BOARD OF SCHOOL EDUCATION HARYANA

Syllabus and Chapter wise division of marks (2023-24)

Class- 11th **Subject: Physics** **Code: 850**

General Instructions:

1. There will be an annual examination based on the entire syllabus.

2. The annual theory examination will be of **70 marks**.

3. Practical Examination will be of **30 marks** (15 marks weightage shall be for Internal Assessment (INA) and 15 marks for practical examination.)

4. Evaluation scheme for Internal Assessment: (15 marks)

Student Assessment (SAT) exams	6 marks
Half yearly exam	2 marks
Attendance and class room participation	2 marks
Project work	2 marks
Practical reord	3 marks
Total	**15 marks**

5. For Practical Examination: (15 marks)

Time :- 3 Hours Maximum Marks = 15

Evaluation Scheme for Practical Examination	Marks
Two experiments (one from each section)	09
One Activity	03
Viva-voce	03
Total	**15 marks**

Practical total marks (15+15) = 30 marks

Theory marks = 70 marks

Total marks = 100 marks

Course Structure (2023-24)

Class- 11th Subject: Physics Code: 850

Sr. No.	Unit	Chapter	Marks
I	Physical World and Measurement	Units and Measurement	4
II	Kinematics	Motion in a Straight Line	11
		Motion in a Plane	
III	Laws of Motion	Laws of Motion	7
IV	Work, Energy and Power	Work, Energy and Power	6
V	Motion of System of Particles and Rigid Body	System of Particles and Rotational Motion	6
VI	Gravitation	Gravitation	6
VII	Properties of Bulk Matter	Mechanical Properties of Solids	12
		Mechanical Properties of Fluids	
		Thermal Properties of Matter	
VIII	Thermodynamics	Thermodynamics	6
IX	Behaviour of Perfect Gases and Kinetic Theory of Gases	Kinetic Theory	4
X	Oscillations and Waves	Oscillations	8
		Waves	
Total			70
Practical			30
Grand Total			**100**

UNIT I: Physical World and Measurement

Chapter 1: Units and Measurement

Introduction, **The International System of Units**, **Significant Figures**: Rules for Arithmetic Operations with Significant Figures, rounding off the Uncertain Digits, Rules for Determining the Uncertainty in the Results of Arithmetic Calculations, **Dimensions of Physical Quantities, Dimensional Formulae and Dimensional Equations, Dimensional Analysis and its Applications:** Checking the Dimensional Consistency of Equations, Deducing Relation among the Physical Quantities.

UNIT II: Kinematics

Chapter 2: Motion in a Straight Line

Introduction, Instantaneous Velocity and Speed, **Acceleration, Kinematic Equations for Uniformly Accelerated Motion**

Chapter 3: Motion in a Plane

Introduction, Scalars And Vectors: Position and Displacement Vectors, Equality of Vectors, **Multiplication Of Vectors By Real Numbers, Addition And Subtraction Of Vectors — Graphical Method, Resolution Of Vectors, Vector Addition – Analytical Method, Motion In A Plane, Motion In A Plane With Constant Acceleration, Projectile Motion, Uniform Circular Motion**

UNIT III: Laws of Motion

Chapter 4: Laws of Motion

Introduction, Aristotle's Fallacy, The Law Of Inertia, Newton's First Law Of Motion, Newton's Second Law Of Motion, Newton's Third Law Of Motion, Conservation Of Momentum, Equilibrium Of A Particle, Common Forces In Mechanics: Friction**, Circular Motion, Solving Problems In Mechanics**

UNIT IV: Work, Energy and Power

Chapter 5: Work, Energy and Power

Introduction: The Scalar Product, **Notions of Work And Kinetic Energy: The Work-Energy Theorem, Work, Kinetic Energy, Work Done by a Variable Force, The Work-Energy Theorem for a Variable Force, The Concept of Potential Energy, The Conservation of Mechanical Energy, The Potential Energy Of A Spring, Power, Collisions:** Elastic And Inelastic Collisions, Collisions In One Dimension, Collisions In Two Dimensions.

UNIT V: Motion of System of Particles and Rigid Body

Chapter 6: Systems of Particles and Rotational Motion

Introduction: What kind of motion can a rigid body have, **Centre of Mass, Motion of Centre of Mass, Linear Momentum of a System of Particles, Vector Product of Two Vectors, Angular Velocity and its Relation with Linear Velocity**: Angular Acceleration, **Torque and Angular Momentum**: Moment of Force (Torque), Angular Momentum of a Particle, **Equilibrium of a Rigid Body**: Principle of Moments, Centre of Gravity, **Moment of Inertia, Kinematics of Rotational Motion about a Fixed Axis, Dynamics of Rotational Motion about a Fixed Axis, Angular Momentum in Case of Rotation about a Fixed Axis**: Conservation of Angular Momentum.

UNIT VI: Gravitation

Chapter 7: Gravitation

Introduction, Kepler's Laws, Universal Law of Gravitation, The Gravitational Constant, Acceleration Due to Gravity of the Earth, Acceleration Due to Gravity below and above the Surface of Earth, Gravitational Potential Energy, Escape Speed, Earth Satellites, Energy of an Orbiting Satellite.

UNIT VII: Properties of Bulk Matter

Chapter 8: Mechanical Properties of Solids

Introduction, Stress and Strain, Hooke's Law, Stress-Strain Curve, Elastic Moduli: Young's Modulus, Shear Modulus, Bulk Modulus, Poisson's Ratio, Elastic Potential Energy in a Stretched Wire, **Applications of Elastic Behaviour of Materials**.

Chapter 9: Mechanical Properties of Fluids

Introduction, Pressure: Pascal's Law, Variation of Pressure with Depth, Atmospheric Pressure and Gauge Pressure, Hydraulic Machines, **Streamline Flow, Bernoulli's Principle**: Speed of Efflux: Torricelli's Law, Dynamic Lift, **Viscosity**: Stokes' Law, **Surface Tension**: Surface Energy, Surface Energy And Surface Tension, Angle of Contact, Drops and Bubbles, Capillary Rise.

Chapter 10: Thermal Properties of Matter

Introduction, Temperature and Heat, Measurement of Temperature Ideal-Gas Equation and Absolute Temperature, Thermal Expansion, Specific Heat Capacity, Calorimetry, Change of State: Latent Heat, **Heat Transfer**: Conduction, Convection, Radiation, Blackbody Radiation, **Newton's Law of Cooling**.

UNIT VIII: Thermodynamics

Chapter 11: Thermodynamics

Introduction, Thermal Equilibrium, Zeroth Law of Thermodynamics, Heat, Internal Energy and Work, First Law of Thermodynamics, Specific Heat Capacity, Thermodynamic State Variables and Equation of State, Thermodynamic Processes: Quasi-Static Process, Isothermal Process, Adiabatic Process, Isochoric Process, Isobaric Process, Cyclic Process, **Second Law of Thermodynamics, Reversible and Irreversible Processes, Carnot Engine.**

UNIT IX: Behaviour of Perfect Gases and Kinetic Theory of Gases

Chapter 12: Kinetic Theory

Introduction, Molecular Nature of Matter, Behaviour of Gases, Kinetic Theory of an Ideal Gas: Pressure of an Ideal Gas, Kinetic Interpretation of Temperature, **Law of Equipartition of Energy, Specific Heat Capacity**: Monatomic Gases, Diatomic Gases, Polyatomic Gases, Specific Heat Capacity of Solids, **Mean Free Path**.

UNIT X: Oscillations and Waves

Chapter 13: Oscillations

Introduction, Periodic and Oscillatory Motions: Period and Frequency, Displacement, **Simple Harmonic Motion, Simple Harmonic Motion and Uniform Circular Motion, Velocity and Acceleration in Simple Harmonic Motion, Force Law for Simple Harmonic Motion, Energy in Simple Harmonic Motion, The Simple Pendulum.**

Chapter 14: Waves

Introduction, Transverse and Longitudinal Waves, Displacement Relation in a Progressive Wave: Amplitude and Phase, Wavelength and Angular Wave Number, Period, Angular Frequency and Frequency, **The Speed of a Travelling Wave**: Speed of a Transverse Wave on Stretched String, Speed of a Longitudinal Wave (Speed Of Sound), **The Principle of Superposition of Waves, Reflection of Waves**: Standing Waves and Normal Modes, **Beats.**

PRACTICAL DETAILED SYLLABUS

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

- Record of at least 10 Experiments [with 5 from each section], to be performed by the students.
- Record of at least 6 Activities [with 3 each from section A and section B], to be performed by the students.

- The Report of the project carried out by the students.

List of Practicals

Section-A

1. Use of vernier callipers
    i. To measure diameter of a small spherical/cylindrical body.
    ii. To measure dimensions of a given regular body of known mass and hence find its density.
    iii. To measure internal diameter & depth of a given beaker and find its volume
2. Use of Screw gauge:-
    i. To measure diameter of a given wire.
    ii. To measure thickness of a given sheet.
    iii. To measure volume of an irregular lamina.
3. To determine radius of curvature of a given spherical surface by a spherometer.
4. To measure the mass of two different objects using a beam balance.
5. To find the weight of a given body using parallelogram law of vector.
6. Using a simple pendulum, plot L-T and L-T^2 graph. Find the effective length of a second's pendulum using appropriate Graph.
7. To study the relationship between free of limiting friction and normal reaction and to find the coefficient of friction between a block and a horizontal surface.
8. To find the down ward free along on inclined plane acting on a roller due to gravitational pull of the earth and study its relationship with the angle of inclination by plotting graph between free and sin Θ.

Activities:-

1. To make a paper scale of given least counte.g.0.2cm, 0.5cm.
2. To determine mass of given body using a meter scale by using principle of moments.
3. To plot a graph for a given set of data with proper choice of scales and error bars.
4. To measure the force of limiting friction for rolling of a roller on a horizontal plane.
5. To study the variation in the range of jet of water with the angle of projection.
6. To study the conservation of energy of a bar rolling down on an inclined plane.

Section-B

Experiments:

1. To determine young's Modules of elasticity of material of given wire.
2. TofindforceconstantandeffectivemassofahelicalspringbyplottingT^2-m graph using Method of oscillations.
3. Tostudythevariationinvolumewithpressureforasampleofairatconstant temperature by plotting graphs between P&V and between P&1/V.
4. To determine surface tension of water by capillary rise method.
5. To determine the coefficient of viscosity of a given viscous liquid by measuring the terminal velocity of a given spherical body.
6. To study the relationship between the temper of a hot body and time by plotting cooling curve.
7. To study the relation between length of a given wire and tension for constant frequency using sonometer.
8. To find the speed of sound in air at room temperature using a resonance tube by two resonance position.
9. To determine Specific heat Capacity of a given 1. Solid 2. Liquid by Methods of mixtures.

Activity:

1. To observe change of state and plot a cooling curve for molten wave.
2. To observe explain the effect of heating on a bimetallic strip.
3. To note the change in level of liquid in a container on heating and interpret the observation.
4. To study the effect of detergents on surface tension of water by capillary rise.
5. To study the factors effecting the rate of loss of heat of a liquid.
6. To study the effect of load on depression of a suitably clamped meter scale loaded 1. at its ends 2. in the middle.

Month wise syllabus distribution (2023-24)

CLASS – 11th **Subject: Physics** **Code: 850**

Month	Chapter	Teaching Period	Revision Period	Practical Period
April	Ch-1: Units and Measurement	12	04	08
May	Ch–2: Motion in Straight line	11	02	12
	Ch–3: Motion in a Plane	12	02	
June	Summer Vacations - Project Work			
July	Ch–4: Laws of Motion	10	02	12
	Ch–5: Work, Energy and Power	12	02	
August	Ch–6: System of Particles and Rotational motion	14	02	14
September	Revision		10	
	Half yearly examination			
October	Ch–7 : Gravitation	8	02	10
	Ch-8 : Mechanical Properties of Solids	6	01	
	Ch-9 : Mechanical Properties of Fluids	10	03	
November	Ch-10: Thermal Properties of Matter	08	02	12
	Ch-11: Thermodynamics	10	04	
December	Ch-12 : Kinetic Theory	08	02	12
	Ch- 13 Oscillations	12	04	

January	Ch- 14: Waves	10	2	08
February	Revision		18	
March	Annual Examination			

Note:

- **Subject teachers are advised to direct the students to prepare notebook of the Terminology/Definitional Words used in the chapters for enhancement of vocabulary for clarity of the concept.**
- **The NCERT textbooks present information in boxes across the book. These help students to get conceptual clarity. However, the information in these boxes would not be assessed in the year-end examination.**

Prescribed Books:

1. Physics Part-I ,Class XI ,Published by Board of School Education Haryana (© NCERT)

2. Physics Part-II ,Class XI ,Published by Board of School Education Haryana (© NCERT)

3. Laboratory Manual of Physics ,Class XI published by (NCERT)

Question Paper Design (2023-24)

Class- 11th Subject: Physics Code: 850

Type of Question	Marks	Number of Question	Description	Total Marks
Objective Questions	1 mark each	18	14 Multiple Choice Questions, 4 Assertion-Reason Questions	18
Very Short Answer Type Question	2 marks each	7	Internal choice will be given in any 2 questions	14
Short Answer Type Question	3 marks each	5	Internal choice will be given in any 2 questions	15
Case Study	4 marks each	2	Internal choice will be given only in one part of both questions	8
Long Answer Type Question	5 marks each	3	Internal choice will be given in all the questions	15
Total		**35**		**70**