

West Bengal Council of Higher Secondary Education.

SYLLABUS

SESSION:- 2021-2022.

CLASS-XII.

SUBJECT:- PHYSICS(PHYS)

MARKS:-100.

THEORETICAL MARKS :-70

Unit-I. Electrostatics

Chapter-1: Electric charges and Coulomb's Law.

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

Chapter-2: Electric field and Gauss's Theorem.

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

Electric flux, statement of Gauss's theorem and its applications to find field due to infinitely long straight wire and uniformly charged infinite plane sheet.

Chapter-3: Electrostatic potential.

Electrostatic potential, potential difference, relation between electric field and potential, electric potential due to a point charge, a dipole and system of charges; equipotential surfaces, electric potential energy of a system of two point charges and of electric dipole in an electrostatic field.

Chapter-4: Capacitors and Dielectrics.

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

Unit – II. Current Electricity.

Chapter-1:- Electric Current and Electric cell.

Electric current, flow of electric charges in a metallic conductor, drift velocity, mobility and their relation with electric current.

Ohm's law, electrical resistance, V-I characteristics (linear and non-linear), electrical energy and power, electrical resistivity and conductivity. Temperature dependence of resistance.

Internal resistance of a cell, potential difference and E.M.F. of a cell, combination of cells in series and in parallel.

Chapter-2: Electric network rules and electrical measurements.

Kirchhoff's laws and simple applications. Wheatstone bridge and metre bridge.

Potentiometer; principle and its applications to measure potential difference and for comparing e.m.f. of two cells, measurement of internal resistance of a cell.

Unit – III. Magnetic effect of current and Magnetism.

Chapter-1: Concept and laws of magnetic field.

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

Ampere's law and its applications to infinitely long straight wire, straight and toroidal solenoids.

Chapter-2: Force on a Charge and current.

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; moving coil galvanometer-its current sensitivity and conversion to ammeter and voltmeter.

Chapter-3: Magnetic Dipole and Earth's Magnetism.

Current loop as a magnetic dipole and its magnetic dipole moment. Magnetic dipole moment of a revolving electron. Bar magnet as an equivalent solenoid, magnetic field lines; earth's magnetic field and magnetic elements.

Unit- IV. Electromagnetic Induction and Alternating Currents.

Chapter-1: Electromagnetic Induction.

Electromagnetic Induction; Faraday's law. Induced emf and current; Lenz's law, Eddy currents, Self and mutual inductance.

Chapter-2: Alternating Current.

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.

AC generator and transformer.

Unit-V. Electromagnetic waves.

Chapter-1: Electromagnetic Waves.

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 :- Part A: Ray Optics and Optical Instrument.

Chapter-1: Refraction of light.

Refraction of light, total internal reflection and it's 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. Refraction of light through a prism.

chapter-2: Optical Instruments.

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

Part B:- Wave Optics:-

Chapter-1:- Propagation principle of wavefront

Wave front and Huygens' principle, reflection and refraction of plane wave at a plane surface using wave fronts. Proof of laws of reflection and refraction using Huygen's principle.

Chapter-2: Interference of light.

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

Chapter-3: Diffraction of light.

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

Unit -VII. Dual Nature of Matter and Radiation.

Chapter-1: Particles Nature of Radiation.

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

Chapter-2: Wave Nature of Matter.

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

Unit – VIII. Atoms and Nuclei

chapter-1: Atoms

Alpha particle scattering experiment: Rutherford's model of atom; Bohr model, energy levels, hydrogen spectrum.

Chapter-2:- Nuclei.

Composition and size of nucleus , Mass-energy relation, mass defect; binding energy per nucleon and it's variation with mass number; nuclear fission and fusion.

Unit- IX. Electronic Devices.

Chapter-1: Band theory of solids

Energy bands in conductors , insulators and Semiconductors.

Chapter-2:- semiconductor Electronics.

semiconductor diode, I-V characteristics of diode in forward and reverse bias, diode ad a rectifier.

Special purpose p-n junction diodes; LED, photodiode, solar cell and their Characteristics.

West Bengal Council of Higher Secondary Education

QUESTION STRUCTURE AND MARK DISTRIBUTION

Class – XII Subject-Physics (PHYS)

Session-2021-2022

SI No	Unit	Section I		Section II			Total Marks
		MCQ	Very Short Answer Question.	Short Answer Questions I	Short Answer Questions II	Long Answer Questions	
		1 mark	1 mark	2 marks	3 marks	5 mark	
1	Electrostatics	1X2=2	00	2×1=2	3×2=6	00	10
2	Current Electricity	1×1=1	00	2×1=2	00	5×1=5	08
3	Magnetic Effect of current and magnetism	1×1=1	1×1=1	00	3×1=3	5×1=5	10
4	Electromagnetic induction and Alternative current	1×1=1	00	2×1=2	3×1=3	00	06
5	Electromagnetic waves	1×1=1	00	2×1=2	00	00	03
6	Optics: Ray Optics and instruments.	1×2=2	00	00	3×2=6	00	8
	Optics: wave optics.	1×1=1	1×1=1	00	00	5×1=5	7
7	Dual Nature of radiation and matter	1×1=1	00	2×1=2	3×1=3	00	6
8	Atoms and Nuclei	1×2=2	1×1=1	00	3×1=3	00	6
9	Electronic Devices	1×2=2	1×1=1	00	3×1=3	00	6
Total.		14	4	10	27	15	70

SUBJECT: CHEMISTRY

SYLLABUS FOR SESSION: 2021 – 2022

CLASS – XII

THEORY – 70 MARKS

SL. NO.	UNIT	MARKS
1.	Solid State	4
2.	Solutions	6
3.	Electrochemistry	5
4.	Chemical Kinetics	10
5.	Surface Chemistry	7
6.	p-Block Elements	8
7.	d- and f-Block Elements	1
8.	Coordination Compounds	4
9.	Haloalkanes and haloarenes	4
10.	Alcohols, Phenols and Ethers	4
11.	Aldehydes, Ketones and Carboxylic Acids	10
12.	Organic Compounds Containing Nitrogen	4
13.	Biomolecules	3

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, packing efficiency, calculation of density of unit Cell, Packing in solids, voids, number of atoms per unit cell in a cubic unit cell , point defects.

Solutions:

Types of Solutions, expression of concentration of solution of solids in liquids, solubility of gases in liquids in liquids, solid solutions, Raoult's law, colligative properties – relative lowering of vapour pressure, elevation of boiling point, depressing of freezing point, osmotic pressure, determination of molecular masses using colligative properties.

Electrochemistry:

Redox reactions, EMF of cell, standard and 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 laws of electrolysis (elementary idea).

Chemical Kinetics:

Rate of 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 reaction)

Surface Chemistry:

Adsorption – Physisorption and chemisorptions, factors affecting adsorption of gases on solids colloidal state, distinction between true solutions, multi molecular and macromolecular colloids; properties of colloids, tyndall effect . Brownian movement, electro phoresis, coagulation.

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.

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 : properties and uses : oxiacids 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, oxiacides of halogens (structure only).

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

d- and f-Block Elements:

General introduction, electronic configuration, occurrence and characteristic of transition metals , general trends in properties of the first row transition metals – metallic character, ionization enthalpy, oxidation states, ionic radii colour, catalytic property, magnetic properties, interstitial compounds, alloy formation. Lanthanoids – electronic configuration, oxidation states and lanthanoid contraction and its consequences.

Coordination Compounds:

Coordination compounds – introduction , ligands, coordination number, colour, magnetic properties and shape, IUPAC nomenclature of mononuclear coordination compounds, bonding, Werner's theory, VBT and CFT.

Haloalkanes and Haloarenes:

Nomenclature, nature of C-X bond, physical and chemical properties, mechanism of substitution reactions, stability of carbonations R-S and d-l configurations.

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

Alcohols, Phenols and Ethers:

Alcohols: Nomenclature, methods of preparation, physical and chemical properties (of primary alcohols only), identification of primary, secondary and tertiary alcohols; mechanism of dehydration

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

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

Aldehydes, Ketones and Carboxylic Acids:

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.

Organic Compounds Containing Nitrogen :

Nitro compounds: General methods of preparation and chemical reactions.

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

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

Bio Molecules:

Carbohydrates – Classification (Alloses and ketose), monosaccharide's (glucose and fructose) D-L configuration

Proteins – Elementary idea of alpha amino acids, peptide bond, polypeptides, proteins, structure of proteins – Primary secondary, tertiary and quaternary structures (qualitative idea only), denaturation of proteins.

Nucleic Acids: DNA and RNA

Question Pattern for H.S. Examination – 2022

Subject: CHEMISTRY

Topic	MCQ (1 mark)	Very Short Answer Questions (1 mark)	Short Answer Questions (1 mark)	Short Answer Questions (2 Marks)	3 Mark Question	Total
Solid State	1x1=1			1x3=3		04
Solutions	1x1=1		1x2=2	1x3=3		06
Electro Chemistry	1x1=1	1x1=1		1x3=3		05
Chemical Kinetics	1x1=1	1x1=1		1x3=3	1x5=5	10
Surface Chemistry	1x1=1	1x1=1	1x2=2	1x3=3		07
P- Block Elements	1x1=1		1x2=2		1x5=5	08
d- and f-Block Elements	1x1=1					01
Co-ordination Compounds	1x1=1	1x1=1	1x2=2			04
Haloalkanes and Haloarenes	1x1=1			1x3=3		04
Alcohols, Phenol and Ethers	1x1=1			1x3=3		04
Aldehydes, Ketones and Carboxylic Acids	2x1=2			1x3=3	1x5=5	10
Organic Compounds Containing Nitrogen	1x1=1			1x3=3		04
Biomolecules	1x1=1		1x2=2			03
Total	14	04	10	27	15	70

MATHEMATICS

Class 12

Unit-1 : Relations and Function

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

2. Inverse Trigonometric Functions

Definition, range, domain, principal value branches

Unit-II: Algebra

1. Matrices:

Concept, notation order equality, types of matrices, zero matrix, transpose of a matrix and 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 (Here all matrices will have real entries)

2. Determinants:

Determinants of a square matrix (upto 3×3 matrices), properties of determinants, minors and Cofactors and applications of determinants in finding the area of a triangle. Adjoint and inverse of a square matrix. Consistency, inconsistency and the number of solutions of system of linear equations by examples, solving system of linear equations in two or three variables (having unique solutions) 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 functions, concept of exponential and logarithmic functions to the base e . Logarithmic functions as inverse of exponential functions.

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

2. Applications of derivatives:

Applications of derivatives, increasing/ decreasing functions, tangents and normals, 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 a real time situation)

3. Integrals:

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

.....dx,

dx, dx

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

evaluation of definite integrals.

4. Applications of the Integrals:

Applications in finding the area under simple curves especially lines ,areas of circles/ parabola/ ellipse (in standard form only)

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 equation by method of separation of variables, homogenous differential equation of first order and first degree.

UNIT-IV : Vectors and Three-Dimensional Geometry

1.Vectors:

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

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 .Distance of a point from a plane.

UNIT-V : Linear Programming :

1. Linear Programming

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

UNIT-VI: Probability:

1. Probability :

Multiplication theorem on probability, Conditional probability, independent events, total probability, Baye's Theorem, Random variable and its probability distribution.

Subject-wise Question Pattern for H.S.Examination-2022

Subject Name : MATH

Theory Marks : 80

Topic	MCQ (1 mark)	Very Short Answer Questions (2 mark)	Short Answer Questions (4 mark)	Long Answer Questions (5 Marks)	Total
Relations & Functions <i>Inv. Trigo Functions</i>	2x1=2	1x2=2	1x4=4	----	8
ALGEBRA • Matrices, <i>Determinants</i>	1x1=1	1x2=2	2x4=8	----	11
CALCULUS • Continuity • Differentiability • Application of Derivatives • Integrals(Definite & Indefinite) • Application of Integrals • Differential Equation	3x1=3	3x2=6	4x4=16	2x5=10	35
3D Geometry <i>Vector</i>	2x1=2	1x2=2	1x4=4	1x5=5	13
Linear Programming	----	----	----	1x5=5	5
Probability	2x1=2	1x2=2	1x4=4	----	8
Total	10	14	36	20	80

BIOLOGICAL SCIENCES (BIOS)

CLASS - XII
FULL MARKS- 100
THEORY – 70 MARKS

Unit – I	REPRODUCTION IN ORGANISMS	14 MARKS
Unit – II	GENETICS AND EVOLUTION	18 MARKS
Unit – III	BIOLOGY AND HUMAN WELFARE	14 MARKS
Unit – IV	BIOTECHNOLOGY AND ITS APPLICATION	10 MARKS
Unit – V	ECOLOGY AND ENVIRONMENT	14 MARKS

Unit – I REPRODUCTION IN ORGANISMS

1 : Sexual Reproduction In flowering Plants

- 1.1 Flower structure: Typical structure of a complete regular flower with diagram
- 1.2 Pollination: Definition, types-self Pollination (autogamy and geitonogamy) And cross pollination. (allogamy and xenogamy); agents of pollination- wind, water, animals, insects and birds- brief description with example. Significance.
- 1.3 Outbreeding devices
- 1.4 Double fertilization
- 1.5 Special modes – apomixes, Parthenogenesis, parthenocarpy and Polyembryony (brief account)
- 1.6 Significance of seed and fruit formation

2 : Human Reproduction

- 2.1 Introduction
- 2.2 Male Reproductive system (outline with diagram)
- 2.3 Female Reproductive system (outline with diagram)
- 2.4 Gametogenesis- Definition and type
- 2.5 Spermatogenesis (brief account)
- 2.6 Oogenesis (brief account)
- 2.7 Menstrual cycle
- 2.8 Fertilization and development of embryo upto blastocyst formation and implantation.
- 2.9 Pregnancy and Placenta formation (elementary idea)

- 2.10 Parturition (elementary idea)
- 1.11 Lactation (elementary idea)

3 : Reproductive Health

- 3.1 Introduction: what is Reproductive health?
- 3.2 Need for reproductive health
- 3.3 Sexually Transmitted diseases (STD) And its prevention
- 3.4 Birth control- Needs and Methods:
 - i) Contraception
 - ii) Medical termination of pregnancy (MTP)
- 3.5 Amniocentesis: What it is and it's Significance
- 3.6 Infertility and assisted reproductive Technologies – IVF (in vitro fertilization), ZIFT (Zygote intrafallopian transfer), GIFT (Gamete intrafallopian transfer) Elementary idea for general awareness.

Unit – II

GENETICS AND EVOLUTION

4. Heredity and Variation

- 4.1 Introduction
- 4.2 Mendelian Inheritance (laws only)
- 4.3 Deviations from Mendelism
 - i) incomplete dominance
 - ii) Co-dominance
 - iii) multiple alleles and Inheritance of Blood groups (ABO & Rh)
 - iv) Pleiotroph
- 4.4 Polygenic inheritance (elementary)
- 4.5 Chromosome theory of inheritance
- 4.6 Chromosome and genes
- 4.7 Sex determination in – Human, bird and honey bee
- 4.8 Linkage and crossing over
- 4.9 Sex –linked inheritance – haemophillia and colour blindness
- 4.10 Mendelian disorder in human: Chromosomal disorders:
 - i) Autosomal – thalassemia
 - ii) Sex-linked-Down's Syndrome, Turner's Syndrome and Klinefelter's Syndrome (cause & symptoms only , Process of inheritance is not required)

5 : Molecular Basic of Inheritance

- 5.1 Search for genetic material
- 5.2 DNA as genetic material:
(experiments on Bacterial transformation by F. Griffith; Avery ,McLeod and Harshey & Chase)
- 5.3 Structure of DNA
- 5.4 Structure of RNA
- 5.5 Types of RNA –mRNA; rRNA & tRNA
- 5.6 DNA Packaging
- 5.7 Central dogma (elementary), DNA replication , transcription. Genetic code and translation .
- 5.8 Regulation of Gene expression (elementary) Lac Operon
- 5.9 Genome and Human genome project
- 5.10 DNA finger printing

6 : Evolution

- 6.1 Introduction
- 6.2 Biological Evolution
 - a) What is biological Evolution?
 - b) Evidence for Biological Evolution
 - i) Paleontological
 - ii) From comparative anatomy
 - iii) Embryological
 - iv) Molecular
- 6.3 Theories of organic evolution
 - Introduction – Darwin's contribution-
 - Modern Synthetic Theory –
 - Hardy Weinberg's Principle

Unit – III

BIOLOGY AND HUMAN WELFARE

7 : Health and Diseases

- 7.1 Basic concept of immunology – vaccines
 - Introduction – immune system – Antigen, Antibody , Antigen-Antibody reaction – Types of immunity – vaccines and vaccination
- 7.2 Pathogens, parasites causing human Diseases-Malaria, Filariasis, Ascariasis, Typhoid, Pneumonia, common cold , Amoebiasis and ring worm .(symptoms of Disease, Name of causative agent ,mode of Transmission ,preventive measures)

- 7.3 Cancer ,HIV and AIDS-Symptoms of disease , causative agent , mode of transmission preventive measures
- 7.4 Adolescence : drug and alcohol abuse

8 : Microbes In Human welfare

- 8.1 In household food processing
- 8.2 Industrial production
- 8.3 Sewage treatment
- 8.4 Energy generation
- 8.5 Bio control agents and bio fertilizers

Unit – IV

BIOTECHNOLOGY AND ITS APPLICATION

9 : Biotechnology and its Application

- 9.1 Introduction
- 9.2 Principle
- 9.3 Process –Genetic Engineering (Recombinant DNA technology)
- 9.4 Application of Biotechnology in health and agriculture – introduction
- 9.5 Human insulin and vaccine production- gene therapy
- 9.6 Genetically modified organisms - BT crops (What is G.M.O ? example- cotton). Transgenic animals.
- 9.7 Bio safety issues
- 9.8 Bio piracy and patents

Unit – V

ECOLOGY AND ENVIRONMENT

10 : Ecology Environment & Population

- 10.1 Meaning of ecology. Environment , Habitat and niche.
- 10.2 Organisms and environment
 - i) Introduction –biome concept and distribution
 - ii) Major abiotic factors – water ,light temperature and soil
 - iii) Responses to abiotic factors
 - iv) Adaptations
- 10.3 Population and ecological adaptations-
 - i) Population interactions – mutualism

- ii) competition, predation, parasitism
Population attributes- growth,
birth rate and death rate ,
age distribution

11 : Biodiversity And Conservation

- 11.1 What is biodiversity?
- 11.2 Levels of biodiversity (genetic , species and Ecological) Patterns of biodiversity
Importance and loss of biodiversity
- 11.3 Threats to need for biodiversity conservation
- 11.4 Hotspots ,endangered organisms, extinction ,Red Data book
- 11.5 Biodiversity conservation –
 - a) Biosphere reserve
 - b) National parks and sanctuaries-

12 : Environment issues

- 12.1 Introduction
- 12.2 Air Pollution and its control
- 12.3 Water Pollution and its control
- 12.4 Agro -Chemicals and their effects
- 12.5 Solid waste management
- 12.6 Radioactive waste management
- 12.7 Green House effect and global warming
- 12.8 Ozone depletion
- 12.9 Deforestation
- 12.10 Three success stories addressing environmental issue – chipko movement, Dasholi Gram Swarajya Mandal (DGSM) Movement ;Silent valley or Amrita Devi-Bishnoi (Jaipur) movements

BIOLOGICAL SCIENCES (BIOS)**Class - XII****(New Syllabus)****QUESTION PATTERN****(THEORY)**• **Marks Distribution :**

Sl. No.	Unit	(1 mark) Sec-I MCQ	(1 mark) Sec-II VSA	(2 marks) Sec-II SA-I	(3 marks) Sec-II SA-II	(5 marks) Sec-II LA	Total
1.	Reproduction	3(3)	1(1)	2(1)	3(1)	5(1)	14
2.	Genetics & Evolution	4(4)	1(1)	2(1)	6(2)	5(1)	18
3.	Biology in Human Welfare	2(2)	1(1)	2(1)	9(3)	—	14
4.	Bio-Technology	2(2)	—	2(1)	6(2)	—	10
5.	Ecology & Environment	3(3)	1(1)	2(1)	3(1)	5(1)	14
		14(14)	4(4)	10(5)	27(9)	15(3)	70

• **Question Paper will have two Sections :**

Section-I : For MCQ (Question Nos. 1 to 14)

Section-II will have four groups :

VSA (1 mark) — one sentence answer (Question Nos. 1-4)

SA-I (2 marks) — (Question Nos. 5-9)

SA-II (3 marks) — (Question Nos. 10-18)

LA (5 marks) — (Question Nos. 19-21)

- There should be no fractions in the marks distribution.
- For SA-I, marks may be divided into 1 + 1
- For SA-II, marks may be divided into 2 + 1
- For LA, marks may be divided into 3 + 2 or 4 + 1.
- Option Summary :

Section I	No internal option
Section-II VSA	Internal options for at least any 2 questions
Section-II SA-I	Internal options for at least any 3 questions
Section-II SA-II	Internal options for at least any 5 questions
Section-II LA	Internal options for at least any 2 questions