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 - 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 - 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 - XII

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.

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

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

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

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 - 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 - 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 - 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-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-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 - 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**
  - o 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 - 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
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  - 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 - 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 - 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 - 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