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FOR HARYANA CLASS 11 PREPARATION

HBSE Class 11 Syllabus 2027 Physics

EXAM	YEAR	TYPE	SUBJECT
Haryana Class 11	2027	Syllabus	Physics

BOARD OF SCHOOL EDUCATION HARYANA

Syllabus and Chapter wise division of marks (2026-27)

Class- XI **Subject: Physics** **Code: 850**

General Instructions:

1. There will be an Annual Examination based on the entire syllabus.
2. The annual examination (Theory) will be of 70 Marks whereas Practical examination will be of 30 marks (Internal). Therefore, Total annual evaluation (70+30) will be of 100 marks.
3. For Practical examination the criteria are as follows:

Total Time: 3 Hours

Evaluation Scheme	**Marks**
Marks allocated for Internal Assessment 1. Student Assessment Test Weightage of marks (06 marks of SAT, 02 marks of half yearly test, 02 marks for attendance and classroom participation) 2. Practical file/ Record 3. Project Record	**15** 10 03 02
Marks allocated for Annual Examination	**15**
Experiments (two)	09 (one from each section)
Activity (One from Syllabus)	03
Viva Voce	03
Total marks	**30**

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Course Structure (2026-27)

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**

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UNIT I: Physical World and Measurement

Chapter 1: Units and Measurement

The International System of Units, Fundamental and derived 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, Elementary concepts of differentiation and Interpretation

Instantaneous Velocity and Speed, Acceleration, Kinematic Equations for Uniformly Accelerated Motion, graphical treatment and calculus method, x-t, v-t and a-t graphs

Chapter 3: Motion in a Plane

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, Scalar and vector product 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

Aristotle's Fallacy, The Law of Inertia, Newton's First Law of Motion, momentum, impulse, Newton's Second Law of Motion, Newton's Third Law of Motion, Conservation Of Linear Momentum and it's application, Equilibrium Of A Particle, Common Forces In Mechanics: Friction **and it's types, Laws of friction , Circular**

Motion: motion of a car on a level road, banked road, Solving Problems In Mechanics

UNIT IV: Work, Energy and Power

Chapter 5: Work, Energy and Power

Work done by constant force and variable force, K.E: **: The Work-Energy Theorem, The Work-Energy Theorem for a Variable Force, The Concept of Potential Energy, The Conservation of Mechanical Energy, The Potential Energy Of A Spring, conservative and non-conservative force, 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

What kind of motion can a rigid body have, **Centre of Mass, Motion of Centre of Mass, Linear Momentum of a System of Particles, 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 for simple geometrical objects (no derivation), Kinematics of Rotational Motion, work done by torque, 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

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, Satellites, Orbital speed of satellites

UNIT VII: Properties of Bulk Matter

Chapter 8: Mechanical Properties of Solids

Stress and Strain, Hooke's Law, Stress-Strain Curve, Elastic Moduli: Young's Modulus, Shear Modulus, Bulk Modulus, Poisson's Ratio, **Applications of Elastic Behaviour of Materials**. (qualitative idea only)

Chapter 9: Mechanical Properties of Fluids

Pressure: Pascal's Law, Variation of Pressure with Depth, Atmospheric Pressure, Hydraulic Machines, **Streamline Flow, Bernoulli's theorem and it's applications**: **Viscosity**: Stokes' Law, Terminal Velocity , critical velocity and type of flow **Surface Tension**: Surface Energy And Surface excess pressure in Soap bubble and air bubble drop, Angle of Contact, Drops and Bubbles, Capillary Rise.

Chapter 10: Thermal Properties of Matter

Temperature and Heat, Measurement of Temperature Ideal-Gas Equation and Absolute Temperature, Thermal Expansion, Thermal stress, Specific Heat Capacity, Molar specific heat capacity, Calorimetry, Change of State: Latent Heat, **Heat Transfer**: Conduction, Convection, Radiation, Weins displacement law, Stefan- Boltzmann law.

UNIT VIII: Thermodynamics

Chapter 11: Thermodynamics

Thermal Equilibrium, Zeroth Law of Thermodynamics, Heat, Internal Energy and Work, First Law of Thermodynamics, Specific Heat Capacity, Specific heat capacity of water, 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.**

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

Chapter 12: Kinetic Theory

Molecular Nature of Matter, Behaviour of Gases, Kinetic Theory of an Ideal Gas: Pressure of an Ideal Gas, Kinetic Interpretation of Temperature, Degrees of freedom **Law of Equipartition of Energy (statement only), Specific Heat Capacity**: Monatomic Gases, Diatomic Gases, Polyatomic Gases, **Mean Free Path** (qualitative idea).

UNIT X: Oscillations and Waves

Chapter 13: Oscillations

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

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, stretched string fixed at both ends, Organ pipe, **Beats.**

PRACTICALS:

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

- Record of at least 08 Experiments [with 4 from each section], to be performed by the students.
- Record of at least 6 Activities [with 3 each from section A and section B], to be performed by the students.
- The Report of the project carried out by the students.

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 temperature 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 (2026-27)

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

Month	Chapter	Teaching Period	Revision Period	Practical Period
April	Ch-1: Units and Measurement Practical: 1. Use of vernier calliper: 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 Activities: To make a paper scale of given least counte.g.0.2cm, 0.5cm.	12	04	08

May	Ch–2: Motion in Straight line Ch–3: Motion in a Plane Practical: 1. 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. Activities: To determine mass of given body using a meter scale by using principle of moments.	11 12	02 02	12
June	Summer Vacations - Project Work			
July	Ch–4: Laws of Motion Ch–5: Work, Energy and Power Practical: 1. To determine radius of curvature of a given spherical surface by a spherometer. 2. To measure the mass of two different objects using a beam balance. Activities: To plot a graph for a given set of data with proper choice of scales and error bars.	10 12	02 02	12

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August	Ch–6: System of Particles and Rotational motion Practical: 1. To find the weight of a given body using parallelogram law of vector. 2. Using a simple pendulum, plot L-T and L-T^2 graph. Find the effective length of a second's pendulum using appropriate Graph. 3. To study the variation in the range of jet of water with the angle of projection. Activities: To measure the force of limiting friction for rolling of a roller on a horizontal plane.	14	02	14

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September	Revision Half yearly examination <u>Practical:</u> 1. 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. 2. 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. <u>Activities:</u> 1. To study the conservation of energy of a bar rolling down on an inclined plane.		10	14

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October	Ch–7 : Gravitation Ch-8 : Mechanical Properties of Solids Ch-9 : Mechanical Properties of Fluids <u>Practical:</u> 1. To determine young's Modules of elasticity of material of given wire. 2. To find force constant and effective mass of a helical spring by plotting T^2- m graph using Method of oscillations. <u>Activities:</u> 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.	8 6 10	02 01 03	10

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November	Ch-10: Thermal Properties of Matter Ch-11: Thermodynamics Practical: 1. To study the variation in volume with pressure for a sample of air at constant temperature by plotting graphs between P&V and between P&1/V. 2. To determine surface tension of water by capillary rise method. 3. To determine the coefficient of viscosity of a given viscous liquid by measuring the terminal velocity of a given spherical body. Activities: 1. To note the change in level of liquid in a container on heating and interpret the observation. 2. To study the effect of detergents on surface tension of water by capillary rise.	08 10	02 04	12

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December	Ch-12: Kinetic Theory Ch- 13 Oscillations Practical: 1. To study the relationship between the temperature of a hot body and time by plotting cooling curve. 2. To study the relation between length of a given wire and tension for constant frequency using sonometer. Activity: 1. To study the factors effecting the rate of loss of heat of a liquid. 2. To study the effect of load on depression of a suitably clamped meter scale loaded 1. at its ends 2. in the middle.	08 12	02 04	12
January	Ch- 14: Waves Practical: 1. To find the speed of sound in air at room temperature using a resonance tube by two resonance position. 2. To determine Specific heat Capacity of a given 1. Solid 2. Liquid by Methods of mixtures.	10	2	08
February	Revision		18	
March	Annual Examination			

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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)

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Question Paper Design (2026-27)

Class- XI **Subject: Physics**
Code: 850 **Time: 3 hours**

Competencies	Marks	Percentage
Knowledge	28	40%
Understanding	21	30%
Application	14	20%
Skill	7	10%
Total	**70**	**100%**

Type of Question	Marks	Number of Question	Description	Total Marks
Objective Questions	1	18	09 Multiple Choice Questions, 03 Fill in the blanks 03 One Word Answer based 03 Assertion-Reason Questions	18
Very Short Answer Type Question	2	7	Internal choice will be given in any 3 questions	14
Short Answer Type Question	3	5	Internal choice will be given in any 2 questions	15
Case Study	4	2	Internal choice will be given only in one part of both questions	8
Long Answer Type Question	5	3	Internal choice will be given in all the questions and may be given in the parts	15
Total		**35**		**70**

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