CUET UG + Board Exam

CUET

- Section IA (English Language Test)
- Section II (Domain Test)
- Section III (General Test)

+2 Board Exam

- Physics
- Chemistry
- Mathematics
- Biology
- Computer Science
- Psychology

Syllabus

राष्ट्रीय परीक्षा एजेंसी
National Testing Agency
Excellence in Assessment

LANGUAGES (IA & IB)
SYLLABUS FOR CLASS 12

SYLLABUS FOR LANGUAGES (IA AND IB)

Note:
There will be one Question Paper which will have 50 questions out of which 40 questions need to be attempted.

<table>
<tr><th>SECTION</th><th>Code</th><th>Name</th><th></th></tr>
<tr><td rowspan="13">Section IA-
Languages
(13 Languages)</td><td>101</td><td>English</td><td rowspan="33">Questions from the Language Section will be from the following topics but are not limited to:
1. Reading Comprehension:

There will be three types of passages (maximum 300-350 words):

i. Factual
ii. Narrative
iii. Literary

2. Verbal Ability
3. Rearranging the parts
4. Choosing the correct word
5. Synonyms and Antonyms
6. Vocabulary</td></tr>
<tr><td>102</td><td>Hindi</td></tr>
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<tr><td>106</td><td>Kannada</td></tr>
<tr><td>107</td><td>Malayalam</td></tr>
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<tr><td>113</td><td>Urdu</td></tr>
<tr><td rowspan="20">Section IB-
Languages
(20 Languages)</td><td>201</td><td>Arabic</td></tr>
<tr><td>202</td><td>Bodo</td></tr>
<tr><td>203</td><td>Chinese</td></tr>
<tr><td>204</td><td>Dogri</td></tr>
<tr><td>205</td><td>French</td></tr>
<tr><td>206</td><td>German</td></tr>
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<tr><td>208</td><td>Japanese</td></tr>
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<tr><td>210</td><td>Konkani</td></tr>
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<tr><td>212</td><td>Manipuri</td></tr>
<tr><td>213</td><td>Nepali</td></tr>
<tr><td>214</td><td>Persian</td></tr>
<tr><td>215</td><td>Russian</td></tr>
<tr><td>216</td><td>Santhali</td></tr>
<tr><td>217</td><td>Sindhi</td></tr>
<tr><td>218</td><td>Spanish</td></tr>
<tr><td>219</td><td>Tibetan</td></tr>
<tr><td></td><td>220</td><td>Sanskrit</td></tr>
</table>

PHYSICS-322

Syllabus of Class 12

PHYSICS-322

Note:

*There will be one Question Paper which will have **50 questions out of which 40 questions** need to be attempted.*

PHYSICS

Unit I: Electrostatics

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

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

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

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

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

Unit II: Current Electricity

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

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

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

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

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

Unit III: Magnetic Effects of Current and Magnetism

Concept of the magnetic field, Oersted's experiment. Biot - Savart law and its application to 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 conductor in a uniform magnetic field. The force between two parallel current-

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

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

Para-, dia- and ferromagnetic substances, with examples. Electromagnets and

factors affecting their strengths. Permanent magnets.

Unit IV: Electromagnetic Induction and Alternating Currents

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

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

Unit V: Electromagnetic Waves

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

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

Unit VI: Optics

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

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

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

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

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

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

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

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

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

PHYSICS-322

Unit VII: Dual Nature of Matter and Radiation

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

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

Unit VIII: Atoms and Nuclei

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

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

Unit IX: Electronic Devices

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

Unit X: Communication Systems

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

Chemistry - 306
Syllabus for Class 12

Note:
There will be one Question Paper which will have 50 questions out of which 40 questions need to be attempted.

CHEMISTRY

Unit I: Solid State

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

Unit II: Solutions

Types of solutions, expression of concentration of solutions of solids in liquids, the solubility of gases in liquids, solid solutions, colligative properties – the relative lowering of vapour pressure, Raoult's law, elevation of B.P., depression of freezing point, osmotic pressure, determination of molecular masses using colligative properties, abnormal molecular mass, Vant Hoff factor.

Unit III: Electrochemistry

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

Unit IV: Chemical Kinetics

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

Unit V: Surface Chemistry

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

Unit VI: General Principles and Processes of Isolation of Elements

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

Unit VII: *p*-Block Elements

*Group 15 elements***:** General introduction, electronic configuration, occurrence, oxidation states, trends in physical and chemical properties; nitrogen – preparation, properties, and uses; compounds of nitrogen: preparation and properties of ammonia and nitric acid, oxides of nitrogen (structure only); Phosphorous-allotropic forms; compounds of phosphorous: preparation and properties of phosphine ,halides (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: preparation, properties, and uses of Sulphur dioxide; sulphuric acid: industrial process of manufacture, properties and uses, oxoacids of sulphur (structures only).

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

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

Unit VIII: *d* and *f* Block Elements

General introduction, electronic configuration, occurrence and characteristics of transition metals, general trends in properties of the first-row transition metals – metallic character, ionization enthalpy, oxidation states, ionic radii, colour, catalytic property, magnetic properties, interstitial compounds, alloy formation. Preparation and properties of $K_2Cr_2O_7$ and $KMnO_4$.

Lanthanoids – electronic configuration, oxidation states, chemical reactivity, and lanthanoid contraction and its consequences.

Actinoids – Electronic configuration, oxidation states, and comparison with lanthanoids.

Unit IX Coordination Compounds

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

Unit X: Haloalkanes and Haloarenes

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

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

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

Unit XI: Alcohols, Phenols, and Ethers

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

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

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

Unit XII: Aldehydes, Ketones, and Carboxylic Acids

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

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

Unit XIII: Organic Compounds Containing Nitrogen

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

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

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

Unit XIV: Biomolecules

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

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

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

Vitamins – Classification and functions.

*Nucleic Acids***:** DNA and RNA

Unit XV: Polymers

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

Unit XVI: Chemistry in Everyday Life

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

MATHEMATICS/ APPLIED MATHEMATICS (319)

Syllabus for Class 12

Mathematics/Applied Mathematics (319)

Note:
There will be one Question Paper which will contain Two Sections i.e. ***Section A and Section B [B1 and B2].***
Section A will have ***15 questions*** *covering both i.e. Mathematics/Applied Mathematics which will be* ***compulsory*** *for all candidates*

Section B1 *will have* ***35 questions*** *from* ***Mathematics*** *out of which* ***25 questions*** *need to be attempted.*
Section B2 *will have* ***35 questions*** *purely from* ***Applied Mathematics*** *out of which* ***25 question*** *will be attempted.*

SECTION A

1. Algebra
(i) Matrices and types of Matrices
(ii) Equality of Matrices, transpose of a Matrix, Symmetric and Skew Symmetric Matrix
(iii) Algebra of Matrices
(iv) Determinants
(v) Inverse of a Matrix
(vi) Solving of simultaneous equations using Matrix Method
2. Calculus
(i) Higher order derivatives
(ii) Tangents and Normals
(iii) Increasing and Decreasing Functions
(iv). Maxima and Minima
3. Integration and its Applications
(i) Indefinite integrals of simple functions
(ii) Evaluation of indefinite integrals
(iii) Definite Integrals

(iv). Application of Integration as area under the curve
4. Differential Equations
(i) Order and degree of differential equations
(ii) Formulating and solving of differential equations with variable separable
5. Probability Distributions
(i) Random variables and its probability distribution
(ii) Expected value of a random variable
(iii) Variance and Standard Deviation of a random variable
(iv). Binomial Distribution
6. Linear Programming
(i) Mathematical formulation of Linear Programming Problem
(ii) Graphical method of solution for problems in two variables
(iii) Feasible and infeasible regions
(iv). Optimal feasible solution

Mathematics/Applied Mathematics (319)

Section B1: Mathematics

UNIT I: RELATIONS AND FUNCTIONS

1. Relations and Functions

Types of relations: Reflexive, symmetric, transitive and equivalence relations. One to one and onto functions, composite functions, 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 3×3 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.

UNIT III: CALCULUS

1. Continuity and Differentiability

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

2. Applications of Derivatives

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

Mathematics/Applied Mathematics (319)

3. Integrals

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

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

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

$$\int \sqrt{ax^2 + bx + c}\ dx \text{ and } \int (px + q)\sqrt{ax^2 + bx + c}\ dx$$

to be evaluated.

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

4. Applications of the Integrals

Applications in finding the area under simple curves, especially lines, arcs of circles/parabolas/ellipses (in standard form only), area between the two above said curves (the region should be cleraly 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 or constant

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

Mathematics/Applied Mathematics (319)

UNIT IV: VECTORSAND 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, scalar triple product.

2. Three-dimensional Geometry

Direction cosines/ratios of a line joining two points. Cartesian and vector equation of a line, coplanar and skew lines, 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

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

Unit VI: Probability

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

Mathematics/Applied Mathematics (319)

Section B2: Applied Mathematics

Unit I: Numbers, Quantification and Numerical Applications

A. Modulo Arithmetic
- Define modulus of an integer
- Apply arithmetic operations using modular arithmetic rules

B. Congruence Modulo
- Define congruence modulo
- Apply the definition in various problems

C. Allegation and Mixture
- Understand the rule of allegation to produce a mixture at a given price
- Determine the mean price of a mixture
- Apply rule of allegation

D. Numerical Problems
- Solve real life problems mathematically

E. Boats and Streams
- Distinguish between upstream and downstream
- Express the problem in the form of an equation

F. Pipes and Cisterns
- Determine the time taken by two or more pipes to fill or

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

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

I. Numerical Inequalities
- Describe the basic concepts of numerical inequalities
- Understand and write numerical inequalities

UNIT II: ALGEBRA

A. Matrices and types of matrices
- Define matrix
- Identify different kinds of matrices

B. Equality of matrices, Transpose of a matrix, Symmetric and Skew symmetric matrix
- Determine equality of two matrices
- Write transpose of given matrix
- Define symmetric and skew symmetric matrix

Mathematics/Applied Mathematics (319)

UNIT III: CALCULUS

A. Higher Order Derivatives

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

B. Marginal Cost and Marginal Revenue using derivatives

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

C. Maxima and Minima

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

UNIT IV: PROBABILITY DISTRIBUTIONS

A. Probability Distribution

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

B. Mathematical Expectation

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

C. Variance

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

UNIT V: INDEX NUMBERS AND TIME BASED DATA

A. Index Numbers

- Define Index numbers as a special type of average

B. Construction of Index numbers

- Construct different type of index numbers

C. Test of Adequacy of IndexNumbers

- Apply time reversal test

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

A. Population and Sample

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

B. Parameter and Statistics and Statistical Interferences

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

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

UNIT VII: INDEX NUMBERS AND TIME-BASED DATA

A. Time Series
- Identify time series a schronological data

B. Components of Time Series
- Distinguish between different components of time series

C. Time Series analysis for univariate data
- Solve practical problems based on statistical data and Interpret

UNIT VIII: FINANCIAL MATHEMATICS

A. Perpetuity, Sinking Funds
- Explain the concept of perpetuity and sinking fund
- Calculate perpetuity
- Differentiate between sinking fund and saving account

B. Valuation of Bonds
- Define the concept of valuation of bond and related terms
- Calculate value of bond using present value approach

C. Calculation of EMI
- Explain the concept of EMI
- Calculate EMI using various methods

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

UNIT IX: LINEAR PROGRAMMING

A. Introduction and related terminology
- Familiarize with terms related to Linear Programming Problem

B. Mathematical formulation of Linear Programming Problem
- Formulate Linear Programming Problem

C. Different types of Linear Programming Problems
- Identify and formulate different types of LPP

D. Graphical Method of Solution for problems in two Variables
- Draw the Graph for a system of linear inequalities involving two variables and to find its solution graphically

E. Feasible and Infeasible Regions

- Identify feasible, infeasible and bounded regions

F. Feasible and infeasible solutions, optimal feasible solution

- Understand feasible and infeasible solutions
- Find optimal feasible solution

BIOLOGY/BIOLOGICAL STUDIES/BIOTECNOLOGY/ BIOCHEMISTRY

(304)

Syllabus for Class 12

Note:
There will be one Question Paper which will have 50 questions out of which 40 questions need to be attempted.

BIOLOGY/BIOLOGICAL STUDIES/BIOTECNOLOGY/BIOCHEMISTRY

Unit I: Reproduction

Reproduction in organisms: Reproduction, a characteristic feature of all organisms for continuation of species; Modes of reproduction – Asexual and sexual; Asexual reproduction; Modes- Binary fission, sporulation, budding, gemmule, fragmentation; vegetative propagation in plants.

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

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

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

Unit II: Genetics and Evolution

Heredity and variation: Mendelian Inheritance; Deviations from Mendelism– Incomplete dominance, Co-dominance, Multiple alleles and Inheritance of blood groups, Pleiotropy; Elementary idea of polygenicinheritance; Chromosome theoryofinheritance;Chromosomesandgenes;Sexdetermination–Inhumans,birds, honeybee; Linkage and crossing over; Sex linked inheritance- Haemophilia, Colour blindness; Mendelian disorders in humans– Thalassemia; Chromosomal disorders in humans; Down's syndrome, Turner'sand Klinefelter's syndromes.

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

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

Unit III: Biology and Human Welfare

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

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

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

Unit IV: Biotechnology and Its Applications

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

Application of Biotechnology in health and agriculture: Human insulin and vaccine production, genetherapy; Genetically modified organisms- Bt crops; Transgenic Animals; Biosafety issues– Bio piracy and patents.

Unit V: Ecology and environment

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

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

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

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

Computer Science/ Informatics Practices - 308

Syllabus for Class 12

Computer Science/Informatics Practices

- 308

Note:

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

Section A will have ***15 questions*** *covering both i.e. Computer Science/Informatics Practices which will be* ***compulsory*** *for all candidates*

Section B1 *will have* ***35 questions*** *from* ***Computer Science*** *out of which* ***25 questions*** *need to be attempted.*

Section B2 *will have* ***35 questions*** *purely from* ***Informatics Practices*** *out of which* ***25 question*** *will be attempted.*

Section A

Exception and File Handling in Python

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

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

Database Concepts

Introduction to database concepts, difference between database and file system, relational data model: concept of domain, tuple, relation, keys - candidate key, primary key, alternate key, foreign key;
Relational algebra: selection, projection, union, set difference and cartesian product;

Structured Query Language

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

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

Data Query: SELECT, FROM, WHERE

Data Manipulation: INSERT, UPDATE, DELETE

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

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

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

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

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

Computer Networks

Introduction to computer networks, Evolution of networking,

Network types: LAN, WAN, MAN

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

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

Basic concept of MAC and IP Address Difference

between Internet and web

Section B1: Computer Science

Chapter 1: Exception and File Handling in Python

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

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

Chapter 2: Stack

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

Chapter 3: Queue

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

Chapter 4: Searching

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

Chapter 5: Sorting

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

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

Chapter 6: Understanding Data

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

Chapter 7: Database Concepts

Introduction to database concepts, difference between database and file system, relational data model: concept of domain, tuple, relation, keys - candidate key, primary key, alternate key, foreign key;
Relational algebra: selection, projection, union, set difference and cartesian product;

Chapter 8: Structured Query Language

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

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

Data Query: SELECT, FROM, WHERE

Data Manipulation: INSERT, UPDATE, DELETE

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

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

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

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

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

Chapter 9: Computer Networks

Introduction to computer networks, Evolution of networking,

Network types: LAN, WAN, MAN

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

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

Basic concept of MAC and IP Address

Difference between Internet and web

Section B2: Informatics Practices

Chapter 1: Database Query using SQL

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

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

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

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

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

Chapter 2: Data Handling using Pandas – I

Introduction to Python libraries- Pandas, NumPy,

Matplotlib. Data structures in Pandas - Series and

DataFrames.

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

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

Importing/Exporting Data between CSV files and DataFrames.

Chapter 3: Data Handling using Pandas – II

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

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

Handling missing values – dropping and filling.

Importing/Exporting Data between MySQL database and Pandas.

Chapter 4: Plotting Data using Matplotlib

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

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

Chapter 5: Introduction to Computer Networks

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

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

Network Topologies: Star, Bus, Tree, Mesh.

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

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

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

Chapter 6: Societal Impacts

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

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

E-waste its a hazard and management

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

Chapter 10: Data Communication

Concept of communication, Types of Data Communication, switching techniques

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

Introduction to mobile telecommunication technologies

Wireless Technologies – Bluetooth, WLAN, Infrared,

Microwave

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

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

Chapter 11: Security Aspects

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

Network Security Concepts: Firewall, Cookies, Hackers and Crackers

Antivirus and their workings

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

PSYCHOLOGY-324

Syllabus for Class 12

Note:
There will be one Question Paper which will have 50 questions out of which 40 questions need to be attempted.

PSYCHOLOGY-324

Unit I: *Variations in Psychological Attributes*

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

Unit II: *Self and Personality*

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

Unit III: *Meeting Life Challenges*

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

Unit IV: *Psychological Disorders*

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

Unit V: *Therapeutic Approaches*

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

Unit VI: *Attitude and Social Cognition*

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

Unit VII: *Social Influence and Group Processes*

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

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

Unit VIII: *Psychology and Life*

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

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

Unit IX: *Developing Psychological Skills*

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

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

ECONOMICS/BUSINESS ECONOMICS-309

Syllabus for Class 12

ECONOMICS/BUSINESS ECONOMICS-309

Note:
*There will be one Question Paper which will have **50 questions out of which 40 questions** need to be attempted.*

Unit I: ***Introduction to Microeconomics***

- What is microeconomics?
- Central problems

Unit II: ***Consumer Behaviour and Demand***

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

Introductory Macroeconomics

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

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

Unit IV: Determination of Income and Employment

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

Unit V: Money and Banking

- Money: meaning, evolution, and functions
- Central bank: meaning and functions
- Commercial banks: meaning and functions

Unit VI: Government Budget and the Economy

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

• Balanced budget, surplus budget, and deficit budget: meaning and implications

• Revenue deficit, fiscal deficit, and primary deficit: meaning and implications; measures to contain different deficits.

Unit VII: Balance of Payments

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

INDIAN ECONOMIC DEVELOPMENT

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

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

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

Unit I X: Current challenges facing the Indian Economy

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

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

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

agricultural diversification;

Employment: Growth and changes in work force participation rate in formal and informal sectors; problems and policies

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

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

Unit X: Development Experience of India

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

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ACCOUNTANCY/BOOK KEEPING-301
SYLLABUS FOR CLASS 12

ACCOUNTANCY/BOOK KEEPING-301

Note:
There will be one Question Paper which will have ***50 questions out of which 40 questions*** *need to be attempted.*

Accounting for Not-for-Profit Organizations and Partnership Firms

Unit I: *Accounting Not-for-Profit Organisation*

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

Unit II: *Accounting for Partnership*

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

Unit III: *Reconstitution of Partnership*

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

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

Unit IV: *Dissolution of Partnership Firm*

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

Company Accounts and Financial Statement Analysis

Unit V: *Accounting for Share and Debenture Capital*

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

Redemption of the debenture.

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

Unit VI: *Analysis of Financial Statements*

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

  Liquidity Ratios: Current ratio, Liquidity ratio.

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

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

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

Unit VII: *Statement of Changes in Financial Position*

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

Computerized Accounting System

Unit I: *Overview of Computerized Accounting System*

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

Unit II: *Using Computerized Accounting System*

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

Unit III: *Accounting Using Database Management System (DBMS)*

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

Unit IV: *Accounting Applications of Electronic Spreadsheet*

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

BUSINESS STUDIES - 305
SYLLABUS FOR CLASS 12

BUSINESS STUDIES – 305

Note:
There will be one Question Paper which will have 50 questions out of which 40 questions need to be attempted.

Principles and Functions of Management

Unit I: *Nature and Significance of Management*

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

Unit II: *Principles of Management*

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

Unit III: *Business Environment*

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

Unit IV: *Planning*

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

Unit V: *Organising*

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

Unit VI: *Staffing*

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

BUSINESS STUDIES - 305

Unit VII: *Directing*

- Meaning, importance, and principles.
- Elements of Direction:

– Supervision – meaning and importance

– Motivation – meaning and importance, Maslow's hierarchy of needs; Financial and non-financial incentives.

– Leadership – meaning, importance; qualities of a good leader.

– Communication – meaning and importance, formal and informal communication; barriers to effective communication.

Unit VIII: *Controlling*

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

Business Finance and Marketing

Unit IX: *Business Finance*

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

Unit X: *Financial Markets*

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

Unit XI: *Marketing*

- Marketing – meaning, functions, role.
- The distinction between marketing and selling.
- Marketing mix – concept and elements:

– Product – nature, classification, branding, labeling, and packaging

– Physical distribution: meaning, role; Channels of distribution, – meaning, types, factors, determining the choice of channels.

– Promotion – meaning and role, promotion mix, Role of Advertising and personal selling; objections to Advertising.

– Price: factors influencing pricing.

Unit XII: *Consumer Protection*

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

Unit XIII: *Entrepreneurship Development*

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

Political Science-323

Syllabus for Class 12

Note:
There will be one Question Paper which will have 50 questions out of which 40 questions need to be attempted.

Political Science – 323

Politics in India since Independence

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

Contemporary World Politics

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

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HISTORY

Syllabus for Class 12

Note:
There will be one Question Paper which will have 50 questions out of which 40 questions need to be attempted.

HISTORY-314

Unit I: The Story of the First Cities Harappan Archaeology

Broad overview: Early urban centres.

Story of discovery: Harappan civilization.
Excerpt: Archaeological report on a major site. *Discussion*: how it has been utilized by archaeologists/ historians.

Unit II: Political and Economic History: How Inscriptions tell a story

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

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

Excerpt: Asokan inscription and Gupta period land grant.

Discussion: Interpretation of inscriptions by historians.

Unit III: Social Histories using the Mahabharata

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

Story of discovery: Transmission and publications of the Mahabharata.

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

Unit IV: A History of Buddhism: Sanchi Stupa

Broad overview:

(a) A brief review of religious histories of Vedic religion, Jainism, Vaisnavism, Saivism.

(b) Focus on Buddhism.

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

Unit V: Medieval society through Travellers' Accounts

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

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

Excerpts: from Alberuni, Ibn Batuta, Bernier.

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

Unit VI: Religious Histories: The Bhakti-Sufi Tradition

Broad Overview:

(a) Outline of religious developments during this period.

(b) Ideas and practices of the Bhakti-Sufi saints.

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

Excerpt: Extracts from selected Bhakti Sufi works.

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

HISTORY-314

Unit VII: New Architecture: Hampi

Broad Overview:

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

Story of Discovery: Account of how Hampi was found.

Excerpt: Visuals of buildings at Hampi.

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

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

Broad overview:

(a) Structure of agrarian relations in the 16th and 17th centuries.

(b) Patterns of change over the period.

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

Excerpt: From the Ain-i-Akbari

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

Unit IX: The Mughal Court: Reconstructing Histories through Chronicles

Broad Overview:

(a) Outline of political history c. 15th-17th centuries.

(b) Discussion of the Mughal court and politics.

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

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

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

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

Broad overview:

(a) Life of zamindars, peasants and artisans in the late18th century.

(b) East India Company, revenue settlements and surveys.

(c) Changes over the nineteenth century.

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

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

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

Unit XI: Representations of 1857

Broad Overview:

(a) The events of 1857-58.

(b) How these events were recorded and narrated.

Focus: Lucknow.

Excerpts: Pictures of 1857. Extracts from contemporary accounts.

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

HISTORY-314

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

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

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

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

Unit XIII: Mahatma Gandhi through Contemporary Eyes

Broad Overview:

(a) The nationalist movement 1918-48,

(b) The nature of Gandhian politics and leadership.

Focus: Mahatma Gandhi in 1931.

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

Discussion: How newspapers can be a source of history.

Unit XIV: Partition through Oral Sources

Broad Overview:

(a) The history of the 1940s;

(b) Nationalism, Communalism and Partition.

Focus: Punjab and Bengal.

Excerpts: Oral testimonies of those who experienced partition.

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

Unit XV: The Making of the Constitution

Broad Overview:

(a) Independence and the new nation state.

(b) The making of the Constitution.

Focus: The Constitutional Assembly debates.

Excerpts: From the debates.

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

SOCIOLOGY

SYLLABUS FOR CLASS 12

SOCIOLOGY-326

Note:
There will be one Question Paper which will have 50 questions out of which 40 questions need to be attempted.

Unit I: *Structure of Indian Society*

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

Unit II: *Social Institutions: Continuity and Change*

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

Unit III: *Social Inequality and Exclusion*

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

Unit IV: *The Challenges of Unity in Diversity*

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

Unit V: Process of Social Change in India

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

Unit VI: *Social Change and the Polity*

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

Unit VII: *Social Change and the Economy*

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

Unit VIII: *Arenas of Social Change*

- Media and Social Change
- Globalization and Social Change

SOCIOLOGY -326

Unit IX: *New Arenas of Social Change*

- Media and Social Change
- Globalization and Social Change

Unity X: *Social Movements*

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

LEGAL STUDIES

SYLLABUS FOR CLASS 12

LEGAL STUDIES-317

Note:
There will be one Question Paper which will have 50 questions out of which 40 questions need to be attempted.

PART	UNIT	
I	**Judiciary**	i. Structure and Hierarchy of Courts and Legal Offices in India ii. Constitution, Roles and Impartiality iii. Appointments, Trainings, Retirement and Removal ofJudges iv. Courts and Judicial Review
II	**Topics of Law**	i. Law of Property ii. Law of Contracts iii. Law of Torts iv. Introduction to Criminal Laws in India
III	**Arbitration, Tribunal Adjunction, and Alternative Dispute Resolution**	i. Adversarial and Inquisitorial Systems ii. Introduction to Alternative Dispute Resolution iii. Types of ADR iv. Arbitration, Administrative, Tribunals v. Mediation and Conciliation vi. Lok Adalats vii. Ombudsman viii. Lokpal and Lokayukta
IV	**Human Rights in India**	i. Introduction – International Context ii. Constitutional framework and Related laws in India iii. Complaint Mechanisms of Quasi-judicial Bodies
V	**Legal Professionin India**	Introduction The Advocates Act, 1961, The Bar Council of India, Lawyers and Professional Ethics, Advertising by Lawyers, Opportunities for Law graduates, Legal Education in India, Liberalization of the Legal Profession, Women and the Legal Profession in India
VI	**Legal Services**	i. Legal background – Free Legal Aid under Criminal law, Legal Aid by the State, Legal Aid under the Indian Constitution, NALSARegulations, 2010 ii. Criteria for giving free Legal Services iii. Lok Adalats iv. Legal Aid in Context of Social Justice and Human Rights

LEGAL STUDIES-317

VII	**International Context**	i. Introduction to International Law ii. Sources of International Law – Treaties, Customs andICJ Decisions iii. International Institutions, International Human Rights iv. Customary International Law v. International law & Municipal Law vi. International Law & India vii. Dispute Resolution – ICJ, ICC and Other Dispute Resolution Mechanisms
VIII	**Legal Maxims**	Important Legal Maxims. Meaning with illustrations of the following: - *Actus non facit reum nisi mens sit rea* - *Ad valorem* - *Amicus Curiae* - *Audi alterem partum* - *Assentio Mentium* - *Bona fide* - *Bona Vacantia* - *Caveat Emptor* - *Corpus Delicto* - *Damnum Sine Injuria* - *De Die in Diem* - *De Minimis Lex Non Curat* - *Doli Incapax* - *Ejusdem Generis* - *Ex Post Facto* - *Ignorantia Facti Excusat – IgnorantiaJuris Non Excusat* - *Injuria Sine Damnum* - *Locus Standi* - *Nemo Debet Esse Judex in Propria SuaCausa* - *Nemo debt non quad habit* - *Noscitur a Sociis* - *Obiter Dicta* - *Pari Materia* - *Per Incuriam* - *Qui Facit Per Alium, Facit Per Se* - *Quid pro quo* - *Ratio Decidendi* - *Res ipsa loquitur* - *Res Judicata Accipitur Pro Veritate* - *Salus Populi Est Suprema Lex* - *Stare Decisis* - *Ubi Jus Ibi Remedium*

GEOGRAPHY/GEOLOGY

SYLLABUS FOR CLASS 12

Note:
There will be one Question Paper which will have 50 questions out of which 40 questions need to be attempted.

GEOGRAPHY/GEOLOGY-313

Fundamentals of Human Geography

Unit I: *Human Geography: Nature and Scope*

Unit II: *People*

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

Unit III: *Human Activities*

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

Unit IV: *Transport, Communication and Trade*

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

Unit V: *Human Settlements*

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

GEOGRAPHY/GEOLOGY-313

India: People and Economy

Unit I: *People*

- Population: distribution, density and growth; composition of population - linguistic, religious; sex, rural-urban and occupational - regional variations in growth of population ;
- Migration: international, national – causes and consequences;
- Human development – selected indicators and regional patterns;
- Population, environment and development.

Unit II: *Human Settlements*

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

Unit III: *Resources and Development* (Periods 30)

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

Unit IV: *Transport, Communication and International Trade*

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

Unit V: *Geographical Perspective on Selected Issues and Problems*

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

AGRICULTURE

(302)

Syllabus for Class 12

AGRICULTURE (302)

Note:
There will be one Question Paper which will have 50 questions out of which 40 questions need to be attempted.

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

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

Genetics & Plant Breeding :

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

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

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

Unit-2: Livestock Production

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

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

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

Artificial Insemination : Reproductive organs, collection, dilution and preservation of semen and artificial insemination, **role of artificial insemination in cattle improvement. Livestock Products:** Processing and marketing of milk and Milk products.

AGRICULTURE (302)

Unit-3: Crop Production

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

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

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

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

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

Unit-4: Horticulture

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

ENVIRONMENTAL STUDIES - 307

SYLLABUS FOR CLASS 12

ENVIRONMENTAL STUDIES-307

Note:
There will be one Question Paper which will have 50 questions out of which 40 questions need to be attempted.

1. Human Beings and Nature

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

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

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

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

2. Population and Conservation Ecology

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

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

(ii) Human populations (Malthusian model and demographic transition).
Definition of Carrying Capacity; Malthusian view: concept of 'over-population' and shortage of resources; Questioning Malthus. Population Growth vs. Disparate Consumption of resources within and amongst nations. Definition and understanding of Demographic Transition; Factors influencing demographic transition.

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

ENVIRONMENTAL STUDIES-307

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

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

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

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

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

Definition of: Conservation, in situ and ex situconservation. Importance of Conservation.

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

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

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

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

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

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

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

3. Monitoring Pollution

(i) Pollution monitoring.

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

ENVIRONMENTAL STUDIES-307

(ii) Monitoring the atmosphere: techniques.

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

(iii) International and national air quality standards.

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

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

(iv) Water testing: indicators of water quality.

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

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

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

4. Third World Development

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

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

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

Definition of Development.

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

(c) Overuse and exploitation of resources;

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

(f) Increasing wastes and pollution.

The above to be explained with suitable examples.

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

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

intermediate technologies;

focus on employment.

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

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

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

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

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

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

5. Sustainable Agriculture

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

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

Irrigation systems:

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

Features of pre-colonial agriculture in India: growing for sustenance rather than market; multi-cropping,

management of soil health, diversity in seed.

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

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

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

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

Land reform – need, advantages, failures and successes.

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

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

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

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

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

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

Meaning of Food Security, need for food security. The problems in attaining food security - those of production, storage and access. Integrated and sustainable approach to food security for the Third World including working for environmental sustainability and social and economic sustainability through land reform, credit support to farmers, market support to farmers, inadequacies in the present marketing system, ways to improve marketing system, improving access to food, ownership of seeds.
An understanding that national level food security may not translate into household and community level food security or long term environmental sustainability unless the above factors are addressed. Main features of the Food Security Law 2013.

6. Environmental and Natural Resource Economics

(i) Definition: resources; scarcity and growth; natural resource accounting.
Classification of natural resources - on the basis of origin (abiotic and biotic), on the basis of renewability (renewable and non- renewable), on the basis of development(potential and actual), on the basis of distribution (ubiquitous and localized); scarcity and growth, natural resource accounting.
Classification of resources as renewable and non-renewable.
Definition, basic principles, advantages and disadvantages of Physical accounting.

ENVIRONMENTAL STUDIES-307

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

(iii) Economic status and welfare (net economic welfare, nature capital, ecological capital, etc.)
A broad overview of the purpose of environmental economics.
Definition and classification: Defensive expenditure (its classification); natural/ ecological capital.

(iv) Externalities: cost benefit analysis (social, ecological).
Externalities – definition, kinds (positive and negative), impacts.
Cost Benefit analysis - Definition, the process in brief, advantages and disadvantages.
EPR (Extended Producer Responsibility) -definition, examples, advantages.

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

7. International Relations and the Environment

(i) Trans-national characteristics of environmental issues using case study of Amazonia, Trade in Wild Life and Ozone Depletion.
Case study of Amazonia - causes for exploitation of forests, reasons for acceleration of deforestation, effects of government policies, ecological value of rainforests and possible solutions to the problem.

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

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

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

(iii) International trade: a theoretical perspective; free trade vs. protectionism; import barriers; domestic industry vs. free trade; transnational companies - a historical perspective (colonialism and its lasting impact today); trade between the first and the third world - characteristics - terms of trade; India's international trade - characteristics - major imports and exports - foreign exchange crises
- the export imperative and its impact on the environment; the case study of aquaculture in India; diversion of scarce resource from production of subsistence needs to commercial products; toxic waste trade - extent and impact; Globalisation - trade regimes (WTO, GATT, IPR) and their impact on third world.
Definition, advantages and disadvantages of globalization, free trade, protectionism.
Transnational Companies (TNCs) – definition; TNCs and environment – conflict of interest.

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

ENVIRONMENTAL STUDIES-307

Economic allocation of scarce resources and its impact on environment.

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

GATT – the organization and its metamorphosis into WTO.

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

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

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

A brief understanding of each of the above categories.

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

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

MASS MEDIA AND COMMUNICATION

SYLLABUS FOR CLASS 12

MASS MEDIA AND COMMUNICATION-318

Note:
There will be one Question Paper which will have 50 questions out of which 40 questions need to be attempted.

1. Communication

(i) Culture and Communication

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

(ii) Communication and Social Change

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

2. Journalism

(i) Qualities of a good Journalist.

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

(ii) Ethical Issues in Journalism.

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

3. TV

A. Advertising

(i) Advertising concepts & process,
(ii) \Functions of Advertising,
(iii) Types of Advertising (Cross promotions, Merchandise, Convert Advertising),
(iv) Forms of Advertising

B. Film

(i) Pre-Shooting stage.
(ii) Shooting Stage.
(iii) Post-Shooting Stage.

4. Radio

(i) Writing for Radio

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

(ii) Recording Radio Programmes

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

(iii) Radio Jockeying

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

5. Cinema

(i) History of Cinema

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

(ii) Cinema Genres.

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

(iii) Cinema and Social Change.

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

6. Social Media

(i) Definition of social media.

(ii) Types of social media platforms.

Self-explanatory.

(iii) Role of social media in democracy.

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

(iv) Cyber Crime.

A understanding of online bullying; stalking; trolling; online frauds.

(v) Netiquettes.

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

7. New Media

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

(ii) Broadcasting

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

(iv) Gigantic organization.

(v) Huge technical infra-structure

(vi) Large scale revenue.

(vii) The changed paradigm due to the Internet.

(viii) Empowering an individual to post data on the Internet.

(ix) Information, message in one medium triggering off activity in the others.

(x) Many sources of the same information.

(xi) Distribution of the information between indi9viduals on an unprecedented global scale.

(xii) Rapidity of opinion generation on a local, national and gloabal scale.

(xiii) The socio-political implications of the new information order.

(xiv) The Strengthening of democracy.

(xv) Emerging trends in Mass Communication

SYLLABUS OF
Teaching Aptitude (327)

Teaching Aptitude

Note:

There will be one Question Paper which will have 50 questions out of which 40 questions need to be attempted.

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

FINE ARTS (312)

(Painting, Sculpture,

Graphics and Commerical

Arts)

Syllabus of Class 12

FINE ARTS -312

Note:

There will be one Question Paper which will have 50 questions out of which 40 questions need to be attempted.

FINE ARTS (312)

PAINTING

Unit 1: The Rajasthani and Pahari Schools of Miniature Painting

Unit 2: The Mughal and Deccan schools of miniature painting

Unit 3: The Bengal School and Cultural Nationalism

Unit 4: The Modern trends In Indian Art

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

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

(A) The Rajasthani Schools

1. Origin and development of the following schools inbrief:
   Mewar, Bundi, Bikaner, Kishangarh, and Jaipur, and the main features of the Rajasthani schools.

2. Study of the following Rajasthani paintings:

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

FINE ARTS -312

- Krishna on swing — Bikaner
- Radha (Bani- Thani) — Kishangarh
- Bharat Meets Rama at Chitrakuta — Jaipur

(B) The Pahari Schools:

1. Origin and development of Basohli, Guler, and Kangra schools in brief and main features of the Pahari schools

2. Study of the following Pahari Paintings:

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

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

1. The Mughal School

1. Origin and development of the Mughal school in brief and main features of the Mughal School

2. **Study of the following Mughal Paintings:**

Title	**Painter**	**School**
• A Folio from Akbar Namah	Basawan	Akbar
• Baber Crossing the river Sone	Jagannath	Akbar
• Krishna Lifting Mount Govardhana	Miskin	Akbar
• Birth of Salim	Ramdas	Akbar
• Jahangir holding the picture	Abul Hassan	Jahangir
• Falcon on Bird-Rest	Ustad Mansoor	Jahangir

FINE ARTS -312

- Kabir and Raidas
- Marriage procession of Dara Shikoh

Ustad Faquirullah Khan

Haji Madni

Shajahan

Provincial Mughal (Oudh)

FINE ARTS -312

2. The Deccani School

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

2. Study of the following Deccani Paintings:

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

Unit 3: The Bengal School and Cultural Nationalism

- New Era in Indian art-an introduction
- **Study of the following paintings:**

(i)	Rama Vanquishing the pride of the ocean	Raja Ravi Verma
(ii)	Journey's End	Abanidranath Tagore
(iii)	Parthasarthi	Nandlal Bose
(ii)	Ghalib's Poetry Paintingbased on	M.A.R. Chughtai
(iii)	Select a cubistic painting	Gaganendranath Tagore
(iv)	Mother and child	Jamini Roy
(v)	Female Face	Rabindranath Tagore
(vi)	Hill Women	Amrita Sher Gill
(Vii)	Shiv and Sati	Nandlal Bose
(viii)	Rasa-Lila	Kshitindranath Majumdar
(ix)	Radhika	M.A.R. Chughtai
(vii)	Meghdoot	Ram Gopal Vijaivargiya

- National flag and the Symbolic significance of its forms and the colours.
- Contribution of Indian artists in the struggle for National Freedom Movement
- Tiller of the Soil-Nandlal Bose.

Unit 4: The Modern trends In Indian Art Introduction

S.No	Painting	Artist/Painter
i.	Mother Teresa	M.F. Hussain
ii.	Birth of Poetry	K.K. Hebbar
iii.	Gossip	N.S. Bendre

iv.	Tantric Painting	G.R. Santosh
v.	Words and images	K.C.S. Pannikar
vi.	Rama Vanquishing the Pride of the Ocean	Raja Ravi Varma
vii.	Mother and child	Jamini Roy
viii.	Haldi Grinders	Amrita Sher Gil
ix.	Mother Teresa	M.F. Husain
x.	The Vulture	Kamlesh Dutt Pande

Sculpture

Study of the following sculptures:

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

Graphic-Prints

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

Syllabus
for
SECTION III
GENERAL TEST (501)

GENERAL TEST

Note:
There will be one Question Paper which will have 60 questions out of which 50 questions need to be attempted.

The Question paper will contain questions from the following topics:

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

CLASS XII (2023-24)

PHYSICS (THEORY)

Time: 3 hrs. **Max Marks: 70**

		No. of Periods	Marks
Unit–I	**Electrostatics**	**26**	**16**
	Chapter–1: Electric Charges and Fields		
	Chapter–2: Electrostatic Potential and Capacitance		
Unit-II	**Current Electricity**	**18**	
	Chapter–3: Current Electricity		
Unit-III	**Magnetic Effects of Current and Magnetism**	**25**	**17**
	Chapter–4: Moving Charges and Magnetism		
	Chapter–5: Magnetism and Matter		
Unit-IV	**Electromagnetic Induction and Alternating Currents**	**24**	
	Chapter–6: Electromagnetic Induction		
	Chapter–7: Alternating Current		
Unit–V	**Electromagnetic Waves**	**04**	**18**
	Chapter–8: Electromagnetic Waves		
Unit–VI	**Optics**	**30**	
	Chapter–9: Ray Optics and Optical Instruments		
	Chapter–10: Wave Optics		
Unit–VII	**Dual Nature of Radiation and Matter**	**8**	**12**
	Chapter–11: Dual Nature of Radiation and Matter		
Unit–VIII	**Atoms and Nuclei**	**15**	
	Chapter–12: Atoms		
	Chapter–13: Nuclei		
Unit–IX	**Electronic Devices**	**10**	**7**
	Chapter–14: Semiconductor Electronics: Materials, Devices and Simple Circuits		
Total		**160**	**70**

Unit I: Electrostatics — 26 Periods

Chapter–1: Electric Charges and Fields

Electric charges, Conservation of charge, Coulomb's law-force between two- point charges, forces between multiple charges; superposition principle and continuous charge distribution.

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

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

Chapter–2: Electrostatic Potential and Capacitance

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 polarization, 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 (no derivation, formulae only).

Unit II: Current Electricity — 18 Periods

Chapter–3: Current Electricity

Electric current, flow of electric charges in a metallic conductor, drift velocity, mobility and their relation with electric current; Ohm's law, V-I characteristics (linear and non-linear), electrical energy and power, electrical resistivity and conductivity, temperature dependence of resistance, Internal resistance of a cell, potential difference and emf of a cell, combination of cells in series and in parallel, Kirchhoff's rules, Wheatstone bridge.

Unit III: Magnetic Effects of Current and Magnetism 25 Periods

Chapter–4: Moving Charges and 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 solenoid (only qualitative treatment), force on a moving charge in uniform magnetic and electric fields.

Force on a current-carrying conductor in a uniform magnetic field, force between two parallel current-carrying conductors-definition of ampere, torque experienced by a current loop in uniform magnetic field; Current loop as a magnetic dipole and its magnetic dipole moment, moving coil galvanometer- its current sensitivity and conversion to ammeter and voltmeter.

Chapter–5: Magnetism and Matter

Bar magnet, bar magnet as an equivalent solenoid (qualitative treatment only), magnetic field intensity due to a magnetic dipole (bar magnet) along its axis and perpendicular to its axis (qualitative treatment only), torque on a magnetic dipole (bar magnet) in a uniform magnetic field (qualitative treatment only), magnetic field lines.

Magnetic properties of materials- Para-, dia- and ferro -
magnetic substances with examples, Magnetization of materials,
effect of temperature on magnetic properties.

Unit IV: Electromagnetic Induction and Alternating Currents 24 Periods

Chapter–6: Electromagnetic Induction

Electromagnetic induction; Faraday's laws, induced EMF and current;
Lenz's Law, Self and mutual induction.

Chapter–7: Alternating Current

Alternating currents, peak and RMS value of alternating current/voltage; reactance and impedance; LCR series circuit (phasors only), resonance, power in AC circuits, power factor, wattless current.

AC generator, Transformer.

Unit V: Electromagnetic waves 04 Periods

Chapter–8: Electromagnetic Waves

Basic idea of displacement current, Electromagnetic waves, their characteristics, their transverse nature (qualitative idea only).

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

Unit VI: Optics 30 Periods

Chapter–9: Ray Optics and Optical Instruments

Ray Optics: Reflection of light, spherical mirrors, mirror formula, refraction of light, total internal reflection and optical fibers, refraction at spherical surfaces, lenses, thin lens formula, lens maker's formula, magnification, power of a lens, combination of thin lenses in contact, refraction of light through a prism.

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

Chapter–10: Wave Optics

Wave optics: Wave front and Huygen's 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 experiment and expression for fringe width (No derivation final expression only), coherent sources and sustained interference of light, diffraction due to a single slit, width of central maxima (qualitative treatment only).

Unit VII: Dual Nature of Radiation and Matter **08 Periods**

Chapter–11: Dual Nature of Radiation and Matter

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

Experimental study of photoelectric effect

Matter waves-wave nature of particles, de-Broglie relation.

Unit VIII: Atoms and Nuclei **15 Periods**

Chapter–12: Atoms

Alpha-particle scattering experiment; Rutherford's model of atom; Bohr model of hydrogen atom, Expression for radius of nth possible orbit, velocity and energy of electron in nth orbit, hydrogen line spectra (qualitative treatment only).

Chapter–13: Nuclei

Composition and size of nucleus, nuclear force

Mass-energy relation, mass defect; binding energy per nucleon and its variation with mass number; nuclear fission, nuclear fusion.

Unit IX: Electronic Devices **10 Periods**

Chapter–14: Semiconductor Electronics: Materials, Devices and Simple Circuits

Energy bands in conductors, semiconductors and insulators (qualitative ideas only) Intrinsic and extrinsic semiconductors- p and n type, p-n junction

Semiconductor diode - I-V characteristics in forward and reverse bias, application of junction diode -diode as a rectifier.

PRACTICALS

Total Periods 60

The record to be submitted by the students at the time of their annual examination has to include:

- Record of at least 8 Experiments [with 4 from each section], to be performed by the students.
- Record of at least 6 Activities [with 3 each from section A and section B], to be performed by the students.
- The Report of the project carried out by the students.

Evaluation Scheme

Max. Marks: 30

Time 3 hours

Two experiments one from each section	7+7 Marks
Practical record [experiments and activities]	5 Marks
One activity from any section	3 Marks
Investigatory Project	3 Marks
Viva on experiments, activities and project	5 Marks
Total	**30 marks**

Experiments **SECTION–A**

1. To determine resistivity of two / three wires by plotting a graph for potential difference versus current.
2. To find resistance of a given wire / standard resistor using metre bridge.
3. To verify the laws of combination (series) of resistances using a metre bridge.

OR

To verify the laws of combination (parallel) of resistances using a metre bridge.

4. To determine resistance of a galvanometer by half-deflection method and to find its figure of merit.
5. To convert the given galvanometer (of known resistance and figure of merit) into a voltmeter of desired range and to verify the same.

OR

To convert the given galvanometer (of known resistance and figure of merit) into an ammeter of desired range and to verify the same.

6. To find the frequency of AC mains with a sonometer.

Activities

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 multimeter.
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

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* or 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 minimum deviation for a given prism by plotting a graph

between angle of incidence and angle of deviation.

6. To determine refractive index of a glass slab using a travelling microscope.
7. To find the refractive index of a liquid using convex lens and plane mirror.
8. To find the refractive index of a liquid using a concave mirror and a plane mirror.
9. To draw the I-V characteristic curve for a p-n junction diode in forward and reverse bias.

Activities

1. To identify a diode, an LED, a resistor and a capacitor from a mixed collection of such items.
2. Use of multimeter to see the unidirectional flow of current in case of a diode and an LED and check whether a given electronic component (e.g., diode) is in working order.
3. To study effect of intensity of light (by varying distance of the source) on an LDR.
4. To observe refraction and lateral deviation of a beam of light incident obliquely on a glass slab.
5. To observe diffraction of light due to a thin slit.
6. To study the nature and size of the image formed by a (i) convex lens, or (ii) concave mirror, on a screen by using a candle and a screen (for different distances of the candle from the lens/mirror).
7. To obtain a lens combination with the specified focal length by using two lenses from the given set of lenses.

Suggested Investigatory Projects

1. To study various factors on which the internal resistance/EMF of a cell depends.
2. To study the variations in current flowing in a circuit containing an LDR because of a variation in

   (a) the power of the incandescent lamp, used to 'illuminate' the LDR (keeping all the lamps at a fixed distance).

(b) the distance of a incandescent lamp (of fixed power) used to 'illuminate' the LDR.

3. To find the refractive indices of (a) water (b) oil (transparent) using a plane mirror, an equiconvex lens (made from a glass of known refractive index) and an adjustable object needle.

4. To investigate the relation between the ratio of (i) output and input voltage and (ii) number of turns in the secondary coil and primary coil of a self-designed transformer.

5. To investigate the dependence of the angle of deviation on the angle of incidence using a hollow prism filled one by one, with different transparent fluids.

6. To estimate the charge induced on each one of the two identical Styrofoam (or pith) balls suspended in a vertical plane by making use of Coulomb's law.

7. To study the factor on which the self-inductance of a coil depends by observing the effect of this coil, when put in series with a resistor/(bulb) in a circuit fed up by an A.C. source of adjustable frequency.

8. To study the earth's magnetic field using a compass needle -bar magnet by plotting magnetic field lines and tangent galvanometer.

Practical Examination for Visually Impaired Students of

Classes XI and XII Evaluation Scheme

Time 2 hours **Max. Marks: 30**

Identification/Familiarity with the apparatus	5 marks
Written test (based on given/prescribed practicals)	10 marks
Practical Record	5 marks
Viva	10 marks
Total	**30 marks**

General Guidelines

- The practical examination will be of two-hour duration.
- A separate list of ten experiments is included here.
- The written examination in practicals for these students will be conducted at the time of practical examination of all other students.
- The written test will be of 30 minutes duration.
- The question paper given to the students should be legibly typed. It should contain a total of 15 practical skill based very short answer type questions. A student would be required to answer any 10 questions.
- A writer may be allowed to such students as per CBSE examination rules.
- All questions included in the question papers should be related to the listed practicals. Every question should require about two minutes to be answered.
- These students are also required to maintain a practical file. A student is expected to record at least five of the listed experiments as per the specific instructions for each subject. These practicals should be duly checked and signed by the internal examiner.
- The format of writing any experiment in the practical file should include aim, apparatus required, simple theory, procedure, related practical skills, precautions etc.
- Questions may be generated jointly by the external/internal examiners and used for assessment.
- The viva questions may include questions based on basic theory/principle/concept, apparatus/ materials/chemicals required, procedure, precautions, sources of error etc.

Class XII

A. Items for Identification/ familiarity with the apparatus for assessment in practicals (All experiments)

Meter scale, general shape of the voltmeter/ammeter, battery/power supply, connecting wires, standard resistances, connecting wires, voltmeter/ammeter, meter bridge, screw gauge, jockey Galvanometer, Resistance Box, standard Resistance, connecting wires, Potentiometer, jockey, Galvanometer, Lechlanche cell, Daniell cell [simple distinction between the two vis-à-vis their outer (glass and copper) containers], rheostat connecting wires, Galvanometer, resistance box, Plug-in and tapping keys, connecting wires battery/power supply, Diode, Resistor (Wire-wound or carbon ones with two wires connected to two ends), capacitors (one or two types), Inductors, Simple electric/electronic bell, battery/power supply, Plug- in and tapping keys, Convex lens, concave lens, convex mirror, concave mirror, Core/hollow wooden cylinder, insulated wire, ferromagnetic rod, Transformer core, insulated wire.

B. List of Practicals

1. To determine the resistance per cm of a given wire by plotting a graph between voltage and current.
2. To verify the laws of combination (series/parallel combination) of resistances by Ohm's law.
3. To find the resistance of a given wire / standard resistor using a meter bridge.
4. To determine the resistance of a galvanometer by half deflection method.
5. To identify a resistor, capacitor, inductor and diode from a mixed collection of such items.
6. To observe the difference between
   (i) a convex lens and a concave lens
   (ii) a convex mirror and a concave mirror and to estimate the likely difference between the power of two given convex /concave lenses.
7. To design an inductor coil and to know the effect of
   (i) change in the number of turns

(ii) Introduction of ferromagnetic material as its core material on the inductance of the coil.

8. To design a (i) step up (ii) step down transformer on a given core and know the relation between its input and output voltages.

Note: The above practicals may be carried out in an experiential manner rather than recording observations.

Prescribed Books:

1. Physics, Class XI, Part -I and II, Published by NCERT.
2. Physics, Class XII, Part -I and II, Published by NCERT.
3. Laboratory Manual of Physics for class XII Published by NCERT.
4. The list of other related books and manuals brought out by NCERT (consider multimedia also).

Note:
The content indicated in NCERT textbooks as excluded for the year 2023-24 is not to be tested by schools and will not be assessed in the Board examinations 2023-24.

QUESTION PAPER DESIGN

Theory (Class: XI/XII)

Maximum Marks: 70 **Duration: 3 hrs.**

S No.	Typology of Questions	Total Marks	Approximate Percentage
1	**Remembering**: Exhibit memory of previously learned material by recalling facts, terms, basic concepts, and answers. **Understanding**: Demonstrate understanding of facts and ideas by organizing, comparing, translating, interpreting, giving descriptions, and stating main ideas	27	38 %
2	**Applying**: Solve problems to new situations by applying acquired knowledge, facts, techniques and rules in a different way.	22	32%
3	**Analysing :** Examine and break information into parts by identifying motives or causes. Make inferences and find evidence to support generalizations **Evaluating:** Present and defend opinions by making judgments about information, validity of ideas, or quality of work based on a set of criteria. **Creating**: Compile information together in a different way by combining elements in a new pattern or proposing alternative solutions.	21	30%
	Total Marks	70	100
	Practical	30	
	Gross Total	100	

Note:

*The above template is only a sample. Suitable internal variations may be made for generating similar templates keeping the overall weightage to different form of questions and typology of questions same**.***

For more details kindly refer to Sample Question Paper of class XII for the year 2023- 24 to be published by CBSE at its website.

3. Detection of Nitrogen in the given organic compound.
4. Detection of Halogen in the given organic compound.

Note: The above practicals may be carried out in an experiential manner rather than recording observations.

Prescribed Books:

1. Chemistry Part – I, Class-XI, Published by NCERT.
2. Chemistry Part – II, Class-XI, Published by NCERT.

CLASS XII (2023-24)
(THEORY)

Time : 3 Hours **70 Marks**

S.No.	Title	No. of Periods	Marks
1	Solutions	10	7
2	Electrochemistry	12	9
3	Chemical Kinetics	10	7
4	d -and f -Block Elements	12	7
5	Coordination Compounds	12	7
6	Haloalkanes and Haloarenes	10	6
7	Alcohols, Phenols and Ethers	10	6
8	Aldehydes, Ketones and Carboxylic Acids	10	8
9	Amines	10	6
10	Biomolecules	12	7
	Total		**70**

Unit II: Solutions **10 Periods**

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

Unit III: Electrochemistry **12 Periods**

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

Unit IV: Chemical Kinetics **10 Periods**

Rate of a reaction (Average and instantaneous), factors affecting rate of reaction: concentration, temperature, catalyst; order and molecularity of a reaction, rate law and specific rate constant, integrated rate equations and half-life (only for zero and first order reactions), concept of collision theory (elementary idea, no mathematical treatment), activation energy, Arrhenius equation.

Unit VIII: d and f Block Elements **12 Periods**

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 **12 Periods**

Coordination compounds - Introduction, ligands, coordination number, colour, magnetic properties and shapes, IUPAC nomenclature of mononuclear coordination compounds. Bonding, Werner's theory, VBT, and CFT; structure and stereoisomerism, importance of coordination compounds (in qualitative analysis, extraction of metals and biological system).

Unit X: Haloalkanes and Haloarenes. **10 Periods**

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

Haloarenes: Nature of C–X bond, substitution reactions (Directive influence of halogen in monosubstituted compounds only).

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

Unit XI: Alcohols, Phenols and Ethers **10 Periods**

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

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

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

Unit XII: Aldehydes, Ketones and Carboxylic Acids **10 Periods**

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

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

Unit XIII: Amines **10 Periods**

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

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

Unit XIV: Biomolecules **12 Periods**

Carbohydrates - Classification (aldoses and ketoses), monosaccahrides (glucose and fructose), D-L configuration oligosaccharides (sucrose, lactose, maltose), polysaccharides (starch, cellulose, glycogen); Importance of carbohydrates.

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

Vitamins - Classification and functions.
Nucleic Acids: DNA and RNA.

PRACTICALS

Evaluation Scheme for Examination	Marks
Volumetric Analysis	08
Salt Analysis	08
Content Based Experiment	06
Project Work	04
Class record and viva	04
Total	**30**

PRACTICAL SYLLABUS **60Periods**

Micro-chemical methods are available for several of the practical experiments.

Wherever possible, such techniques should be used.

A. Surface Chemistry

(a) Preparation of one lyophilic and one

lyophobic sol Lyophilic sol - starch, egg

albumin and gum

Lyophobic sol - aluminium hydroxide, ferric hydroxide, arsenous sulphide.

(b) Dialysis of sol-prepared in (a) above.

(c) Study of the role of emulsifying agents in stabilizing the emulsion 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 concentration of Iodide ions.

(ii) Reaction between Potassium Iodate, (KIO_3) and Sodium Sulphite: (Na_2SO_3) using starch solution as indicator (clock reaction).

C. Thermochemistry

Any one of the following experiments

i) Enthalpy of dissolution of Copper Sulphate or Potassium Nitrate.

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

iii) Determination of enthaply change during interaction (Hydrogen bond formation) between Acetone and Chloroform.

D. Electrochemistry

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 Compounds

Preparation of double salt of Ferrous Ammonium Sulphate or Potash Alum.
Preparation of Potassium Ferric Oxalate.

G. Preparation of Organic Compounds

Preparation of any one of the following compounds

i) Acetanilide ii) Di -benzalAcetone iii) p-Nitroacetanilide iv) Aniline yellow or 2 - Naphthol Anilinedye.

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

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

I. **Characteristic tests of carbohydrates, fats and proteins in pure samples and their detection in given foodstuffs.**

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

i) Oxalic acid,

ii) Ferrous Ammonium Sulphate

(Students will be required to prepare standard solutions by weighing themselves). **K.**

Qualitative analysis

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

Cation : Pb^{2+}, Cu^{2+} As^{3+}, $A\ell^{3+}$, Fe^{3+}, Mn^{2+}, Zn^{2+}, Cu^{2+}, Ni^{2+}, Ca^{2+}, Sr^{2+}, Ba^{2+}, Mg^{2+}, NH_4^+

Anions: $(CO_3)^{2-}$, S^{2-}, $(SO_3)^{2-}$, $(NO_2)^-$, $(SO_4)^{2-}$, $C\ell^-$, Br^-, I^-, $PO^{3-}{}_4$, $(C_2O_4)^{2-}$, CH_3COO^-, NO_3^-

(Note: Insoluble salts

excluded) PROJECT

Scientific investigations involving laboratory testing and collecting information from other sources A

few suggested Projects.

- Study of the presence of oxalate ions in guava fruit at different stages of ripening.
- Study of quantity of casein present in different samples of milk.
- Preparation of soybean milk and its comparison with the natural milk with respect to curd formation, effect of temperature, etc.
- Study of the effect of Potassium Bisulphate as food preservative under various conditions (temperature, concentration, time, etc.)
- Study of digestion of starch by salivary amylase and effect of pH and temperature on it.
- Comparative study of the rate of fermentation of following materials: wheat flour, gram flour, potato juice, carrot juice, etc.
- Extraction of essential oils present in Saunf (aniseed), Ajwain (carum), Illaichi (cardamom).
- Study of common food adulterants in fat, oil, butter, sugar, turmeric power, chilli powder and pepper. **Note:** Any other investigatory project, which involves about 10 periods of work, can be chosen with the approval of the teacher.

Practical Examination for Visually Impaired Students of Classes XI and XII Evaluation Scheme

Time Allowed: Two hours ***Max. Marks:30***

Identification/Familiarity with the apparatus	*5 marks*
Written test (based on given/prescribed practicals)	*10 marks*
Practical Record	*5 marks*
Viva	*10 marks*
Total	***30 marks***

CLASS-XII
(2023-24)

One Paper **Max Marks: 80**

No.	Units	No. of Periods	Marks
I.	Relations and Functions	30	08
II.	Algebra	50	10
III.	Calculus	80	35
IV.	Vectors and Three - Dimensional Geometry	30	14
V.	Linear Programming	20	05
VI.	Probability	30	08
	Total	240	80
	Internal Assessment		20

Unit-I: Relations and Functions

1. Relations and Functions **15 Periods**

Types of relations: reflexive, symmetric, transitive and equivalence relations. One to one and onto functions.

2. Inverse Trigonometric Functions **15 Periods**

Definition, range, domain, principal value branch. Graphs of inverse trigonometric functions.

Unit-II: Algebra

1. Matrices **25 Periods**

Concept, notation, order, equality, types of matrices, zero and identity matrix, transpose of a matrix, symmetric and skew symmetric matrices. Operations on matrices: Addition and multiplication and multiplication with a scalar. 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). Invertible matrices and proof of the uniqueness of inverse, if it exists; (Here all matrices will have real entries).

2. Determinants **25 Periods**

Determinant of a square matrix (up to 3 x 3 matrices), minors, co-factors 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.

Unit-III: Calculus

1. Continuity and Differentiability 20 Periods

Continuity and differentiability, chain rule, derivative of inverse trigonometric functions, $like\ \sin^{-1} x$, $\cos^{-1} x$ and $\tan^{-1} x$, derivative of implicit functions. Concept of exponential and logarithmic functions.

Derivatives of logarithmic and exponential functions. Logarithmic differentiation, derivative of functions expressed in parametric forms. Second order derivatives.

2. Applications of Derivatives 10 Periods

Applications of derivatives: rate of change of quantities, increasing/decreasing functions, 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 20 Periods

Integration as inverse process of differentiation. Integration of a variety of functions by substitution, by partial fractions and by parts, Evaluation of simple integrals of the following types and problems based on them.

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

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

$$\int \sqrt{ax^2 + bx + c}\, dx,$$

Fundamental Theorem of Calculus (without proof). Basic properties of definite integrals and evaluation of definite integrals.

4. Applications of the Integrals 15 Periods

Applications in finding the area under simple curves, especially lines, circles/ parabolas/ellipses (in standard form only)

5. Differential Equations 15 Periods

Definition, order and degree, general and particular solutions of a differential equation. Solution of differential equations by method of separation of variables, solutions of homogeneous differential equations of first order and first degree. Solutions of linear differential equation of the type:

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

$$\frac{dx}{dy} + px = q, \text{ where p and q are functions of y or constants.}$$

Unit-IV: Vectors and Three-Dimensional Geometry

1. Vectors **15 Periods**

Vectors and scalars, magnitude and direction of a vector. Direction cosines and direction ratios of a vector. 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. Definition, Geometrical Interpretation, properties and application of scalar (dot) product of vectors, vector (cross) product of vectors.

2. Three - dimensional Geometry **15 Periods**

Direction cosines and direction ratios of a line joining two points. Cartesian equation and vector equation of a line, skew lines, shortest distance between two lines. Angle between two lines.

Unit-V: Linear Programming

1. Linear Programming **20 Periods**

Introduction, related terminology such as constraints, objective function, optimization, graphical method of solution for problems in two variables, feasible and infeasible regions (bounded or unbounded), feasible and infeasible solutions, optimal feasible solutions (up to three non-trivial constraints).

Unit-VI: Probability

1. Probability **30 Periods**

Conditional probability, multiplication theorem on probability, independent events, total probability, Bayes' theorem, Random variable and its probability distribution, mean of random variable.

MATHEMATICS (Code No. - 041)

QUESTION PAPER DESIGN CLASS - XII

(2023-24)

Time: 3 hours **Max. Marks: 80**

S. No.	Typology of Questions	Total Marks	% Weightage
1	**Remembering:** Exhibit memory of previously learned material by recalling facts, terms, basic concepts, and answers. **Understanding:** Demonstrate understanding of facts and ideas by organizing, comparing, translating, interpreting, giving descriptions, and stating main ideas	44	55
2	**Applying:** Solve problems to new situations by applying acquired knowledge, facts, techniques and rules in a different way.	20	25
3	**Analysing :** Examine and break information into parts by identifying motives or causes. Make inferences and find evidence to support generalizations **Evaluating:** Present and defend opinions by making judgments about information, validity of ideas, or quality of work based on a set of criteria. **Creating:** Compile information together in a different way by combining elements in a new pattern or proposing alternative solutions	16	20
	Total	80	100

1. *No chapter wise weightage. Care to be taken to cover all the chapters*
2. *Suitable internal variations may be made for generating various templates keeping the overall weightage to different form of questions and typology of questions same.*

Choice(s):

There will be no overall choice in the question paper.

However, 33% internal choices will be given in all the sections

INTERNAL ASSESSMENT	**20 MARKS**
Periodic Tests (Best 2 out of 3 tests conducted)	10 Marks
Mathematics Activities	10 Marks

Note: For activities NCERT Lab Manual may be referred.

Conduct of Periodic Tests:

Periodic Test is a Pen and Paper assessment which is to be conducted by the respective subject teacher. The format of periodic test must have questions items with a balance mix, such as, very short answer (VSA), short answer (SA) and long answer (LA) to effectively assess the knowledge, understanding, application, skills, analysis, evaluation and synthesis. Depending on the nature of subject, the subject teacher will have the liberty of incorporating any other types of questions too. The modalities of the PT are as follows:

a) **Mode:** The periodic test is to be taken in the form of pen-paper test.

b) **Schedule:** In the entire Academic Year, three Periodic Tests in each subject may be conducted as follows:

Test	Pre Mid-term (PT-I)	Mid-Term (PT-II)	Post Mid-Term (PT-III)
Tentative Month	July-August	November	December-January

This is only a suggestive schedule and schools may conduct periodic tests as per their convenience. The winter bound schools would develop their own schedule with similar time gaps between two consecutive tests.

c) **Average of Marks**: Once schools complete the conduct of all the three periodic tests, they will convert the weightage of each of the three tests into ten marks each for identifying best two tests. The best two will be taken into consideration and the average of the two shall be taken as the final marks for PT.

d) The school will ensure simple documentation to keep a record of performance as suggested in detail circular no.Acad-05/2017.

e) **Sharing of Feedback/Performance**: The students' achievement in each test must be shared with the students and their parents to give them an overview of the level of learning that has taken place during different periods. Feedback will help parents formulate interventions (conducive ambience, support materials, motivation and morale-boosting) to further enhance learning. A teacher, while sharing the feedback with student or parent, should be empathetic, non- judgmental and motivating. It is recommended that the teacher share best examples/performances of IA with the class to motivate all learners.

Assessment of Activity Work:

Throughout the year any 10 activities shall be performed by the student from the activities given in the NCERT Laboratory Manual for the respective class (XI or XII) which is available on the link: http://www.ncert.nic.in/exemplar/labmanuals.htmla record of the same may be kept by the student. An year end test on the activity may be conducted

The weightage are as under:

- The activities performed by the student throughout the year and record keeping : 5 marks
- Assessment of the activity performed during the year end test: 3 marks
- Viva-voce: 2 marks

Prescribed Books:

1) Mathematics Textbook for Class XI, NCERT Publications
2) Mathematics Part I - Textbook for Class XII, NCERT Publication
3) Mathematics Part II - Textbook for Class XII, NCERT Publication
4) Mathematics Exemplar Problem for Class XI, Published by NCERT
5) Mathematics Exemplar Problem for Class XII, Published by NCERT
6) Mathematics Lab Manual class XI, published by NCERT
7) Mathematics Lab Manual class XII, published by NCERT

CLASS XII (2023-24) (THEORY)

Time: 03 Hours **Max. Marks: 70**

Unit	Title	Marks
VI	Reproduction	**16**
VII	Genetics and Evolution	**20**
VIII	Biology and Human Welfare	**12**
IX	Biotechnology and its Applications	**12**
X	Ecology and Environment	**10**
	Total	**70**

Unit-VI Reproduction

Chapter-2: Sexual Reproduction in Flowering Plants

Flower structure; development of male and female gametophytes; pollination - types, agencies and examples; out breeding devices; pollen-pistil interaction; double fertilization; post fertilization events - development of endosperm and embryo, development of seed and formation of fruit; special modes- apomixis, parthenocarpy, polyembryony; Significance of seed dispersal and fruit formation.

Chapter-3: Human Reproduction

Male and female reproductive systems; microscopic anatomy of testis and ovary; gametogenesis -spermatogenesis and oogenesis; menstrual cycle; fertilisation, embryo development upto blastocyst formation, implantation; pregnancy and placenta formation (elementary idea); parturition (elementary idea); lactation (elementary idea).

Chapter-4: Reproductive Health

Need for reproductive health and prevention of Sexually Transmitted Diseases (STDs); birth control - need and methods, contraception and medical termination of pregnancy (MTP); amniocentesis; infertility and assisted reproductive technologies - IVF, ZIFT, GIFT (elementary idea for general awareness).

Unit-VII Genetics and Evolution

Chapter-5: Principles of Inheritance and Variation

Heredity and variation: Mendelian inheritance; deviations from Mendelism – incomplete dominance, co-dominance, multiple alleles and inheritance of blood groups, pleiotropy;

elementary idea of polygenic inheritance; chromosome theory of inheritance; chromosomes and genes; Sex determination - in humans, birds and honey bee; linkage and crossing over; sex linked inheritance - haemophilia, colour blindness; Mendelian disorders in humans - thalassemia; chromosomal disorders in humans; Down's syndrome, Turner's and Klinefelter's syndromes.

Chapter-6: Molecular Basis of Inheritance

Search for genetic material and DNA as genetic material; Structure of DNA and RNA; DNA packaging; DNA replication; Central Dogma; transcription, genetic code, translation; gene

Expression and regulation - lac operon; Genome, Human and rice genome projects; DNA fingerprinting.

Chapter-7: Evolution

Origin of life; biological evolution and evidences for biological evolution (paleontology, comparative anatomy, embryology and molecular evidences); Darwin's contribution, modern synthetic theory of evolution; mechanism of evolution - variation (mutation and recombination) and natural selection with examples, types of natural selection; Gene flow and genetic drift; Hardy
- Weinberg's principle; adaptive radiation; human evolution.

Unit-VIII Biology and Human Welfare

Chapter-8: Human Health and Diseases

Pathogens; parasites causing human diseases (malaria, dengue, chikungunya, filariasis, ascariasis, typhoid, pneumonia, common cold, amoebiasis, ring worm) and their control; Basic concepts of immunology - vaccines; cancer, HIV and AIDS; Adolescence - drug and alcohol abuse.

Chapter-10: Microbes in Human Welfare

Microbes in food processing, industrial production, sewage treatment, energy generation and microbes as bio-control agents and bio-fertilizers. Antibiotics; production and judicioususe.

Unit-IX Biotechnology and its Applications

Chapter-11: Biotechnology - Principles and Processes

Genetic Engineering (Recombinant DNA Technology).

Chapter-12: Biotechnology and its Applications

Application of biotechnology in health and agriculture: Human insulin and vaccine production, stem cell technology, gene therapy; genetically modified organisms - Bt crops; transgenic animals; biosafety issues, biopiracy and patents.

Unit-X Ecology and Environment

Chapter-13: Organisms and Populations

Population interactions - mutualism, competition, predation, parasitism; population attributes - growth, birth rate and death rate, age distribution. (Topics excluded: Organism and its Environment, Major Aboitic Factors, Responses to Abioitic Factors, Adaptations)

Chapter-14: Ecosystem

Ecosystems: Patterns, components; productivity and decomposition; energy flow; pyramids of number, biomass, energy (Topics excluded: Ecological Succession and Nutrient Cycles).

Chapter-15: Biodiversity and its Conservation

Biodiversity-Concept, patterns, importance; loss of biodiversity; biodiversity conservation; hotspots, endangered organisms, extinction, Red Data Book, Sacred Groves, biosphere reserves, national parks, wildlife, sanctuaries and Ramsar sites.

PRACTICALS

Time allowed: 3 Hours **Max. Marks: 30**

Evaluation Scheme		Marks
One Major Experiment 5		5
One Minor Experiment 2 & 3		4
Slide Preparation 1& 4		5
Spotting		7
Practical Record + Viva Voce	(Credit to the student's work over the academic session may be given)	4
Investigatory Project and its Project Record + Viva Voce		5
Total		30

A. List of Experiments

1. Prepare a temporary mount to observe pollen germination.
2. Study the plant population density by quadrat method.
3. Study the plant population frequency by quadrat method.
4. Prepare a temporary mount of onion root tip to study mitosis.
5. Isolate DNA from available plant material such as spinach, green pea seeds, papaya, etc.

B. Study and observer the following (Spotting):

1. Flowers adapted to pollination by different agencies (wind, insects, birds).
2. Pollen germination on stigma through a permanent slide or scanning electron micrograph.
3. Identification of stages of gamete development, i.e., T.S. of testis and T.S. of ovary through permanent slides (from grasshopper/mice).
4. Meiosis in onion bud cell or grasshopper testis through permanent slides.
5. T.S. of blastula through permanent slides (Mammalian).
6. Mendelian inheritance using seeds of different colour/sizes of any plant.
7. Prepared pedigree charts of any one of the genetic traits such as rolling of tongue, blood groups, ear lobes, widow's peak and colour blindness.
8. Controlled pollination - emasculation, tagging and bagging.
9. Common disease causing organisms like *Ascaris, Entamoeba, Plasmodium*, any fungus causing ringworm through permanent slides, models or virtual images or specimens. Comment on symptoms of diseases that they cause.

10. Models specimen showing symbolic association in root modules of leguminous plants, Cuscuta on host, lichens.
11. Flash cards models showing examples of homologous and analogous organs.

Practical Examination for Visually Impaired Students of Classes XI and XII
Evaluation Scheme

Time: 02 Hours **Max. Marks: 30**

Topic	Marks
Identification/Familiarity with the apparatus	5
Written test (Based on given / prescribed practicals)	10
Practical Records	5
Viva	10
Total	**30**

General Guidelines

- The practical examination will be of two hour duration. A separate list of ten experiments is included here.
- The written examination in practicals for these students will be conducted at the time of practical examination of all other students.
- The written test will be of 30 minutes duration.
- The question paper given to the students should be legibly typed. It should contain a total of 15 practical skill based very short answer type questions. A student would be required to answer any 10 questions.
- A writer may be allowed to such students as per CBSE examination rules.
- All questions included in the question paper should be related to the listed practicals. Every question should require about two minutes to be answered.
- These students are also required to maintain a practical file. A student is expected to record at least five of the listed experiments as per the specific instructions for each subject. These practicals should be duly checked and signed by the internal examiner.
- The format of writing any experiment in the practical file should include aim, apparatus required, simple theory, procedure, related practical skills, precautions etc.
- Questions may be generated jointly by the external/internal examiners and used for assessment.
- The viva questions may include questions based on basic theory / principle / concept, apparatus / materials / chemicals required, procedure, precautions, sources of error etc.

Class XII

A. **Items for Identification/ familiarity with the apparatus for assessment in practicals (All experiments)** Beaker, flask, petriplates, soil from different sites - sandy, clayey, loamy,small potted plants, aluminium foil, paint brush, test tubes, starch solution, iodine, ice cubes,Bunsen burner/spirit lamp/water bath, large flowers, Maize inflorescence, model of developmental stages highlighting morula and blastula of frog, beads/seeds of different shapes/size/texture *Ascaris*, Cactus/*Opuntia*(model).

B. List of Practicals

1. Study of flowers adapted to pollination by different agencies (wind, insects).
2. Identification of T.S of morula or blastula of frog (Model).
3. Study of Mendelian inheritance pattern using beads/seeds of different sizes/texture.
4. Preparation of pedigree charts of genetic traits such as rolling of tongue, colour blindness.
5. Study of emasculation, tagging and bagging by trying out an exercise on controlled pollination.
6. Identify common disease causing organisms like *Ascaris* (model)and learn some common symptoms of the disease that they cause.
7. Comment upon the morphological adaptations of plants found in xerophytic conditions.

Note: The above practicals may be carried out in an experiential manner rather than recording observations.

Prescribed Books:

1. Biology, Class-XII, Published by NCERT
2. Other related books and manuals brought out by NCERT (consider multimedia also)
3. Biology Supplementary Material (Revised). Available on CBSE website.

Question Paper Design (Theory) 2023-24

Class XII

Biology (044)

Competencies	
Demonstrate Knowledge and Understanding	50%
Application of Knowledge / Concepts	30%
Analyse, Evaluate and Create	20%

Note:

- Typology of questions: VSA including MCQs, Assertion – Reasoning type questions; SA; LA-I; LA-II; Source-based/ Case-based/ Passage-based/ Integrated assessment questions.
- An internal choice of approximately 33% would be provided.

Suggestive verbs for various competencies

- **Demonstrate, Knowledge and Understanding**

  State, name, list, identify, define, suggest, describe, outline, summarize, etc.

- **Application of Knowledge/Concepts**

  Calculate, illustrate, show, adapt, explain, distinguish, etc.

- **Analyze, Evaluate and Create**

  Interpret, analyse, compare, contrast, examine, evaluate, discuss, construct, etc.

Computer Science

CLASS-XII

Code No. 083

2023-24

1. Prerequisites

Computer Science- Class XI

2. Learning Outcomes

Student should be able to

a) apply the concept of function.

b) explain and use the concept of file handling.

c) use basic data structure: Stacks

d) explain basics of computer networks.

e) use Database concepts, SQL along with connectivity between Python and SQL.

3. Distribution of Marks:

Unit No.	Unit Name	Marks	Periods	
			Theory	Practical
I	Computational Thinking and Programming – 2	40	70	50
II	Computer Networks	10	15	…
III	Database Management	20	25	20
	Total	70	110	70

4. Unit wise Syllabus

Unit I: Computational Thinking and Programming – 2

- Revision of Python topics covered in Class XI.
- Functions: types of function (built-in functions, functions defined in module, user defined functions), creating user defined function, arguments and parameters, default

parameters, positional parameters, function returning value(s), flow of execution, scope of a variable (global scope, local scope)

- Exception Handling: Introduction, handling exceptions using try-except-finally blocks
- Introduction to files, types of files (Text file, Binary file, CSV file), relative and absolute paths
- Text file: opening a text file, text file open modes (r, r+, w, w+, a, a+), closing a text file, opening a file using with clause, writing/appending data to a text file using write() and writelines(), reading from a text file using read(), readline() and readlines(), seek and tell methods, manipulation of data in a text file
- Binary file: basic operations on a binary file: open using file open modes (rb, rb+, wb, wb+, ab, ab+), close a binary file, import pickle module, dump() and load() method, read, write/create, search, append and update operations in a binary file
- CSV file: import csv module, open / close csv file, write into a csv file using writer(),writerow(),writerows() and read from a csv file using reader()
- Data Structure: Stack, operations on stack (push & pop), implementation of stack using list.

Unit II: Computer Networks

- Evolution of networking: introduction to computer networks, evolution of networking (ARPANET, NSFNET, INTERNET)
- Data communication terminologies: concept of communication, components of data communication (sender, receiver, message, communication media, protocols), measuring capacity of communication media (bandwidth, data transfer rate), IP address, switching techniques (Circuit switching, Packet switching)
- Transmission media: Wired communication media (Twisted pair cable, Co-axial cable, Fiber-optic cable), Wireless media (Radio waves, Micro waves, Infrared waves)
- Network devices (Modem, Ethernet card, RJ45, Repeater, Hub, Switch, Router, Gateway, WIFI card)
- Network topologies and Network types: types of networks (PAN, LAN, MAN, WAN), networking topologies (Bus, Star, Tree)
- Network protocol: HTTP, FTP, PPP, SMTP, TCP/IP, POP3, HTTPS, TELNET, VoIP
- Introduction to web services: WWW, Hyper Text Markup Language (HTML), Extensible Markup Language (XML), domain names, URL, website, web browser, web servers, web hosting

Unit III: Database Management

- Database concepts: introduction to database concepts and its need
- Relational data model: relation, attribute, tuple, domain, degree, cardinality, keys (candidate key, primary key, alternate key, foreign key)
- Structured Query Language: introduction, Data Definition Language and Data Manipulation Language, data type (char(n), varchar(n), int, float, date), constraints (not null, unique, primary key), create database, use database, show databases, drop database, show tables, create table, describe table, alter table (add and remove an attribute, add and remove primary key), drop table, insert, delete, select, operators (mathematical, relational and logical), aliasing, distinct clause, where clause, in, between, order by, meaning of null, is null, is not null, like, update command, delete command, aggregate functions (max, min, avg, sum, count), group by, having clause,

joins: cartesian product on two tables, equi-join and natural join

- Interface of python with an SQL database: connecting SQL with Python, performing insert, update, delete queries using cursor, display data by using connect(), cursor(), execute(), commit(), fetchone(), fetchall(), row count, creating database connectivity applications, use of %s format specifier or format() to perform queries

5. Practical

S.No	Unit Name	Marks (Total=30)
1	Lab Test: 1. Python program (60% logic + 20% documentation + 20% code quality)	8
	2. SQL queries (4 queries based on one or two tables)	4
2	Report file: ● Minimum 15 Python programs. ● SQL Queries – Minimum 5 sets using one table / two tables. ● Minimum 4 programs based on Python - SQL connectivity	7
3	Project (using concepts learnt in Classes 11 and 12)	8
4	Viva voce	3

6. Suggested Practical List:

Python Programming

- Read a text file line by line and display each word separated by a #.
- Read a text file and display the number of vowels/consonants/uppercase/lowercase characters in the file.
- Remove all the lines that contain the character 'a' in a file and write it to another file.
- Create a binary file with name and roll number. Search for a given roll number and display the name, if not found display appropriate message.
- Create a binary file with roll number, name and marks. Input a roll number and update the marks.
- Write a random number generator that generates random numbers between 1 and 6 (simulates a dice).

- Write a Python program to implement a stack using list.
- Create a CSV file by entering user-id and password, read and search the password for given user id.

Database Management

- Create a student table and insert data. Implement the following SQL commands on the student table:
    - o ALTER table to add new attributes / modify data type / drop attribute
    - o UPDATE table to modify data
    - o ORDER By to display data in ascending / descending order
    - o DELETE to remove tuple(s)
    - o GROUP BY and find the min, max, sum, count and average
- Similar exercise may be framed for other cases.
- Integrate SQL with Python by importing suitable module.

7. Suggested Reading Material

- NCERT Textbook for COMPUTER SCIENCE (Class XII)
- Support Materials on the CBSE website.

8. Project

The aim of the class project is to create something that is tangible and useful using Python file handling/ Python-SQL connectivity. This should be done in groups of two to three students and should be started by students at least 6 months before the submission deadline. The aim here is to find a real world problem that is worthwhile to solve.

Students are encouraged to visit local businesses and ask them about the problems that they are facing. For example, if a business is finding it hard to create invoices for filing GST claims, then students can do a project that takes the raw data (list of transactions), groups the transactions by category, accounts for the GST tax rates, and creates invoices in the appropriate format. Students can be extremely creative here. They can use a wide variety of Python libraries to create user friendly applications such as games, software for their school, software for their disabled fellow students, and mobile applications, of course to do some of these projects, some additional learning is required; this should be encouraged. Students should know how to teach themselves.

The students should be sensitized to avoid plagiarism and violations of copyright issues while working on projects. Teachers should take necessary measures for this.

COURSE STRUCTURE
CLASS XII (2023-2024)

Theory Paper **3 Hours**
Marks: 70

Units	Topics	No. of periods	Marks
I	Variations in Psychological Attributes	30	13
II	Self and Personality	32	13
III	Meeting Life Challenges	23	9
IV	Psychological Disorders	30	12
V	Therapeutic Approaches	25	9
VI	Attitude and Social Cognition	16	8
VII	Social Influence and Group Processes	14	6
	Total	**170**	**70**

COURSE CONTENT

Unit I	**Variations in Psychological Attributes** *The topics in this unit are:* 1. Introduction 2. Individual Differences in Human Functioning 3. Assessment of Psychological Attributes 4. Intelligence 5. Psychometric Theories of Intelligence, Information Processing Theory: Planning, Attention-arousal and Simultaneous successive Model of Intelligence, Triarchic Theory of Intelligence; Theory of Multiple Intelligences. 6. Individual Differences in Intelligence 7. Culture and Intelligence 8. Emotional Intelligence 9. Special Abilities: Aptitude: Nature and Measurement 10. Creativity	**30 Periods**
Unit II	**Self and Personality** *The topics in this unit are:* 1. Introduction 2. Self and Personality 3. Concept of Self 4. Cognitive and Behavioural aspects of Self	**32 Periods**

	5. Culture and Self 6. Concept of Personality 7. Major Approaches to the Study of Personality • Type Approaches • Trait Approaches • Psychodynamic Approach and Post Freudian Approaches • Behavioural Approach • Cultural Approach • Humanistic Approach 8. Assessment of Personality • Self-report Measures • Projective Techniques • Behavioural Analysis	
Unit III	**Meeting Life Challenges** *The topics in this unit are:* 1. Introduction 2. Nature, Types and Sources of Stress 3. Effects of Stress on Psychological Functioning and Health • Stress and Health • General Adaptation Syndrome • Stress and Immune System • Lifestyle 4. Coping with Stress • Stress Management Techniques 5. Promoting Positive Health and Well-being • Life Skills • Positive Health	**23 periods**
Unit IV	**Psychological Disorders** *The topics in this unit are:* 1. Introduction 2. Concepts of Abnormality and Psychological Disorders • Historical Background 3. Classification of Psychological Disorders 4. Factors Underlying Abnormal Behaviour 5. Major Psychological Disorders	**30 Periods**

	• Anxiety Disorders • Obsessive-Compulsive and Related Disorders • Trauma-and Stressor-Related Disorders • Somatic Symptom and Related Disorders • Dissociative Disorders • Depressive Disorder • Bipolar and Related Disorders • Schizophrenia Spectrum and Other Psychotic Disorders • Neurodevelopmental Disorders • Disruptive, Impulse-Control and Conduct Disorders • Feeding and Eating Disorders • Substance Related and Addictive Disorders	
Unit V	**Therapeutic Approaches** *The topics in this unit are:* 1. Nature and Process of psychotherapy • Therapeutic relationship 2. Types of Therapies • Behaviour Therapy • Cognitive Therapy • Humanistic-Existential Therapy • Alternative Therapies • Factors contributing to healing in Psychotherapy • Ethics in Psychotherapy 3. Rehabilitation of the Mentally Ill	**25 Periods**
Unit VI	**Attitude and Social Cognition** *The topics in this unit are:* 1. Introduction 2. Explaining Social Behaviour 3. Nature and Components of Attitudes 4. Attitude Formation and Change • Attitude Formation • Attitude Change • Attitude-Behaviour Relationship 5. Prejudice and Discrimination 6. Strategies for Handling Prejudice	**16 Periods**

Unit VII	**Social Influence and Group Processes** *The topics in this unit are:* 1. Introduction 2. Nature and Formation of Groups 3. Type of Groups 4. Influence of Group on Individual Behaviour • Social Loafing • Group Polarisation	**14 Periods**
Practical **30 Marks** A. Development of case profile: Using appropriate methods like interview, observation & psychological tests. B. Test administration: Students are required to administer and interpret five psychological tests related to various psychological attributes like intelligence, aptitude, attitude, personality, etc. C. In the Practical examination, the student will be required to administer and interpret two psychological tests. **Distribution of Marks:**		**60 Periods**

• Practical File and Case Profile	10 Marks
• Viva Voce (Case Profile & Two Practicals)	05 Marks
• Two Practicals (5 marks for conduct of practicals and 10 marks for reporting)	15 Marks
Total	**30 Marks**

QUESTION PAPER
DESIGN CLASS – XII
(2023-24)

I. Board Examination: Theory

Time: 3 Hours		**Maximum Marks: 70**	
S. No.	**Competencies**	**Total Marks**	**% Weightage**
1	**Remembering and Understanding:** Exhibiting memory of previously learned material by recalling facts, terms, basic concepts, and answers; Demonstrating understanding of facts and ideas by organizing, comparing, translating, interpreting, giving descriptions and stating main ideas	25	35%
2	**Applying:** Solving problems to new situations by applying acquired knowledge, facts, techniques and rules in a different way	31	45%
3	**Formulating, Analysing, Evaluating and Creating:** Examining and breaking information into parts by identifying motives or causes; Making inferences and finding evidence to support generalizations; Presenting and defending opinions by making judgments about information, validity of ideas, or quality of work based on a set of criteria; Compiling information together in a different way by combining elements in a new pattern or proposing alternative solutions	14	20%
	Total	**70**	**100%**

II. Practical: 30 Marks

Prescribed Books:

1. Psychology, Class XI, Published by NCERT
2. Psychology, Class XII, Published by NCERT

Note: The above textbooks are also available in Hindi medium.