SHIVALIK PUBLIC SCHOOL
SYLLABUS FOR CLASS –XII(SCIENCE)
SESSION: 2021-2022

SUBJECT: ENGLISH LITERATURE

Prescribed Books

1. Flamingo: English Reader published by National Council of Education Research and Training, New Delhi

2. Vistas: Supplementary Reader published by National Council of Education Research and Training, New Delhi

PART A (40 MARKS)

Reading Comprehension 20 Marks

I. Multiple Choice questions based on one unseen passage to assess comprehension, interpretation and inference. Vocabulary and inference of meaning will also be assessed. The passage may be factual, descriptive or literary. Ten out of eleven questions to be done. (**10x1=10 Marks)**

II. Multiple Choice questions based on one unseen **case-based** factual passage with verbal/visual inputs like statistical data, charts, newspaper report etc. Ten out of eleven questions to be done. (**10x1=10 Marks)**

Note: The combined word limit for both the passages will be 700-750 words.

Literature 20 Marks

III. Multiple Choice Questions based on two prose extracts, one each from the books **Flamingo and Vistas,** to assess comprehension and appreciation. Refer to the lines to answer questions based on the given extract. Any 2 out of 3extracts to be done.**(8x1=8)**

IV. Multiple Choice Questions based on a poetry extract from the book **Flamingo** to assess comprehension, analysis and inference. Refer to the lines to answer questions based on the given extract. Any 1 out of 2 extracts to be done. **(4x1=4)**

VI. Text based questions interpretation from the books done. **(8x1=8)**

To assess comprehension, analysis, inference and **Flamingo and Vistas**. Eight out of ten

questions to be

PART B (SUBJECTIVE QUESTIONS) - 40

MARKS Writing Section: 16 Marks

Q1. Short writing task –Notice/Advertisement up to 50 words. One out of the two given questions to be answered.**(3 Marks**: Format : 1 / Content : 1 / Expression : 1).

Q2. Short writing task –Formal/Informal Invitation and Reply up to 50 words.One out of the two given questions to be answered.**(3 Marks**: Format : 1 / Content : 1 / Expression : 1)

Q3. Letters based on verbal/visual input, to be answered in approximately 120-150 words. Letter types include application for a job, Letters to the editor (giving suggestions or opinion on issues of public interest) . One out of the two given questions to be answered (**5 Marks** :Format: 1 / Content: 2 / Expression: 2)

Q4. Article/ Report Writing, descriptive and analytical in nature, based on verbal inputs, to be answered in 120-150 words. One out of the two given questions to be answered **(5Marks:**Format : 1 / Content : 2 / Expression : 2)

Literature Section: 24 Marks

Q6. **Five** Short answer type question, **out of six, from Prose and Poetry from the book Flamingo,** to be answered in 30-40 words. Questions should elicit inferential responses through critical thinking.**(5x2=10)**

Q7. **Two** Short answer type question ,out of three, from **Prose (Vistas),** to be answered in 30-40 words. Questions should elicit inferential responses through critical thinking.

(2x2=4)

Q 8. **One** Long answer type question, from **Prose/poetry (Flamingo),** to be answered in 120-150 words to assess global comprehension and extrapolation beyond the text. Questions to provide evaluative and analytical responses using incidents, events, themes as reference points. Any 1 out of 2 questions to be done.**(1x5=5)**

Q.9 One Long answer type question, based on the chapters from the book **Vistas**, to be answered in 120-150 words to assess global comprehension and extrapolation beyond the text. Questions to provide evaluative and analytical responses using incidents, events, themes as reference points. Any 1 out of 2 questions to be done.**(1x5=5)**

Periodic Assessment

One Paper **1 hour**

Marks:25

Section	Area of Learning	Marks specified
Part A	Reading Unseen Passages	5
Extracts		3
Part B	Writing Skills	5
C	Textual Questions	4+2 =6
Long answer		3+ 3=6

Annual Assessment

One Paper **3 hours** **Marks: 80**

Section	**Area of Learning**	**Marks specified**
Part A	Reading Unseen Passages (2)	10+10 = 20
	Multiple Choice from Literature (based on prose,poetry extracts Flamingo &Vistas)	8+4+8 =20
Part B	Advanced Writing Skills	3+3+5+5 =16
	Textual Questions Literature Reader- Flamingo Suppl. Reader - Vistas	10+4+5+5 =24

Unit wise distribution of syllabus

Unit I

L. Reader : Poem- My mother at 66

(Key Words- ashen, corpse, sprinting, spilling, wan, ache)

Ch.1- The Last Lesson

(Key Words-bustle, unison, solemn, reproach, enslaved, rapt, logical,primer, gesture, thunderclap, apprentice)

S. Reader : Ch 1 The Third Level

(Key words- futuristic, intersection, derby, premium, spittoons, duckedArched, protectors, apparent, illogicality)

Writing Skills : Advertisement- Classified Ads, Notice writing

Activity : Practice of listening skill

Speech on " Preserving Language Preserves Identity"

Unit II

L. Reader : Ch.2- Lost Spring

(Key words- scrounging, glibly, bleak, perpetual, periphery, metaphorically, squatters, unkempt, sanctity, apathy, vicious)

S. Reader : Ch.2- The Tiger King

(Key Words-indomitable, transfixed, stupefaction, incoherent,brandishing, catastrophic, imperative, incredible, carcass, summoned, supplication)

Writing Skills : Advertisement- Display Ads, Article writing

Reading Skills : Practice of Unseen Passage

Note Making Activity : Card Making on Mother's Day (Work Experience)

Unit III

L. Reader : Poem- An Elementary School Classroom in a Slum

(Key words- gusty, heir, gnarled, capes, azure, cramped)

: Ch.3- Deep Water

(Key Words-phobia, treacherous, misadventure, aversion,summoned, oblivion, paralysed, panicky, handicap, nightmare, bruiser, haunting, terror)

S. Reader : Ch 3 Journey to the end of the Earth

(Key words- immensity, ecosphere, amalgatamated , cordilleran , desolate, ubiquitous,austral, retreating, phytoplankton, synthesise, assimilate)

Writing Skills : Speech Writing, Job Applications

Reading Skills : Practice of Unseen Passage

Note MakingActivity: Practice of listening skill

Unit IV

L. Reader : Chapter – 4 The Rattrap

(Key words-plods, incredulous, forge, valet, jagged)

S. Reader : Ch.4- The Enemy

(Key Words-stupor, resolution, strewed, repulsion, conviction, retching, ruthless, assassins,stubbornness, execution, prejudice)

Writing Skills : Poster Making (Designing and Drafting of Poster on any given topic), ReportWriting

Reading Skills : Practice of unseen passage for Note Making

Activity: Practice of Speaking skill- (Expressing Opinion)"If you were in Dr. Sadao's place what would you have done?"

Unit V

L. Reader : Poem – Keeping Quiet

(Key words- exotic, inactivity, truck, interrupt)

Chapter – 5 Indigo

(Key words- delegates, emaciated, tenacity, chided, vehemently)

S. Reader : Chapter – 5 Should Wizard Hit Mommy

(Key words-spell, fatiguing, swamp, fuss, ivory)

Writing Skills : Formal and Informal Invitation and replies.
Business & Official letters

Reading Skills : Practice of Comprehension Passage

Activity : Practice of Listening & Speaking skill
Speech on "Qualities of a Good Leader"

Unit VI

L. Reader : Ch 6 Poets & Pancakes

(key words : incandescent, fiery, hued, ignominy, affluent, incriminating, drudge)

S. Reader : Chapter – 6 On the Face of it

(Key words-startled, whispered, peculiar, daft, Steady)

Writing Skills : Speech Writing, Designing and Drafting of Poster, Debate

WritingReading Skills :Practice of Note Making & Summary

Activity :Practice of Listening & speaking skill

Debate : Everyone should become a vegetarian

Unit VII

L. Reader : Poem – A Thing of Beauty

(Key words-nothingness, dearth, rills, grandeur, brink)

: Ch 7 Interview

(Key words- extravagant, despise, perpetrated,ionized, dissertateion,hypotheses, aesthetics, seminaI)

S. Reader : Chapter 7 Evan Tries an O Level

(Key Words: Congenital, Kleptomaniac, Incommunicado, Reiterated, Contemptuous, Amiable, Demeanour, Impersonating)

Writing Skill :Formal and Informal Invitation Writing ,
Formal Letter
Writing Reading Skill : Practice of Unseen Passage
Activity : Practice of listening skill
: Report Writing on Science Symposium in your school

Unit VIII

L. Reader : A Roadside Stand

(Key words- pathetic, marred, swarm, squeal, requisite, quarts)

S. Reader : Chapter 8 Memories of childhood.

(Key Words : Moccasins, Squeaking, Shingled, Indignities, Harangue, Muzzled, Errands, Infuriated, Reverently)

Writing Skill : Formal and Informal Letter Writing , Debate WritingArticle Writing
Reading Skills: Practice of Unseen Passage and Note Making
Activity :Poster Making on Eco-friendly Diwali (work experience)
Activity: Practice of listening skill

Unit IX

L. Reader : Poem : Aunt Jennifer's Tigers

(Key words : Prance, Chivalric, Fluttering, Terrified, Ordeals, Panel, Sleek)

Chapter – 8 Going Places

(Key words-scooping, stooped, tinkering, wriggled, freckled)

Writing Skill : Formal and Informal Letter Writing,

Speech Writing Activity: Practice of listening skill

Unit X
Revision of Unit 1 &2

Writing Skill : Poster Designing and Drafting ,

Report WritingReading Skill: Practice of Unseen Passage
Activity : Practice of Listening & speaking skill

SUBJECT: MATHS

The Syllabus in the subject of Mathematics has undergone changes from time to time in accordance with growth of the subject and emerging needs of the society. Senior Secondary stage is a launching stage from where the students go either for higher academic education in Mathematics or for professional courses like Engineering, Physical and Biological science, Commerce or Computer Applications. The present revised syllabus has been designed in accordance with National Curriculum Framework 2005 and as per guidelines given in Focus Group on Teaching of Mathematics 2005 which is to meet the emerging needs of all categories of students. Motivating the topics from real life situations and other subject areas, greater emphasis has been laid on application of various concepts.

Objectives

The broad objectives of teaching Mathematics at senior school stage intend to help the students:

- to acquire knowledge and critical understanding, particularly by way of motivation and visualization, of basic concepts, terms, principles, symbols and mastery of underlying processes and skills.
- to feel the flow of reasons while proving a result or solving a problem.
- to apply the knowledge and skills acquired to solve problems and wherever possible, by more than one method.
- to develop positive attitude to think, analyze and articulate logically.
- to develop interest in the subject by participating in related competitions.
- to acquaint students with different aspects of Mathematics used in daily life.
- to develop an interest in students to study Mathematics as a discipline.
- to develop awareness of the need for national integration, protection of environment, observance of small family norms, removal of social barriers, elimination of gender biases.
- to develop reverence and respect towards great Mathematicians for their contributions to the field of Mathematics.

UNIT WISE MARKS DIVISION OF SYLLABUS AS PER CBSE

ONE PAPER	**CLASS XII 2021-22**	**MAX MARKS 80**
NO	**UNITS**	**MARKS**
I	RELATIONS AND FUNCTIONS	08
II	ALGEBRA	10
III	CALCULUS	35
IV	VECTORS AND 3 DIMENSIONAL GEOMETRY	14
V	LINEAR PROGRAMMING	05
VI	PROBABILITY	08
	TOTAL	80
	INTERNAL ASSESSMENT	20

UNIT I	
CHAPTER 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.
UNIT II	
CHAPTER 2	**Inverse Trigonometric Functions** Definition, range, domain, principal value branch. Graphs of inverse trigonometric functions Elementary properties of inverse trigonometric functions.
CHAPTER 3	**Matrices** Concept, notation, order, equality, types of matrices, zero and identity matrix, transpose of a matrix, symmetric and skew symmetric matrices. Operation on matrices: Addition and multiplication and multiplication with a scalar. Simple properties of addition, multiplication and scalar multiplication. On- 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).
UNIT III	
CHAPTER 4	**Determinants** Determinant of a square matrix (up to 3 x 3 matrices), properties of determinants, 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 IV	
CHAPTER 5	**Continuity and Differentiability** Continuity and differentiability, derivative of composite functions, chain rule, derivative of inverse trigonometric functions, 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. Rolle's and Lagrange's Mean Value

	Theorems (without proof) and their geometric interpretation.
CHAPTER 6	**Applications of Derivatives** Applications of derivatives: rate of change of bodies, increasing/decreasing functions, tangents and normals, use of derivatives in approximation, maxima and minima (first derivative test motivated geometrically and second derivative test given as a provable tool). Simple problems (that illustrate basic principles and understanding of the subject as well as real-life situations).
UNIT V	
CHAPTER 7	**Integrals** 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. $\int \frac{dx}{x^2 \pm a^2}, \int \frac{dx}{\sqrt{x^2 \pm a^2}}, \int \frac{dx}{\sqrt{a^2 - x^2}}, \int \frac{dx}{ax^2 + bx + c}, \int \frac{dx}{\sqrt{ax^{2+}bx+c}}$ $\int \frac{px + q}{ax^2 + bx + c} dx, \int \frac{px + q}{\sqrt{ax^{2+}bx + c}} dx, \int \sqrt{a^2 \pm x^2}\, dx, \quad \int \sqrt{x^2 - a^2} dx$ $\int \sqrt{ax^2 + bx + c} dx, \int (px + q)\sqrt{ax^2 + bx + c}\, dx$ Definite integrals as a limit of a sum, Fundamental Theorem of Calculus (without proofS). Basic properties of definite integrals and evaluation of definite integrals.
UNIT VI	
CHAPTER 8	**Applications of the Integrals** Applications in finding the area under simple curves, especially lines, circles/ parabolas/ellipses (in standard form only), Area between any of the two above said curves (the region should be clearly identifiable).
UNIT VII	
CHAPTER 9	**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, solutions of 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 constants. $\frac{dx}{dy} + px = q$, where p and q are functions of y or constants.
UNIT VIII	
CHAPTER 10	**Vectors** 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, scalar triple product of vectors.
UNIT IX	
CHAPTER 11	**Three - dimensional Geometry** Direction cosines and direction ratios of a line joining two points. Cartesian equation 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.
CHAPTER 12	**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 (bounded or unbounded), feasible and infeasible solutions, optimal feasible solutions (up to three non-trivial constraints).
UNIT X	
CHAPTER 13	**Probability** Conditional probability, multiplication theorem on probability, independent events, total probability, Bayes' theorem, Random

	variable and its probability distribution, mean and variance of random variable. Binomial probability distribution.

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**

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

Prescribed Books:

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

SUBJECT: PHYSICS

Senior Secondary stage of school education is a stage of transition from general education to discipline-based focus on curriculum. The present updated syllabus keeps in view the rigour and depth of disciplinary approach as well as the comprehension level of learners. Due care has also been taken that the syllabus is comparable to the international standards. Salient features of the syllabus include:

- Emphasis on basic conceptual understanding of the content.
- Emphasis on use of SI units, symbols, nomenclature of physical quantities and formulations as per international standards.
- Providing logical sequencing of units of the subject matter and proper placement of concepts with their linkage for better learning.
- Reducing the curriculum load by eliminating overlapping of concepts/content within the discipline and other disciplines.
- Promotion of process-skills, problem-solving abilities and applications of Physics concepts.

Besides, the syllabus also attempts to

- Strengthen the concepts developed at the secondary stage to provide firm foundation for further learning in the subject.
- Expose the learners to different processes used in Physics-related industrial and technological applications.
- Develop process-skills and experimental, observational, manipulative, decision making and investigatory skills in the learners.
- Promote problem solving abilities and creative thinking in learners.
- Develop conceptual competence in the learners and make them realize and appreciate the interface of Physics with other disciplines.

QUESTION PAPER DESIGN (Class: XII)

Board Examination –Theory

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

S.NO.	Typology of Questions	VSA-Objective Type (1 mark)	SA (2marks)	LA-I (3 marks)	LA-II (5 marks)	Total Marks	Percentage
1	Remembering: Exhibit memory Of previously learned Material By recalling facts, terms, basic concepts, and answers.	2	2	1	-	9	12%
2	Understanding:Demonstrate understanding of facts and ideas by organizing, comparing, translating, interpreting, giving descriptions, and stating main ideas	6	2	2	1	21	30%
3	Applying: Solve problems to new situations by applying acquired knowledge, facts, techniques and rules in a different way.	6	2	1	2	23	33%
4	Analysing and Evaluating: Examine and break information into parts by identifying motives or causes. Make inferences and find evidence to support generalizations Present and defent opinions by making judgments about information, validity of ideas, or quality of work based on a set of criteria.	6	1	2	-	14	20%
5	Creating: Compile information together in a different way by combining elements in a new pattern alternative or proposing solutions.	-	-	1	-	3	5%
	Total	**20x1=20**	**7x2=14**	**7x3=21**	**3x5=15**	**70**	**100**

Practical: 30 Marks

Note:

1. Internal Choice: There is no overall choice in the paper. However, there will be at least 33% internal choice.
2. 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.

COURSE STRUCTURE (THEORY)

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

Unit No.	Chapter's Name	No. of Periods	Marks
Unit–I	Electrostatics Chapter–1: Electric Charges and Fields Chapter–2: Electrostatic Potential and Capacitance	24	
Unit-II	Current Electricity Chapter–3: Current Electricity	18	16
Unit-III	Magnetic Effects of Current and Magnetism Chapter–4: Moving Charges and Magnetism Chapter–5: Magnetism and Matter	22	
Unit-IV	Electromagnetic Induction and Alternating Currents Chapter–6: Electromagnetic Induction Chapter–7: Alternating Current	20	17
Unit–V	Electromagnetic Waves Chapter–8: Electromagnetic Waves	04	
Unit–VI	Optics Chapter–9: Ray Optics and Optical Instruments	27	
Unit –VII	Chapter–10: Wave Optics		18
Unit–VIII	Dual Nature of Radiation and Matter Chapter–11: Dual Nature of Radiation and Matter	08	
Unit- IX	Atoms and Nuclei Chapter–12: Atoms Chapter–13: Nuclei	15	12
Unit–X	Electronic Devices Chapter–14: Semiconductor Electronics: Materials, Devices and Simple Circuits	12	7
Total		150	70

Unit I: Electrostatics **22 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 fleld.

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 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.

PRACTICAL: 1. To determine resistivity of two / three wires by plotting a graph for potential difference versus current.

Unit II: Current Electricity **20 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, :energy and power, electrical resistivity and conductivity, Carbon resistors, colour code for carbon resistors; series and parallel combinations of resistors; temperature dependence of resistance.
Internal resistance of a cell, potential difference and emf of a cell, combination of cells in series and in parallel, Kirchhoff's laws and simple applications, Wheatstone bridge, metre bridge.

Potentiometer - principle and its applications to measure potential difference and for comparing EMF of two cells; measurement of internal resistance of a cell.

PRACTICAL: 2.To find resistance of a given wire / standard resistor using metre bridge .

PRACTICAL:3To 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.

Unit III: Magnetic Effects of Current and Magnetism 22 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 and toroidal solenoids (only qualitative treatment), force on a moving charge in uniform magnetic and electric fields, Cyclotron.

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–5: Magnetism and Matter

Current loop as a magnetic dipole and its magnetic dipole moment, 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 ferro - magnetic substances, with examples.Electromagnets and factors affecting their strengths, permanent magnets.

PRACTICAL: 4.To compare the EMF of two given primary cells using potentiometer.

PRACTICAL:5.To determine the internal resistance of given primary cell using potentiometer.

Unit IV: Electromagnetic Induction and Alternating Currents 20 Periods

Chapter–6: Electromagnetic Induction

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

Chapter–7: 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, power factor, wattless current.

AC generator and transformer**.**

PRACTICAL: 6.To determine resistance of a galvanometer by half-deflection method and to find its figure of merit.

Unit V: Electromagnetic waves 04 Periods

Chapter–8: Electromagnetic Waves

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

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

PRACTICAL: 7.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.

Unit VI: Optics 27 Periods

Chapter–9: Ray Optics and Optical Instruments

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

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

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

PRACTICAL: 8.To find the value of v for different values of u in case of a concave mirror and to find the focal length.
PRACTICAL: 9.To find the focal length of a convex mirror, using a convex lens.

UNIT – VII: 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, coherent sources and sustained interference of light, diffraction due to a single slit, width of central maximum, resolving power of microscope and astronomical telescope, polarisation, plane polarised light, Brewster's law, uses of plane polarised light and Polaroids.

PRACTICAL 10 .To find the focal length of a convex lens by plotting graphs between u and v or between 1/u and 1/v.

PRACTICAL:11.To find the focal length of a concave lens, using a convex lens.

Unit VIII: 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.

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

PRACTICAL 12 .To determine angle of minimum deviation for a given prism by plotting a graph between angle of incidence and angle of deviation.

Unit IX: Atoms and Nuclei 15 Periods

Chapter–12: Atoms

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

Chapter–13: Nuclei

Composition and size of nucleus, 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, nuclear fusion.

PRACTICAL:13.To draw the I-V characteristic curve for a p-n junction in forward bias and reverse bias.

OR

To draw the characteristic curve of a zener diode and to determine its reverse breaks down voltage.

Unit X: Electronic Devices **12 Periods**

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

Energy bands in conductors, semiconductors and insulators (qualitative ideas only)

Semiconductor diode - I-V characteristics in forward and reverse bias, diode as a rectifier;

Special purpose p-n junction diodes: LED, photodiode, solar cell and Zener diode and their characteristics, zener diode as a voltage regulator

ACTIVITIES:

1.To assemble a household circuit comprising three bulbs, three (on/off) switches, a fuse and a power source.

2.To assemble the components of a given electrical circuit.

3.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.

4.To identify a diode, an LED, a resistor and a capacitor from a mixed collection of such items.

5.To observe refraction and lateral deviation of a beam of light incident obliquely on a glass slab

6.To observe diffraction of light due to a thin slit.

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 12 Experiments [with a minimum of 6 from each section], to be performed by the students.**
- **Record of at least 6 Activities [with a minimum of 3 each from section A and section B], to be demonstrated by the teachers.**
- **The Report of the project to be carried out by the students.**

Evaluation Scheme

Time Allowed: Three hours Max. Marks: 30

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	**5 Marks**
Viva on experiments, activities and project 5 Marks	**3 Marks**
TOTAL	**30 Marks**

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).**

SUBJECT: CHEMISTRY

Prescribed Books:

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

Rationale

Higher Secondary is the most crucial stage of school education because at this juncture specialized discipline based, content -oriented courses are introduced. Students reach this stage after 10 years of general education and opt for Chemistry with a purpose of pursuing their career in basic sciences or professional courses like medicine, engineering, technology and study courses in applied areas of science and technology at tertiary level. Therefore, there is a need to provide learners with sufficient conceptual background of Chemistry, which will make them competent to meet the challenges of academic and professional courses after the senior secondary stage.

The new and updated curriculum is based on disciplinary approach with rigour and depth taking care that the syllabus is not heavy and at the same time it is comparable to the international level. The knowledge related to the subject of Chemistry has undergone tremendous changes during the past one decade. Many new areas like synthetic materials, bio -molecules, natural resources, industrial chemistry are coming in a big way and deserve to be an integral part of chemistry syllabus at senior secondary stage. At international level, new formulations and nomenclature of elements and compounds, symbols and units of physical quantities floated by scientific bodies like IUPAC and CGPM are of immense importance and need to be incorporated in the updated syllabus. The revised syllabus takes care of all these aspects. Greater emphasis has been laid on use of new nomenclature, symbols and formulations,teaching of fundamental concepts, application of concepts in chemistry to industry/ technology, logical sequencing of units, removal of obsolete content and repetition, etc.

OBJECTIVES

The broad objectives of teaching Chemistry at Senior Secondary Stage are:

- to promote understanding of basic facts and concepts in chemistry while retaining the excitement of chemistry.
- to make students capable of studying chemistry in academic and professional courses (such as medicine, engineering, technology) at tertiary level.
- to expose the students to various emerging new areas of chemistry and apprise them with their relevance in future studies and their application in various spheres of chemical sciences and technology.
- to equip students to face various challenges related to health, nutrition, environment, population, weather, Industries and agriculture.
- to develop problem solving skills in students.
- to expose the students to different processes used in industries and their technological applications.
- to apprise students with interface of chemistry with other disciplines of science such as physics, biology, geology, engineering etc.
- to acquaint students with different aspects of chemistry used in daily life.
- to develop an interest in students to study chemistry as a discipline.

UNIT WISE DISTRIBUTION OF MARKS

CLASS XII (2021-22)
(THEORY)
Total Periods (Theory 160 + Practical 60)

Time : 3 Hours **70 marks**

Unit no.	Title	No. of Periods	Marks
1	Solid State	10	**23**
2	Solutions	10	
3	Electrochemistry	12	
4	Chemical Kinetics	10	
5	Surface Chemistry	08	
6	General Principles and Processes of Isolation of Elements	08	**19**
7	p-Block Elements	12	
8	d and f Block Elements	12	
9	Coordination Compounds	12	
10	Haloalkanes and Haloarenes	10	**28**
11	Alcohols, Phenols and Ethers	10	
12	Aldehydes, Keones and Carboxylic	10	
13	Organic Compounds containing Nitrogen	10	
14	Biomolecules	12	
15	Polymers	08	
16	Chemistry in Everyday life	06	
	TOTAL	**160**	**70**

PRACTICAL DISTRIBUTION (Evaluation Scheme)

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**

FEW SUGGESTED PROJECTS:

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.

SYLLABUS:

Unit I: Solid State (10 Periods)

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.

KEY WORDS- Ferrimagnetic, Anti ferromagnetic ,Diamagnetic,Paramagnetic, 13-15 compounds, 12- 16 compounds ,Doping , Frenkel defect,Schottky defect,Radius ratio , Packing efficiency, Coordination number,pseudo solids,anisotropy,unit cell,imperfections,F-centre.

Practical: 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)

Unit II: Solutions (10 Periods)

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

elevation of boiling point, depression of freezing point, osmotic pressure, determination of molecular masses using colligative properties, abnormal molecular mass, Van't Hoff factor.

KEY WORDS-Osmotic pressure , Depression of freezing point ,Elevation of boiling point Azeotropes, Raoult's law , Henry's Law , Normality , Molarity , Molality, Mole fraction,ideal and non-ideal solution,colligative property, molal elevation constant or ebullioscopic constant,molal depression constant or molalcryoscopic constant., endo-osmosis, exo-osmosis, isotonic solutions.

Electrochemistry (12 Periods)

Redox reactions, 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, 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.

KEY WORDS :Cathodic protection, Faraday's first law of electrolysis , Equivalent conductivity, Faraday's second law of electrolysis, Molar conductivity, Electro chemical series, Equivalent conductance, Specific conductance, strong and weak electrolytes, Electrochemicalcell, Electrolytic cell,conductance, specific conductance.

Practical: Preparation of double salt of Ferrous Ammonium Sulphate or Potash Alum.

Unit III:

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, Arrhenious equation.

KEY WORDS Differential rate law, Integrated rate equation ,The rate law, Rate determining step , Activated complex , Activation energy , Half- life of a reaction Order of a reaction , Molecularity , Rate constant, threshold energy, law of mass action.

Surface Chemistry (08 Periods)

Adsorption - physisorption and chemisorption, factors affecting adsorption of gases on solids, catalysis, homogenous and heterogenous activity and selectivity; enzyme catalysis colloidal state distinction between true solutions, colloids and suspension; lyophilic, lyophobic multimolecularand macromolecular colloids; properties of colloids; Tyndall effect, Brownian movement, electrophoresis, coagulation, emulsion - types of emulsions.

KEY WORDS Activators ,Zeolites, Peptization , Multimolucular, Lyophillic ,Lyophobic, Multimolucular colloid , Macromolecular colloid, Sol and Gel ,Emulsions ,Hardy- Schulze rule, Brownian movement Electrophoresis, Tyndalleffect,goldnumber,coagulation,adsorbent,adsorbate,adsorption isobar, zeolites,micelles.

General Principles and Processes of Isolation of Elements

(08 Periods)

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

KEY WORDS- Ellingham diagrams, Reduction reaction , Reducing agent, Calcination Roasting, Mond's process ,Slag,gangue,vanarkelprocess,smelting,leaching,castiron,pig iron

Practical: Preparation of one lyophilic and one lyophobic sol

Lyophilic sol - starch, egg albumin and gum

Lyophobic sol - aluminium hydroxide, ferric hydroxide, arsenoussulphide

Unit IV: "p"-Block Elements (12 Periods)

Group -15 Elements: General introduction, electronic configuration, occurrence, oxidation states, trends in physical and chemical properties; Nitrogen preparation properties and uses; compounds of Nitrogen, preparation and properties of Ammonia and Nitric Acid, Oxides of Nitrogen(Structure only) ; Phosphorus - allotropic forms, compounds of Phosphorus: Preparation and Properties of Phosphine, Halides 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.

KEY WORDS- Oxidation state, Atomic size, Ionization enthalpy ,Electro negativity , Disproportionation reaction, Aerosols Electro negativity, Hydrogen bonding ,Inert pair effect, bonding, interhalogens, pseudohalides.

Practical: To distinguish carbohydrates, fats and proteins.

Unit V: "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.

KEY WORDS- Actinoid contraction, Magnetic moment, Reducing agent, oxo anions, Amphoteric nature, Disproportionation reaction, Interstitial compounds Enthalpies of atomization, Lanthanoidcontraction, Baeyer'sreagent, coinage metals.

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 inclusion, extraction of metals and biological system).

KEY WORDS Co-ordination compounds, Co-ordination Complex, Co-ordination Sphere, Double salts,Crystal field splitting energy(CFSE), Diamagnetic, Ligand, Chelate, Chelating effect, Coordination number,Ligand, Ionisation Isomerism, Linkage Isomerism, Hydration Isomerism, Coordination Isomerism, Cis& Trans Isomerism, Facial & Meridian Isomerism.

Practical: Chromatography

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

Unit VI: Haloalkanes and Haloarenes. (10 Periods)

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 in monosubstituted compounds only).

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

KEY WORDS Achiral, alkyl halides, allylichalides, ambidentnucleophiles, carbocation, DDT,
dextrorotatory,diazoniumsalts,electrophillicsubstitution,elimination reaction, Freon refrigerant geminalhalides, grignard reagent, optically active, stereocentre.

Practical: Tests for the functional groups present in organic compounds: Unsaturation, alcoholic, phenolic.

Unit VII: 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.
KEY WORDS Acidity, Aromatic ring, Benzylic alcohols, Cumene, Dehydrogenation, Electrophillic aromatic substitution, Polyhydric compounds, Vinylicalcohol,ferric chloride test for phenols.iodoform test,lucas test.
Practical: Tests for the functional groups present in organic compounds: Aldehydic, ketonic, carboxylic and amino (Primary) groups.

Unit VIII: 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.
KEY WORDS Aldehydes, Phenol, benzoic acid, Benzophenone, Acetophenone , Benzaldehyde, Acetaldehyde , Electrophilic substitution, Inductive Effect, Aldol Condensation, Alkyl benzenes, Bacyer's reagent, Electron donating groups, Electron withdrawing groups, Ozonolysis, Polarity,Cannizzaro reaction, cross-aldolcondensation, tollen'stest,Fehling's test, estertest, acetal. cyanohydrin, ketal, oxime, imine.
Practical: Determination of one cation and one anion in a given salt.

Unit IX: Organic compounds containing Nitrogen

(10 Periods)

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 text.
Diazonium salts: Preparation, chemical reactions and importance in synthetic organic chemistry.
KEY WORDS Zwitter ion Aniline Nitration Ammonolysis Primary, secondary and tertiary amines. Aromatic amines Quaternary ammonium salts, acylation, ammonolysis, carbylamine, diazotization, azo dye.

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.

KEY WORDS Aldopentose, amino acids, amylopectin, amylase, animal starch,oligosaccharides, polysaccharides denaturation of proteins, globular proteins,nucleoside, nucleotide, peptide linkage, Zwitter ion.

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

Unit X: Polymers (08 Periods)

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.

KEY WORDS Biodegradable polymers, chain initiating step, chain propagating step chain terminating step, copolymers, Ziegler – Natta catalyst, vulcanization of rubber, cross-linked polymer, fibres, elastomers, thermosetting polymer, thermoplastic polymer.

Chemistry in Everyday life (06 Periods)

Chemicals in medicines - analgesics, tranquilizers antiseptics, disinfectants, antimicrobials, antifertility drugs, antibiotics, antacids, antihistamines.

Chemicals in food - preservatives, artificial sweetening agents, elementary idea of antioxidants.

Cleansing agents- soaps and detergents, cleansing action.

KEY WORDS Active site, allosteric site, analgesics, antacids, broad spectrum antibiotics, limited spectrum antibiotics, narrow spectrum antibiotics, antifertility, antihistamine,antimicrobial, antipyretic, bactericidal, bacteriostatic, antiseptic, disinfectants,narcoticdrugs,non-narcotic drugs,anti-depressants.

Practical- Preparation of any one of the following compounds-

i) Acetanilide ii) Di -benzal Acetone iii)p-Nitroacetanilide

iv) Aniline yellow or 2 - Naphthol Aniline dye

Assessment Areas (Theory) 2021-22

(Class XII)

CHEMISTRY (043)

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

EVALUATION CRITERIA	
Competency based questions (these can be in form of MCQ,case based questions, source based integrated questions or any other types)	20 %
Objective type questions	20 %
Short/long answer questions	60 %

SUBJECT: BIOLOGY

Prescribed Book:
Biology, Class XII, Published by NCERT
RATIONALE:
The present syllabus reinforces the ideas introduced till the secondary classes. It provides the students with new concepts along with an extended exposure to contemporary areas of the subject. The syllabus also aims at emphasizing on the underlying principles that are common to both animals and plants as well as highlighting the relationship of biology with other areas of knowledge. The format of the syllabus allows a simple, clear, sequential flow of concepts without any jarring jumps. The syllabus also stresses on making better connections among biological concepts. It relates the study of biology to real life through the use of techonology. It links the discoveries and innovations in biology to everyday life such as environment, industry, health and agriculture. The updated syllabus also focuses on reducing the curriculum load while ensuring that ample opportunities and scope for learning and appreciating basic concepts of the subject continue to be available within its framework.
OBJECTIVES:
- promote understanding of basic principles of Biology
- encourage learning of emerging knowledge and its relevance to individual and society.
- promote rational/scientific attitude to issues related to population,environment and development
- enhance awareness about environmental issues, problems and their appropriate solutions
- create awareness amongst the learners about diverity in the living organisms
- appreciate that the most complex biological phenomena are built on essentially simple processes.

It is expected that the students would get an exposure to various branches of Biology in the syllabus in a more contextual and friendly manner as they study its various units.

CLASS XII (2021-22) (THEORY)

Time:3 Hours
Max.Marks:70

Unit	TITLE	No. of Periods	Marks
VI	Reproduction	30	14
VII	Genetics and Evolution	40	18
VIII	Biology and Human Welfare	30	14
IX	Biotechnology and its Applications	30	10
X	Ecology and Environment	30	14
	Total	**160**	**70**

PRACTICALS

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

Evaluation Scheme	
One Major Experiment Part A	5 Marks
One Minor Experiment Part A	4 Marks
Slide Preparation Part A	5 Marks
Spotting	7 Marks
Practical Record+Viva Voce	4 Marks
Project Record + Viva Voce	5 Marks
Total	**30 Marks**

Assessment Areas (Theory) 2021-22
Biology (044)

Time :3hrs. Maximum Marks: 70Marks

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

QUESTION WISE BREAK UP
SUMMATIVE ASSESMENT

Type of Question	Mark(s) per Question	Total No. of Questions	Total Marks
VSA	1	14	14
Case based Questions	4	02	08
SA-I	2	09	18
SA-II	3	05	15
LA	5	03	15
Total		33	70

FORMATIVE ASSESMENT

Type of Question	Mark(s) per Question	Total No. of Questions	Total Marks
VSA	1	05	05
Case Based Questions	4	01	04
SA-I	2	04	08
SA-II	3	01	03
LA	5	01	05
Total		12	25

- 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 beprovided. Suggestive verbs for various competencies
- **Demonstrate, Knowledge and Understanding**

  State, name, list, identify, define, suggest, describe, outline, summarize, etc.
- Application ofKnowledge/Concepts

  Calculate, illustrate, show, adapt, explain, distinguish, etc.
- Analyze, Evaluate and Create

  Interpret, analyse, compare, contrast, examine, evaluate, discuss, constru

UNITWISE SYLLABUS

UNIT-1 Reproduction **(Marks-7)**

Keyword: vegetative reproduction, juvenile phase, senescent phase, dioecious, monoecious, pericarp, syngamy, meiocyte.

Content:

Reproduction in organisms: Reproduction, a characterstic feature of all organisms for continuation of species; modes of reproduction; asexual and sexual reproduction; asexual reproduction- 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, out breeding devices; pollen pistil interaction; double fertilisations; post fertilization events- development, endosperm and embryo, development of seed and formation of fruit; special modes- apomixis, parthenocarpy, polyembryony; significance of seed dispersal and fruit formation.

Practical:

- Study pollen germination on a slide.
- Controlled pollination- emasculation, tagging and bagging (Spotting).
- Flowers adapted to pollination by different agencies (wind, insect, bird) (Spotting).
- Pollen germination on stigma through permanent slide (spotting).

UNIT-2 Reproduction (Marks-7)

Keywords: Human reproduction, testis, ovary, gametogenesis, spermatogenesis, oogenesis, follicular atresia, menarche, ovulation, menopause, cleavage, implantation.

Content:

Human reproduction: male and female reproductive system; 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).

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).

Practical:

- Study and identify stages of gamete development i.e. T.S. testis and ovary through permanent slide (spotting).
- T.S. of blastula through permanent slide (spotting).

Unit-3 Genetics (Marks-6)

Keywords: Heredity, Variations, Alleles, Phenotype, Genotype, Homozygote, Heterozygote, Dominant allele, Recessive allele, Pleiotropy, Multiple allelism, Co dominance, Monohybrid, Dihybrid.

Content:

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, Chromosome and genes, Sex determination in human, Birds and honey bee, Linkage and crossing over, Sex linked inheritance, haemophilia, Colour blindness, Thalassemia, Phenylketonuria. Mendelian disorders in humans, Chromosomal disorders in humans Down syndrome, Turners and Klinefelter's syndrome.

Practical (spotting):

- Mendelian inheritance using seeds of different colour, size of any plant.

UNIT-4 Molecular basis of inheritance (Marks-6)

Keywords: Replication, ori of replication, Nucleosome, Transcription, Replication fork, Translation, Silent mutations, Frame shift mutation, Operon, DNA probe.

Content: Molecular basis of inheritance

Search for genetic material and DNA as genetic material, Structure of DNA and RNA, DNA packaging, DNA replication, Central dogma, Trancription, Genetic Code, Translation, Gene expression and regulation-lac operon, Genome and human genome project, DNA fingerprinting.

Practical:

- Prepare pedigree chart of any one of genetic traits such as rolling of tongue, blood groups, ear lobes, widow's peak and colour blindness (spotting)
- Isolation of DNA from available plant material such as spinach, green pea seeds and papaya etc.

UNIT-5 Evolution (Marks-6)

Keywords: Homologous organs, Analogous organs, Speciation, Genetic drift, Natural selection, Reproductive isolation, Embryology, Paleontology, Convergent evolution, Divergent evolution, Natural selection, Artificial selection.

Content: Evolution

Origin of life, Biological evolution and evidences for biological evolution, Darwin's contribution, Modern synthetic theory of evolution, Mechanism of evolution, variation and natural selection with examples, Types of natural selection, Gene flow and genetic drift, Hardy-weinberg's principle, Adaptive radiation, Human evolution.

Practical:

- Prepare a temporary mount of onion root tip to study mitosis.
- Study various stages of meiosis in onion bud cell or grasshopper testes through permanent slides (spotting).
- To study analogous and homologous organs in various plants and animals.

UNIT-6 Biology and Human Welfare (Marks-6)

Keywords: Pathogens, antibodies, antigens, immunity, interferons, allergy, cancer, metastasis, tumours, retroviruses, drug abuse, adolescence, addiction.

Content:

Health and diseases: 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.

Practical:

- Common disease causing organisms like Ascaris, Entamoeba, Plasmodium, Roundworm through permanent slides or specimens Comment on symptoms of disease (spotting).

Activity: On AIDS days- Poster making or A Visit to hospital.

UNIT-7 Biology and Human welfare (Marks-8)

Keywords: Plant breeding, germplasm, apiculture, somaclones, explant, implant, plant tissue culture, biofortification Prions, fermentors, Flocs, antibiotics, biogas, Baculo viruses .

Content:

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.

Practical:

- Study the effect of different temperatures and three different pH on the activity of salivary amylase on starch.

UNIT-8 Biotechnology (Marks-10)

Keywords: Transgenic, gene cloning, plasmid, recombinant DNA, recognition site, palindromes, electroporation, gene therapy, microinjection, gene gun.

Content:

Principles and processes of biotechnology: Genetic Engineering (Recombinant DNA Technology).

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

Practical:

- Isolation of DNA from plant material such as spinach, green pea seed, papaya etc.

UNIT-9 Ecology (Marks-7)

Keywords: Habitat, Niche, ecosystem, Birth rate, Mortality rate, Primary succession, climax community, obligate parasites 10% law, Mutualism.

Content:

Organism and environment: Habitat and niche, Population and ecological adaptation, Population interactions; mutualism, competition, Predation, Parasitism, Population attributes, growth rate and birth rate, age distribution.

Ecosystem: Patterns components, Productivity and decomposition, Energy flow, Pyramids of number, Biomass, Nutrient cycles, Ecological succession, Ecological services, Carbon fixation, Pollination, Seed dispersal, oxygen release.

Practical:

- Collect and study soil from at least two different sites and study them for texture imoisture content, PH and water holding capacity. Correlate with the kinds of plants found in them.
- Study of plant population density and population frequency by quadrat method.
- Two plants and two animals (models/virtual images) found in xeric conditions and in aquatic condition. Comment upon their morphological adaptation.

Activity: On nature conservation day- Tree plantation and poster making.

UNIT-10 Environment (Marks-7)

Keyword: Biodiversity hostspots, endangered animals, Biosphere e-waste, Nuclear waste, Aforestation, Ozone depletion, Global warming, sacred forests, Cryopreservation.

Content:

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; greenhouse effect and global warming; ozone depletion; Deforestation; any three case studies as success stories addressing environmental issues, diseases:

Practical:

- Collect water from two different water bodies around you and study them for PH, clarity and presence of any living organisms.
- Study the presence of suspended particulate matter in air at two widely different sites

SUBJECT: PHYSICAL EDUCATION

THEORY **Max. Marks 70**

Unit I: Planning in Sports

- Meaning & Objectives of Planning
- Various Committees & its Responsibilities (pre; during & post)
- Tournament – Knock-Out, League or Round Robin & Combination

Procedure to Draw Fixtures – Knock-Out (Bye & Seeding) & League (Staircase & Cyclic)

- Intramural & Extramural- meaning, objectives& its significance

Specific sports programme (Sports Day,Health Run, Run for fun,Run for specific cause & Run for unity)

PRACTICAL-General fitness-Warming up and cooling down

Unit II: Sports & Nutrition

- Balanced Diet & Nutrition: Macro & Micro Nutrients
- Nutritive & Non-Nutritive Components Of Diet
- Eating For Weight Control – A Healthy Weight, the Pitfalls of Dieting, Food Intolerance & Food Myths

PRACTICAL- Game-Fundamentals skills of Badminton

Unit III: Yoga & Lifestyle

- Asanas as preventive measures
- Obesity: Procedure, Benefits & contraindications for Vajrasana, Hastasana, Trikonasana, Ardh Matsyendrasana
- Diabetes: Procedure, Benefits & contraindications for Bhujangasana, Paschimottasana, Pavan Muktasana, Ardh Matsyendrasana
- Asthema: Procedure, Benefits & contraindications for Sukhasana, Chakrasana, Gomukhasana, Parvatasana, Bhujangasana, Paschimottasana, Matsyasana
- Hypertension: Tadasana, Vajrasana, Pavan Muktasana, Ardha Chakrasana, Bhujangasana, Sharasana
- Back Pain: Tadasana, Ardh Matsyendrasana, Vakrasana, Shalabhasana, Bhujangasana

PRACTICAL-Practice of yoga asana,meditation and pranayam

Unit IV: Physical Education & Sports for CWSN (Children with Special Needs - Divyang)

- Concept of Disability & Disorder
- Types of Disability, its causes & nature (cognitive disability, intellectual disability, physical disability)
- Types of Disorder, its cause & nature (ADHD, SPD, ASD, ODD, OCD)
- Disability Etiquettes
- Advantage of Physical Activities for children with special needs
- Strategies to make Physical Activities accessible for children with special need.

PRACTICAL- Athletics events-Short, middle and long races

Unit V: Children & Women in Sports

- Motor development & factors affecting it
- Exercise Guidelines at different stages of growth & Development
- Common Postural Deformities - Knock Knee; Flat Foot; Round Shoulders;

Lordosis, Kyphosis,Bow Legs and Scoliosis and their corrective measures

- Sports participation of women in India
- Special consideration (Menarch & Menstural Disfunction)
- Female Athletes Triad (Oestoperosis, Amenoria, Eating disorders)

PRACTICAL- Game-Badminton-Dimension, rules of the game

Unit VI: Test & Measurement in Sports

- Motor Fitness Test – 50 M Standing Start, 600 M Run/Walk, Sit & Reach, Partial Curl Up, Push Ups (Boys), Modified Push Ups (Girls), Standing Broad Jump, Agility – 4x10 M ShuttleRun
- General Motor Fitness – Barrow three item general motor ability (Standing Broad Jump, Zig Zag Run, and Medicine Ball Put – For Boys: 03 Kg & for Girls: 01 Kg)
- Measurement of Cardio Vascular Fitness – Harvard Step Test/Rockport Test

Computation of Fitness Index: Duration of the Exercise in Seconds x 100

5.5 X Pulse count of 1-1.5 Min after Exercise Rikli & Jones - Senior Citizen Fitness Test

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

PRACTICAL-AAPHER and Barrow test

Unit VII: Physiology & Injuries in Sports

- Physiological factor determining component of Physical Fitness

- Effect of exercise on Cardio Respiratory System

- Effect of exercise on Muscular System

- Sports injuries: Classification (Soft Tissue Injuries :(Abrasion, Contusion, Laceration, Incision,Sprain & Strain)

- Bone & Joint Injuries: (Dislocation, Fractures: Stress Fracture, Green Stick,

Comminuted, Transverse Oblique & Impacted) Causes, Prevention& treatment

- First Aid – Aims & Objectives

PRACTICAL-Game-Volleyball-Fundamental skills

Unit VIII: Biomechanics & Sports

- Meaning and Importance of Biomechanics in Sports

- Types of movements (Flexion, Extension, Abduction & Adduction)

- Newton's Law of Motion & its application in sports

Friction & Sports

PRACTICAL- Dimension, rules of Volleyball

Unit IX: Psychology & Sports

- Personality; its definition & types – Trait & Types (Sheldon & Jung Classification) & Big Five

Theory

- Motivation, its type & techniques

- Exercise Adherence; Reasons to Exercise, Benefits of Exercise

- Strategies for Enhancing Adherence to Exercise

- Meaning, Concept & Types of Aggressions in Sports

PRACTICAL-Practice of Meditation and Pranayama

Unit X: Training in Sports

- Strength – Definition, types & methods of improving Strength – Isometric, Isotonic & Isokinetic

- Endurance - Definition, types & methods to develop Endurance – Continuous Training, Interval Training & Fartlek Training

- Speed – Definition, types & methods to develop Speed – Acceleration Run & Pace Run

- Flexibility – Definition, types & methods to improve flexibility

- Coordinative Abilities – Definition & types

- Circuit Training - Introduction & its importance

PRACTICAL-Isometric,Isotonic,Isokinetic

PRACTICAL **Max. Marks 30**

01. Physical Fitness Test - 6 Marks

02. Proficiency in Games and Sports (Skill of any one Game of choice from the given list*)- 7 Marks

03. Yogic Practices - 7 Marks

04. Record File ** - 5 Marks

05. Viva Voce (Health/ Games & Sports/ Yoga) - 5 Marks

* Basketball, Football, Kabaddi, Kho-Kho, Volleyball, Handball, Hockey, Cricket, Bocce & Unified Basketball [CWSN (Children with Special Needs – Divyang)]

****Record File shall include:**

Practical-1: Fitness tests administration for all items.

Practical-2: Procedure for Asanas, Benefits & Contraindication for any two Asanas for each lifestyle disease.

Practical-3: Procedure for administering Senior Citizen Fitness Test for 5 elderly family

Practical-4: Any one game of your choice out of the list above. Labelled diagram of field & equipment (Rules, Terminologies & Skills).