on the basis of his sales amount, customer feedback, count of customer specified using checkbox)

- To create a simple GUI application to change the properties of a control based on the selection made by the user.

  (ex1: To change the background/foreground colour of any of the controls of the form based on the colour selected from a list)

  (ex2: To change the background/foreground colour of a label based on the values input/stored in a combo-box)

- Use of MS Word – Same features as in Theory part **(5 Marks)**
- Use of PowerPoint – Same features as in Theory part **(5 Marks)**
- **Viva Voce** **(5 Marks)**

COMPUTER APPLICATION (COMA)

Class - XII

Full Marks 100

Theory Marks 70

Practical Marks - 30

A. Logic Gate and Combination Circuits (15 marks)

- Logic Gates – OR, AND, NOT, XOR, X-NOR Gates
- Universal Gates – NAND and NOR Gate
- Basic gates using Universal Gates
- Two Level Circuits
- Combinational Circuits:
  - Half Adder & Full Adder (definition and representation)
  - Full Adder using Half Adders only
  - Half Subtractor & Full Subtractor (definition and representation)
  - 4 bit Adder and Subtractor Circuit
  - Multiplexer (4x1) and De-multiplexer (1x4)
  - Decoder (Maximum 3 bits), and Encoder (Decimal to Binary, Octal to Binary)

B. Networking (20 marks)

- **Introduction to Networking (Definition, Advantage, Disadvantage, Application)**
  - Analogue and Digital Communication
  - Modes of Communication : Simplex, Half Duplex and Full Duplex Communication
  - Types of Network – LAN, MAN, WAN
  - Network Architecture : Client Server & Peer-to-Peer Networks
  - Serial and Parallel Communication
  - Bandwidth, Channel Capacity, Baud
  - Synchronous and Asynchronous Transmission Modes
  - Baseband and Broadband Networks

- **Components of a Network**
  - Servers (File server, Communication Server, Print Server) and Workstation
  - NIC
  - Guided Media
    - Cables – UTP, STP, Co-axial, Fibre Optic
  - Unguided Media
    - Infrared, Radio & Microwave Communication, Satellite
  - Network Operating System – Characteristics
- **Network Topologies -**
  - Bus
  - Ring
  - Star
- **Network Connecting Devices –**
  - Hub
  - Repeater
  - Bridge
  - Switch
  - Router
  - Gateways
- **LAN Protocols**
  - Ethernet (CSMA / CD) and Token Ring Protocol
- **Switching Technique**
  - Circuit, Message and Packet Switching
- **Use of MODEM**
- **TCP / IP Protocols - TCP, IP, UDP, FTP, HTTP, TELNET**
- **IP Addressing**
  - Class A, Class B, Class C IP address
- **Domain Name System**
- **URL**

- **Introduction to Internet**
  - Basic requirement for connecting to the Internet, ISP
  - Services provided by Internet – www, browser, e-mail, search engine, social networking
  - Networking Security – Computer Virus, Concept of Firewall, Password
- HTML
  - Basic Page Design, Using Ordered and Unordered Lists, Using Image, Hyperlinking, Using Tables

C. Database Management System **(15 marks)**

- **Introduction of Database :**
  - Definition of Database
  - Advantage and disadvantages of DBMS
  - Database Languages (DDL, DML, DCL)
  - Data Dictionary, Metadata
  - Database Schema and Instance
  - DBMS and its components
  - Various Data Models – ER Model, Hierarchical Model, Network Model, Relational Model (only concepts)
  - Different Database Users
  - Functions of DBA
- **Relational Model**
  - Concept of Relation, Topple, Attribute, Domain, Degree, Cardinality
  - Concept of Keys – Key, Super Key, Candidate Key, Primary Key, Alternate Key
  - Concept of Relationships – 1:1, 1:N, N:M relationships
  - Database Constraints – Equity Integrity Constraint, Domain Constraint, Referential Integrity Constraint and Concept of Foreign Key
- **Relational Algebra**
  - Selection Operation
  - Projection Operation
  - Set Operation
  - Cartesian Product
  - Natural Join Operation

- **SQL**
  - Simple SELECT Queries (SELECT, FROM, WHERE, DISTINCT, AND, OR, IN, NOT IN, BETWEEN, LIKE, ORDER BY)

D. Introduction to Spread Sheet – (MS Office 2007 or compatible) (10 marks)

- Introduction to Excel
- Concept of Workbook, Worksheet, Row, Column, Cell
- Creating Opening, Editing, Saving a Workbook
- Changing Row and Column widths
- Formatting cells
- Different data types in Excel
- Entering labels and values
- Use of following inbuilt functions only – SUM, PRODUCT, AVERAGE, MAX, MIN, ROUND, COUNT, COUNTIF, IF, AND, OR, NOT, DATE, TIME, NOW, CONCATENATE, UPPER, LOWER
- Copying Cells – Relative, Absolute and Mixed Referencing
- Making calculations and re-calculations
- Auto fill, Fill with series
- Conditional Formatting
- Sorting and Filtering Data (use of Auto Filter)
- Goal Seek
- Hiding Rows and Columns
- Use of Macros
- Creating Line Diagrams, Pie Charts, Bar Graphs

E. Using MS Access (MS Office 2007 or compatible) (10 marks)

- Introduction to Access
- Table creating using Design View and Wizard
- Different data types in Access
- Manipulation of data using Access facilities – Inserting, Updating, Deleting data
- Creating Relationships between Tables
- Form creation using Wizard, Auto Form
- Query generation using Design View
- Report generation using Wizard, Auto Report

F. Practical **(30 marks)**

- **Using MS Excel and Access** **(10 marks)**
- **Web Page design using HTML** **(5 marks)**
- **Project Work (two projects)** **(10 marks)**
  - **Suggestive Topics:**
- Application of Excel:
  - Using Excel creation of Mark Sheet, Balance Sheet, Monthly / Yearly Expenditure, Reports
  - Web page designing using HTML (minimum 5 linked pages)
    - Travel and Tourism
    - Festivals
    - Book Catalogue
    - Pollution and pollution control
  - Viva Voce **(5 marks)**

COMPUTER SCIENCE (COMS)

Class - XI

Full Marks 100

THEORY(70 Marks)

A. Brief Review of Computer Systems : (35 Marks)

i) Evolution of Computers and Computer Organization :

- **Evolution of Computers**
  - Abacus, Napier's Bone, Pascaline, The Babbage Machine
  - Stored Program Concept, Von Neumann Concept / Architecture
- **Computer Hardware Generations**
  - First, Second, Third, Fourth and Fifth Generation of Computers;
  - Components, Advantages, Disadvantages
- **Concept of Circuit Integration**
  - SSI, MSI, LSI, VLSI, ULSI
- **Classification of Computers**
  - Analogue, Digital, Hybrid Computers
  - Mainframe and Super Computer
  - Mini, Micro, Laptop Computer
- **Computers in Modern Society**
- **Concept of Data and Information, Data Processing**
- **Brief description of each functional block of a computer**
  - Block Diagram of a Computer System
  - Input Devices (Keyboard, Mouse, Scanner, Touch Screen, OMR, OCR, MICR, Graphic Tablet, Barcode Reader, Light Pen, Microphone, Joystick)
  - Output Devices
    - Monitor – CRT, LCD
    - Printer – Impact Printers (Dot Matrix Printer), Non-Impact Printers (Inkjet Printer, Laser Printer)

        - Plotter
    - Central Processing Unit : CU, ALU
    - Storage Devices
        - Primary Memory : RAM (DRAM, SRAM), ROM (PROM, EPROM, EEPROM, UVPROM)
        - Secondary Memory : Magnetic Media (HDD, FDD), Optical Media (CD, DVD, Blue-Ray Disk)
        - Cache Memory
        - Flash Memory
    - Communication Bus
        - System Bus – Address Bus, Data Bus, Control Bus, Power Bus

ii) <u>Data Representation :</u>

- **Number Systems**
    - Concept of Non-Positional Number System
        - Roman Number System

  Concept of Positional Number System
        - Decimal, Binary, Octal and Hexadecimal Number System
    - Conversion
        - Inter-conversion between Decimal, Binary, Octal and Hexadecimal Numbers (Whole numbers and Fractions, using Double Add and Half Add Methods)
    - Arithmetic
        - Addition, Subtraction – Decimal, Binary, Octal and Hexadecimal Numbers
        - Multiplication, Division – Binary Number System only
    - Different methods of Negative Number Representation
        - Signed Magnitude
        - One’s Complement
        - Two’s Complement
        - Subtraction using Complements (1’s, 2’s, 7’s, 8’s, 9’s, 10’s, 15’s, 16’s complement)

- **Various Binary Coding Schemes**
    - BCD
    - EBCDIC
    - ASCII
    - ISCII

- Gray Code
- Excess-3 Code

- **Concept of Fixed and Floating Point Numbers**
  - Difference between fixed and floating point numbers
  - Concept of normalised numbers
  - Floating point arithmetic (addition, subtraction, multiplication, division)

- **Bit map representation of images**

iii) <u>Boolean Algebra</u>

- Definition and postulates.
- Boolean operations – OR, AND, NOT
- Proof using identities and truth tables
- De' Morgan's Theorems and Basic Principle of Duality
- Deriving truth table from Boolean expression and vice versa
  - Sum of Product (SOP) Expressions (using min-terms)
  - Product of Sum (POS) Expressions (using max-term)
- Canonical form of Boolean expressions and their complements
- Simplifications (Algebraic method, K-map method up to 4 variables)
- Use of Don't Care terms
- Logic Gates – OR, AND, NOT, XOR, X-NOR Gates
- Universal Gates – NAND and NOR Gate
- Basic gates using Universal Gates
- Two Level Circuits
- Combinational Circuits :
  - Half Adder & Full Adder (definition and representation)
  - Full Adder using Half Adders only
  - Half Subtractor & Full Subtractor (definition and representation)
  - 4 bit Adder and Subtractor Circuit
  - Multiplexer (4x1) and De-multiplexer (1x4)
  - Decoder (Maximum 3 bits), and Encoder (Decimal to Binary, Octal to Binary)

B. Software and Languages: (10 Marks)

- Definition of Software

- Programming Languages : Concepts of High Level, Low Level and Assembly language
- Types of Software
  - System Software
    - Translator – compiler, interpreter, assembler
    - Operating systems:
      - Definition and Function
      - Types of OS – Single User, Multi-user, Multiprogramming, Multiprocessing, Time Sharing
      - Booting (cold and warm), Spooling, Buffering, Concept of Virtual Memory
      - Directory and file Structure, Path and Pathname
      - Concept of GUI, CUI with examples
      - Using MS DOS (Commands and their use – DIR, MD, RD, CD, COPY, CON, MOVE, REN, DEL, TYPE, MORE, ATTRIB, EDIT, DATE, TIME, CLS), Concept of Batch File
      - Using MS Windows OS
      - UNIX OS (Commands and their use – chmod, cd, pr, cp, cat, rn, rmdir, ls, vi, mkdir, more, mv, mail, who), Use of Wild Card, File Permission, Concept of Piping, UNIX shell
  - Application Software (definition and example)
  - Utility Software (definition and example)

C. Programming in C: (25 Marks)

- Concept of Algorithm and Flowchart
- Introduction to C
- Character Sets, Keywords, Constants, Variables, Operators in C
- Data types in C
- Header files
- Input / Output operations
- Control structures
- Loop structures
- Functions (user-defined and common library functions) including recursive function
- Array (one and two dimension numeric array)
- Basic concept of Pointer and String

- Structures
- Problem solving

D. Practical - (30 Marks)

- **MS-Windows / UNIX / LINUX Operating System Commands - (5 Marks)**

- **Programming in C (Algorithm / Flow Chart, Coding, Execution (15 Marks)**
  - One program using branching and loop (5 marks)
  - One program using Function, Array, String, Structure (10 marks)

- **Laboratory Copy (must have minimum 20 programs from topics in class 11) (5 Marks)**
  - 6 programs on control structures
  - 4 programs on array manipulations
  - 4 programs on string manipulation
  - 2 programs on structure manipulation
  - 4 programs on functions

- **Viva Voce (5 Marks)**

COMPUTER SCIENCE (COMS)

Class - XII

Full Marks 100

THEORY (70 Marks)

A. Sequential Logic Circuits: (15 Marks)

- Concept of Asynchronous and Synchronous Circuits
- Positive and Negative Edge Triggers
- Concept of Latch and Flip Flops
- SR Flip Flops using NAND and NOR gates
- D, JK, T and Master-Slave Flip Flops
- Serial and Parallel Registers :
    - SISO, SIPO, PIPO, PISO
- Concept of Asynchronous and Synchronous Counters
    - Block diagram and working of Asynchronous Counter (Up / Down Ripple Counter)
    - Block diagram and working of Decode Counter
    - Block diagram and working of Synchronous Counter
    - Block diagram and working of Ring Counter
    - Block diagram and working of Johnson Counter

B. Programming in C and Data Structures: (15 Marks)

- Pointers in C- Definition, Pointers and Arrays, Array of Pointers, Pointer to an Array, Pointer and Strings, Pointer and 2D array, Pointer and Structures, Pointers and Functions, Dynamic Memory Allocation
- Command Line Arguments
- I/O File Handling in C (Text Files and Binary Files)
    - Concept of File Pointer
    - Modes of opening in file
    - Use of functions open, close, put, puts, print, fgetc, gets, scan, tell, seek, rewind, write, read
- Data Structures in C (Both Algorithm and Program)
    - Single Linked List– Create, Display, Add and Delete Nodes from a List, Search from a list, Reverse a list (physically reverse a list, display list in reverse order)
    - Stack using Arrays; Push and Pop Operations
    - Queue using Arrays; Store and Retrieve Operations (only simple linear queue)
    - Application of Linked List :
        - Creating Stack and Queue using Linked List

- Application of Stack:
  - Infix, Prefix and Postfix notations
  - Infix to Postfix conversion (only conversion using rules, program not required)
  - Evaluation of Postfix expression (only evaluation using rules, program not required)

C. Networking: (15 Marks)

- **Introduction to Networking (Definition, Advantage, Disadvantage, Application)**
  - Analogue and Digital Communication
  - Modes of Communication: Simplex, Half Duplex and Full Duplex Communication
  - Types of Network – LAN, MAN, WAN
  - Network Architecture : Client Server & Peer-to-Peer Networks
  - Serial and Parallel Communication
  - Bandwidth, Channel Capacity, Baud
  - Synchronous and Asynchronous Transmission Modes
  - Baseband and Broadband Networks
- **Components of a Network**
  - Servers (File server, Communication Server, Print Server) and Workstation
  - NIC
  - Guided Media
    - Cables – UTP, STP, Co-axial, Fibre Optic
  - Unguided Media
    - Infra-red, Radio & Microwave Communication, Satellite
  - Network Operating System – Characteristics
- **Network Topologies -**
  - Bus
  - Ring
  - Star
  - Mesh
- **Network Connecting Devices –**
  - Hub
  - Repeater
  - Bridge
  - Switch
  - Router
  - Gateways

- **LAN Protocols**
  - Ethernet (CSMA /CD) and Token Ring Protocol
- **Switching Technique**
  - Circuit, Message and Packet Switching
- **Use of MODEM**
- **TCP / IP Protocols**
  - TCP, IP, UDP, FTP, HTTP, TELNET
- **IP Addressing**
  - Class A, Class B, Class C IP addresses
- **Domain Name System**
- **URL**
- **Introduction to Internet**
  - Basic requirement for connecting to the Internet, ISP
  - Services provided by Internet– www, browser, e-mail, search engine, social networking
  - Networking Security – Computer Virus, Concept of Firewall, Password
- **HTML**
  - Basic Page Design, Using Ordered and Unordered Lists, Using Image, Hyperlinking, Using Tables

D. Database Management System (15 Marks)

- **Introduction of Database :**
  - Definition of Database
  - Database Languages (DDL, DML, DCL)
  - DBMS and its components
  - Various Data Models – ER Model, Hierarchical Model, Network Model, Relational Model (only concepts)
- **Relational Model**
  - Concept of Relation, Tuple, Attribute, Domain, Degree, Cardinality
  - Concept of Keys – Key, Super Key, Candidate Key, Primary Key, Alternate Key
  - Concept of Relationships – 1:1, 1:N, N:M relationships
  - Database Constraints – Equity Integrity Constraint, Domain Constraint, Referential Integrity Constraint and Concept of Foreign Key
  - Functional Dependency – Full, Partial, Transitive and Trivial Dependencies
  - Database Anomalies – Insertion, Deletion and Updation Anomaly

- Normalisation – Definition, Different Normal Forms (Normalising a Relation up to 3NF)

- **Relational Algebra**
  - Selection Operation
  - Projection Operation
  - Set Operation
  - Cartesian Product
  - Natural Join Operation

- **SQL**
  - CREATE TABLE, ALTER TABLE, DROP TABLE
  - INSERT, DELETE, UPDATE
  - SELECT (DISTINCT, FROM, WHERE, AND, OR , IN, NOT, IN, BETWEEN, LIKE, GROUP BY, HAVING, ORDER BY)
  - SUM, AVG, COUNT, MAX, MIN
  - GRANT, REVOKE, ROLLBACK

E. Introduction to Object Oriented Programming (10 Marks)

- **Basic Concept of OOP**
  - Data Abstraction
  - Encapsulation
  - Inheritance
  - Polymorphism
- **Implementing OOP using C++**
  - Basic input / output, branching, looping (simple programs)
  - Definition of a Class
  - Members of Class – Data Members and Member Functions;
  - Concept of Constructor and Destructor (Programming not required)
  - Object Creation and accessing members of a Class (simple programs)

F. Practical (30 marks)

- **Programming in C (Coding, Execution) (10 marks)**
  - One programming problem in C to be developed and tested in computer during the examination. Marks are allotted on the basis of the following:
    - Logic (5 marks)
    - Documentation (2 marks)
    - Output presentation (3 marks)
  - Types of problems to be given will be of application type from the following topics:

- Linked List manipulation
- Stack using array and linked implementation
- Queue using array and linked implementation (only linear queue)
- Text and Binary File operations (creation, display, searching, modification)

- **Web Page design using HTML and SQL (command as per theory syllabus) (5 marks)**
- **Project Work (one project using C and one project using HTML) (5 marks)**
  - **Suggestive Topics:**
    - Application of C (Program on any one of following topics):
      - Problem related to Numerical Analysis–Bisection Method, Trapezoidal Rule
      - Creation and manipulation of telephone index using concept of files
      - Creation and addition of polynomials using Linked Lists
    - Web page designing using HTML (minimum 5 linked pages)
      - Travel and Tourism
      - Festivals
      - Book Catalogue
      - Pollution and pollution control

- **Laboratory Copy (5 marks)**

- **Viva Voce (5 marks)**

EDUCATION (EDCN)

Class-XI

Full Marks: 100

Theory - 80 Marks

Project - 20 Marks

GROUP: A (30 Marks)

Concept and factors of Education

1. Concept and aims of Education

a) Definition of Education
b) Concept of Education: Narrow and wider: Education is a lifelong process
c) Aims of Education

i) Determination of aims of education
ii) Different aims (mention only)
iii) Individual development
Social Development and
National Development: as aims of education

2. Significant factors of Education:

A) Educand: is a psycho-social component is a product of interaction between heredity and environment
B) Teacher: Role of modern teacher in education
C) Curriculum
   i) Definition, traditional and modern concept.
   ii) Factors to be considered for curriculum construction with special reference to
      a) Purpose of Education
      b) Needs and capacities of the educand and
      c) Available of the resources
D) Co-curricular activities: Meaning, Types & Significance
E) Types of environment: Physical and Social

3. Forms of Education

a) Informal Education: Characteristics, Limitations:
   i) Role of family and
   ii) Mass media.

b) Formal Education: Characteristics, Limitations, Role of School.

c) Non formal Education: Need and meaning, concept, types, methods

GROUP-B (30 Marks)

Psychological perspectives

4. Psychology: Definition, Relation between Education and Psychology and its importance, Educational psychology: Definition

5. Growth and development of a child
   i) Definition of Growth and development and differences
   ii) Developmental characteristics and needs at different stages of development: (Physical, Psychological and Social)
      a) Infancy
      b) Childhood
      c) Adolescence
      d) Adult hood
   iii) Levels of Education related to stages of development (mention stages of formal education only)

6. Maturation and learning as process of development
   Definition, Characteristics and Inter-relationship

7. Process involved in the acquisition of knowledge
   a) Sensation-Definition, types, importance of sensation in education (with reference to Froebel and Montessori)
   b) Perception: Definition, Difference between perception and sensation, importance of perception in education
   c) Concept: definition, stages of concept development, importance of concept formation in education and acquisition of knowledge

GROUP-C (20 Marks)

Historical development of Indian education

8. Ancient period (Brahmanic and Buddhistic) characteristics only based on (Aims of education, curriculum rituals, institutions, teacher pupil relationship, method of teaching, discipline, evaluation)

9. Medieval period: Characteristics only related to the points as referred above

10. Important events leading to the modern system of education: pre independent period: Charter Act-1813,Woods Despatch-1854, Hunter Commission-1882, Curzon Policy: an overview on primary, secondary and higher education, Sadler Commission-1917, Sargent Plan-1944: Brief Study

11. Contribution of eminent Indian educators towards the development of modern education in India

    a) Raja Ram Mohan Roy- A social reformer and pre-cursor of education in India.
    b) Ishwar Chandra Vidyasagar : Social and educational contribution towards mass education, establishment or schools, curriculum reforms, contribution to Bengali Language and literature and women's education.
    c) Rabindranath Tagore: Educational thought and practice of education (with special reference to Santiniketan and Sriniketan)
    d) Swami Vivekananda: Views on education-man making and character building, mass education, women's education and technical education.
    e) Mahatma Gandhi: Educational views with special emphasis on Basic education.

Project work(20 Marks)

- To study needs of the students of class VI to X (at least 10 students of any two classes belonging to two stages of development: childhood and adolescence
- To organize any activity within school (cultural function, debate, any game, sports, morning assembly etc.) or to study on going co-curricular activities in another secondary/primary school in comparison to your own
- Project or comprehensive study on the view point of Indian educators on women's education, mass education etc
- Apart from the suggested project or field studies any relevant project based on the syllabus can be undertaken

EDUCATION (EDCN)

Class - XII

Full Marks: 100

Theory - 80 Marks

Project -20 Marks

GROUP: A (30 Marks)
(Psychological and Statistical perspective)

1. Learning

a) Learning - definition and nature, types (as stated by gagne)

b) Factors of Learning

i) Maturation - Its role in learning

ii) Motivation - Definition, Role in Learning

iii) Attention - Definition, Characteristics, Role in Education

iv) Interest - Definition, Characteristics, Role in Education

v) Mental Abilities - Nature as described by Spearman and Thurston

- Intelligence - Definition and Characteristics
- Role of mental abilities in learning

2. Mechanisms of learning

a) Conditioning

i) Classical conditioning - experiment and educational implications

ii) Operant conditioning - experiment and educational implications

b) Problem Solving

i) Trial and error mechanism - experiment, major laws, educational implications

ii) Insightful mechanism - experiment and educational implications

3. Statistics in education

i) Tabulation of data

ii) Frequency distribution

iii) Graphical representation (frequency Polygon and Histogram)

iv) Measures of central tendency and their uses

GROUP- B (30 Marks)

Historical Development (Post-independent period)

4. Educational provisions in Indian constitution related to women's education, equalization of opportunity, education for minority, SC, ST

5. University Education Commission (1948-49) - First Education Commission in free India, Aims of higher education and concept of Rural University

6. Secondary Education Commission (1952-53), aims of secondary education, structure, seven stream system and multipurpose schools

7. The Indian Education Commission or Kothari Commission (1964-66) and the modern system of education in India

a) Concept of general education in present India
- Stages of General education in present India
  - i) Pre-Primary education - Aims and objectives, structure, curriculum and institutions
  - ii) Primary education - Aims and objectives, structure, curriculum and institutions
  - iii) Secondary education - Aims and objectives, structure, curriculum and institutions
  - iv) Higher Secondary - Aims and objectives, structure, curriculum and institutions
  - v) Higher education - mention the position of higher education according to Kothari commission

b) Vocational and Technical education prevailing in India
- i) Vocational and Technical education - concept, relation, types of institutions up to secondary level
- ii) Vocational and Technical education - types, curriculum and institutions up to higher secondary level

c) Opportunities of education after higher secondary stage (names of courses)

8. N.E.P. (1986 as reviewed in 1992) - basic features.

GROUP-C (10 Marks)

Current Issues in Indian education

9. Education for the differently abled children

i) Visually impaired children - Categories and educational provisions
ii) Deaf and dumb children - Categories and educational provisions
iii) Common behavioural problems observed in class room situations and the role of the Parents and teachers to overcome these problems (general study)

10. Universalization of primary education (U.P.E.)

i) Concept
ii) Measures taken to achieve the objectives of U.P.E. - Audit Education programme, Literacy drive programme, S.S.A.

GROUP-D (10 Marks)

Education for the 21st century

11. Global vision for education - Delores commission - 4 pillars of learning- a synoptic view

12. Role of technology in education

Project work (20 Marks)

- Study of interest pattern amongst secondary/higher secondary students
- To study the achievement of students at secondary level in any two subjects and analyse scores in terms of mean, median & mode
- To study the behavioural problems observed amongst the adolescents in a school and suggest measures to overcome it
- To study the programmes or activities of S.S.A. in your locality
- To study the curriculum and types of primary schools (at least two in and around your locality). Apart from the suggested project or field studies any relevant project based on the syllabus can be undertaken

ENVIRONMENT STUDIES (ENVS)

Class - XI

Full Marks: 100

Theory: 80 marks

Project: 20 marks

Chapter-I: **MAN AND ENVIRONMENT**

i) Introduction

ii) Dimensions of Environment-Physical, Biological & Social

iii) Human Being as a Rational and social Partner in Environmental Actions

iv) Society and Environment in India: Indian Traditions, Customs and Culture-Past and Present

v) Population and Environment

vi) Impact of Human Activities on Environment

vii) Conclusion

Chapter-II: ENVIRONMENT AND DEVELOPMENT

i) Introduction

ii) Economic and Social Needs as a Basic Considerations for Development

iii) Global Development Scenario-Some Facts

iv) Agriculture and Industry as Major Sectors of Development

v) Social factors Affecting Development- Education, Employment, Child Marriage and child Labour, Health, Social Security, Cultural and ethical Values

vi) Impact of Development on Environment – Changing Pattern of Land Use, Land Reclamation, Deforestation, Resource Depletion, Pollution and Environmental Degradation

vii) Impact of Liberalization and Globalization on Agriculture and Industrial Development

viii) Role of the Society in Development and Environment – Public Awareness Through Education, Eco-clubs, Population Education Programme, Campaigns, Public Participation in Development

Chapter-III: ENVIRONMENTAL POLLUTION AND GLOBAL ISSUES

i) Air Pollution
ii) Water Pollution
iii) Soil Pollution
iv) Hazardous Waste and Materials
v) Noise Pollution
vi) Radiation Pollution
vii) Ozone Layer Depletion and its Effects
viii) Green House Effects and Global Warming
ix) Pollution Related Diseases
x) Disaster – Natural & Man-Made
xi) Strategies for Pollution abatement and Environmental Quality Improvement

Chapter-IV: ENERGY

i) Introduction
ii) Changing Global Pattern of Energy Consumption
iii) Energy Consumption as a Measure of Quality of Life-Style
iv) Energy Scenario in India
v) Energy Sources
vi) Fossil fuel Harnessing and Environmental Consequences
vii) Energy Conservation- Efficient Production and Efficient Uses
viii) Planning & Management of Energy

PROJECT

Project: 20 marks (1500-2000 words) (any one)

1. A Project Report on Air/Water/Sound Pollution in your locality.
2. Eco-friendly unconventional source of Energy
3. Waste Management System in your local Hospital
4. Afforestation Programme taken by your Municipality/Panchayet

ENVIRONMENT STUDIES (ENVS)

Class - XII

Full Marks: 100

Theory: 80 marks

Project: 20 marks

Chapter-V: **BIODIVERSITY**

i) Concept of Biodiversity
ii) Value of Biodiversity
iii) Types of Biodiversity
iv) Loss of Biodiversity
v) Balance in Nature
vi) India as Mega diversity Nation
vii) Our Common Plants
viii) Our Common Animals
ix) Economic Potential
x) Wildlife in Trade
xi) Strategies of Conservation

Chapter-VI: ENVIRONMENT MANAGEMENT

i) Introduction
ii) Need for Environmental Management vis a vis Development
iii) Aspects of Environmental Management
iv) Legal Provisions for Environmental Management
v) Approaches for Environmental Management

Chapter-VII: SUSTAINABLE DEVELOPMENT

i) Concept of Sustainable Development
ii) Concept of Sustainable Consumption
iii) Need of Sustainable Development for Improving Quality of Life for the Present and Future

iv) Challenges for Sustainable Development- Social, Political and Economic Considerations
v) Support Base for Sustainable Development
vi) Role of National and International Agencies (Both Government and Non-Government)

Chapter-VIII: SUSTAINABLE AGRICULTURE

i) Introduction
ii) Need for Sustainable Agriculture
iii) Importance of Soil for Crops
iv) Irrigation Systems, Use of Manure and Fertilizers
v) Crop Protection – Major Plant Pests & Diseases, Measures for their Control – Agrochemicals
vi) Impact of Agrochemicals on Environment
vii) Elements of Sustainable Agriculture
viii) Action Plan for sustainable Agriculture

PROJECT

Project: 20 marks (1500-2000 words) (any one)

1. Global Warming.
2. Importance of setting up Disaster Management System in Earthquake prone Regions.
3. Erosion of soil due to floods and its impact on Society.
4. Effects of excessive use of mobile phones.

GEOGRAPHY (GEGR)

Class - XI

Full Marks: 100

Theory: 70 and Practical: 30

THEORY

A.	**Physical Geography.**	40 Marks
B.	**Economic Geography.**	30 Marks

A. Physical Geography.

1. Geography as a Discipline.

- Branches of Geography.
- Future Scope of Branches of Geography.

2. Principles of Physical Geography.

- Origin of Earth (Explanation of a Classical Theory).
- Interior of the Earth.
- Concept and definition of Isostasy.
- Seafloor spreading, drifting of Continents, Plate Tectonic and Island Arc.

3. Geomorphic Processes and Resultant Landforms.

- Definition and types of Geomorphic Processes.
- Endogenic Processes Resultant Landforms.

i) Folding:

- Mechanism of Folding.
- Structural Elements of Fold.
- Types of Fold: * Symmetrical Fold, *Asymmetrical Fold, * Isoclinal Fold, * Monoclinal Fold, * Recumbent Fold, * Over thrust Fold, * Fan Fold.

ii) Faulting:

- Mechanism of Faulting.
- Structural Elements of Faulting.
- Types of Faulting: * Normal Fault, * Reverse Fault, * Thrust Fault, * Step Fault

iii) Volcanicity and Associated Landforms:

- Definition and concept of Volcanicity.
- Causes of Volcanicity.
- Types of Volcanicity.
- Associated Landforms of Volcanicity: Extrusive and Intrusive.
- Concept of Volcano.
- Different parts of Volcano.
- Different types of volcanoes according to frequency of eruption.
- Distribution of World Volcanoes with special reference to Pacific Ring of Fire.

iv) Earthquake:

- Concept and Definition of Earthquake.
- Types of Seismic Waves.
- Measuring Instruments and Scale.
- Isoseismal and Homoseismal Line.
- Causes of Earthquake (Examples from India).
- Effects of Earthquake (Examples from India).
- Distribution of Earthquake prone Zone.
- Seaquakes and Tsunamis.
- Prediction of Earthquake.

4. Hydrosphere.

i) Topography of Ocean floor:

- Major 4 divisions and others types of Ocean floor topography.
- Topography of Ocean Floor:
    - Pacific Ocean,
    - Atlantic Ocean
    - Indian Ocean.

ii) Ocean Deposits:

- Classification of Ocean Deposits according to origin and location.
- Importance of Marine Resources:
    - Mineral resources.
    - Food Resources.

- Power Resources (Tidal, Wave, Sea thermal)

iii) Temperature, Salinity and Density of Ocean Water:

Temperature:

- Importance of Temperature of Ocean Water.
- Process of Heating and Cooling of Ocean Water.
- Factors of Temperature Variation of Ocean Water.
- Horizontal and Vertical Distribution of Ocean Water Temperature.

Salinity:

- Concept and importance of Salinity.
- Causes of Salinity of Ocean Water.
- Distribution of Salinity of Ocean Water.

Density:

- Effects of Temperature and Salinity on Density of Ocean Water.

iv) Ocean Currents:

- Concept and Causes of Ocean Currents.
- Distribution of Ocean Currents in the Pacific Ocean.
- Distribution of Ocean Currents in the Atlantic Ocean.
- Distribution of Ocean Currents in the Indian Ocean.
- Importance of Ocean Currents.

5. Biosphere.

- Nature and Extent of Biosphere.
- Components of Biosphere.
- Concept of Ecosystem.
- Types of Ecosystem.
- Components of Ecosystem.
- Concept of Tropic Level (Food Pyramid).
- Food Web.
- Energy Flow (Energy Pyramid in Ecosystem).

B. Economic Geography.

1. Resource.

- Concept and Definition of Resource.
- Characteristics of Resource.

- Classification of Resource.
- Resource Creating Factors (Man, Nature, Culture)

2. Utilization of World Resources.

Biotic Resource:

i) Forest.

- Types of Forests with special emphasizes on Temperate Forest, Equatorial Forest, Mangrove Forest, Grassland.
- Forest Resources and their Conservation.

ii) Fishing.

- Concept of Fishing.
- Fishing Ground.
- Factors behind the development of Fishing Ground.
- Types of Fish.
- Methods of Fishing.
- Areas of Fishing with special reference to India, Japan and Bangladesh.
- Development of Ports and Markets depending upon Fishing.
- Fish Conservation.
- Recent Fisheries Policy of India.

iii) Land use Pattern.

- Land use Pattern of USA and Canada.
- Land use Pattern of China, Japan and Korea.
- Land use Pattern of Brazil, Chili and Argentina.
- Land use Pattern of Ukraine and Netherlands.
- Land use Pattern of South Africa.
- Land use Pattern of Australia, New Zealand and Tasmania.

iv) Water Resource: Irrigation and Water Preservation.

- Techniques of Irrigation.
- Use and Misuse of Water in Irrigation.
- Dangers of Over-watering.
- Conservation of Water Resources and Watershed Management.
- Irrigation of India, Pakistan and Egypt.
- Alternative Methods of Irrigation.

v) Mineral and Power Resources.

- Types of Mineral Resources.
- World Distribution of **Iron Ore, Copper, Manganese, Mica, Petroleum and Natural Gas, Coal, Uranium and Thorium**.
- Types of Power Resource: Conventional and Non-conventional.
- Types of Energy: Thermal, Hydroelectric and Nuclear Energy.
- World Distribution of – Hydroelectric: Canada and Scandinavian Countries.
  Thermal: India in World Respect.
  Nuclear: Main Leading Countries.
- Non-conventional Energy: Solar Energy, Tidal Energy, Sea Wave Energy, Geothermal Energy, Wind Energy, Biogas Energy, Waste-garbage recycling Energy and others.
- Conservation of Natural Resources – Need and Method.

vi) Map Works: Showing World Distribution of Resources.

Practical

30 marks

1) Maps & Scales

a) Draw a linear scale with given R.F. **(4 marks)**

b) One short answer type question from maps related portion. **(1 mark)**

2) Cartograms

a) Draw a cartograms with the help of given data. **(4 marks)**

b) One short answer type question from this chaper. **(1 mark)**

3) Weather Instruments

a) Observation of reading of any one out of two weather instruments and write down in a proper table. **(4 marks)**

b) One short answer type question from instrument oriented chaper **(1 mark)**

4) Interpretation of Weather map & Rainfall & Temperature Graph.

a) Interpretation of any item (pressure, wind, cloudiness. rainfall etc.)
Co-relation between any two items (pressure, wind, cloudiness, rainfall) **(4 marks)**

b) Identification of climate type from given rainfall - temperature graph. **(1 mark)**

OR

a) Draw a rainfall - temperature graph from given data and identify the climate type. **(4 marks)**

b) Identification of any one weather symbol **(1 mark)**

5) Field study & viva. (3+2=5 marks)

6) Laboratory Note Book. (3+2=5 marks)

GEOGRAPHY (GEGR)

Class - XII

Full Marks: 100

A. Physical Geography 35 Marks B. Economic Geography 35 Marks

A. Physical Geography

1. (a) Geomorphic Processes – Exogenous Processes and associated landforms
2 periods

- Gradation
- Degradation
- Aggradations
- Weathering
- Agents of Gradation

} very short — Chart No. - 1

(b) Work of Ground water and associated landforms

Definition of Ground water

Water table,

Acquifers, Springs, Process of erosion by groundwater solution, corrosion, Karst Topography – Sink holes, dolines, caves, caveras, Karst lakes, depositional features: stalactites, stalagmites, cavepillars, dripstones their formation Diagrams and Examples from India, Australia & Yugoslavia

(c) Marine Processes and associated landforms :

Erosional Process of sea wave – abrasion, attrition, solution and hydraulic action; coastline and shoreline, erosional features; sea-cliffs, sea caves, stacks and depositional land forms. e.g. bays, bars and lagoons. Coral reefs : types – fringing, barrier and atolls; submerged and emergent coastlines.

Diagrams and Example from India, Australia and West Europe. (Wherever relevant)

[Note : Only diagram based questions will be asked]

2. Cycle of Erosion: Mechanism & Processes.

a) Normal cycle
b) Arid cycle
c) Interruption of Fluvial cycle
Rejuvenation and resultant landforms

3. Drainage Pattern:

Classification and characteristics

Relation with underlying structure

4. Soil

Introduction & Definition

Genesis of soil

Factors of soil formation

Soil forming process: Fundamental & specific with special reference to fundamental (Weathering, Illuviation, Elluviation, Humification)

Soil profile

Properties of soil

Soil Fertility and Plant Nutrition

Soil classification (U.S.D.A. classification)
(By chart)

Soil Degradation & Conservation

5. Atmosphere

A. Atmospheric disturbances

Cyclone – mechanism of cyclone

Cyclone of tropical zones

Cyclone of temperate zones

Anticyclones – their types and associated weather

World Map showing major paths of cyclone

Modern concepts of weather circulation, Jet Stream, EI Nino, La Nina

Concepts to be introduced with reference to India

B. Climate Change

Climatic classification (Equatorial Monsoon, Mediterranean, climatic regions of the world)

Climate & Vegetation

Influence of climate on Natural vegetation

Classification of plants (According E. Warming)

Climate Change

Causes of climatic change
Role of Human Being on World climatic change
Ozone Depletion
Green House Effect
Global Warming
Evidence of climatic change

6. Biodiversity

Definition
Types of Biodiversity
Loss of Biodiversity
Importance of Biodiversity
Significance of conservation of Biodiversity
Biodiversity & Man
Strategies of conservation of Biodiversity

7. Man Environment Interaction

A. Natural Hazard & Disasters

Definition and difference
Classification of Natural Disaster
Measures of Disaster
Pre Disaster
Post Disaster
Mitigation Strategies

B. Economic Geography

1. Economic Activities

a) Primary
b) Secondary
c) Tertiary
d) Quaternary
e) Quinary

a) Primary Activity: Agriculture

i) Types of agriculture
- Wet and dry
- Crop Rotation and Crop Combination
- Intensity of cropping
- Modern inputs in agriculture
- Technological Shifting – from subsistence to commercial agriculture
- Green Revolution, White Revolution & Blue Revolution

ii) Food Grains : Rice (China / India)
- Wheat (leading two countries)
- Pulses & Millets (India)

iii) Commercial & Industrial Crops
- Coffee – (South India)
- Tea – (Sri Lanka)
- Cotton – (Egypt, Pakistan)
- Sugarcane –
- Jute - (Bangladesh)
- Oil Seed – (India Ground Nut & Soya bean)
- Coconut – (Sri Lanka)

Importance of Market Gardening and Orchard Farming

Reasons and trends in development in recent year
Special Emphasize on Mediterranean countries
Special Ref. of India regarding market gardening

b) Secondary Activities:

Industry

Factors of Growth of Industrial Location (Theories of Industrial Location)
Major and minor industrial regions of the World
Types of industries –

A) Agro based –
- i) Food Processing Industry (Developed countries) In comparison to India
- ii) Cotton Textile (U.S.A., India)
- iii) Ready-made Garments (India & World)
- iv) New Trend in Jute Industry (Bangladesh, India)

B) Forest Based
Paper Industry (Canada, India)
Rubber Industry (Malaysia, Brazil)
C) Mineral Based – Metal – Iron & Steel (China, Japan, India)
Non metal – Petrochemical (U.S.A., India)
D) Engineering and Automobiles (U.S.A., India)

c) Tertiary Activities

Definition
Classification: Trade, Transport, Communication, Services, Tourism.

d) Quaternary Activities

Information Based
R & D (Research & Development) Based

e) Quinary Activities

Specialist
Decision makers
Consultants
Policy formulators

C. Population & Settlement

Density of population
Man – Land Ratio, over population, under population, optimum-population
Present Trend of population growth of World with special reference to India.
Impact of Migration on distribution (worldwide) of population
Determinants of population change: Age-Sex Ratio
Causes of uneven distribution of population
Demographic Transition Model: Present status of India
Settlement: Types: Rural, Urban
Types of Rural Settlement
Factors determining the types of rural settlement
Distribution of rural settlement in India
Classification of Urban settlement based on size and functions
Urbanization in India

D. Regional Economic Development

Definition of Development

Planning Regions

Hierarchy of Planning Regions

Special Reference to India

a) Chhatishgarh

b) Electronic Industry – Bangalore

c) Growth of Haldia Port

GEOGRAPHY (GEGR)

Practical Marks: 30

1)

a) Drawing of cross-section to show topographical features **(2+1=3 marks)**

b) Interpretation of co-relation of different physical and cultural elements. **(4 marks)**

c) Any question related to topographical maps **(1mark)**

2)

a) Calculation and drawing graticules of any one of the two projections **(2+3=5 marks)**

b) Any conceptual question from the given map projections **(1 mark)**

3)

a) Any Question related to statistical portion **(1 mark)**

b) Graphical representation of data through histogram / frequency polygon / Ogive

Tabulation ..... **2 marks**

Diagrammatic Representation ..... **3 marks**

OR

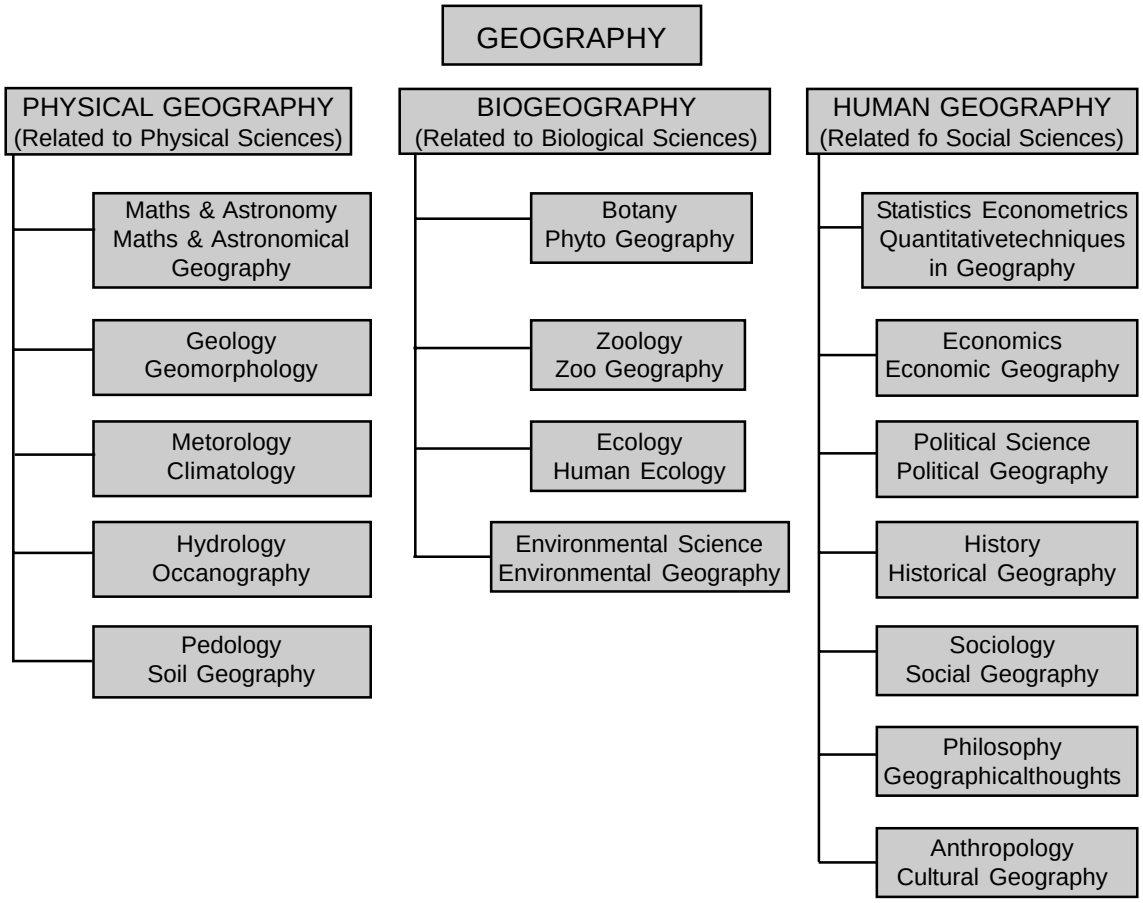
b) Measures of Central tendency / Standard Deviation / Coefficient of Variation **(5 marks)**

4) Project Work (any one) (5 Marks)

- must be handwritten
- not more than 10 pages of A4 size including diagrams.

5) Laboratory Note Book and Viva voce (3+2=5 marks)

Chart No. – 1


GEOGRAPHY
PHYSICAL GEOGRAPHY
(Related to Physical Sciences)
Maths & Astronomy
Maths & Astronomical
Geography
Geology
Geomorphology
Metorology
Climatology
Hydrology
Occanography
Pedology
Soil Geography
BIOGEOGRAPHY
(Related to Biological Sciences)
Botany
Phyto Geography
Zoology
Zoo Geography
Ecology
Human Ecology
Environmental Science
Environmental Geography
HUMAN GEOGRAPHY
(Related fo Social Sciences)
Statistics Econometrics
Quantitativetechniques
in Geography
Economics
Economic Geography
Political Science
Political Geography
History
Historical Geography
Sociology
Social Geography
Philosophy
Geographicalthoughts
Anthropology
Cultural Geography