

West Bengal Board Class 11 Physics Theory & Practical Reduced Syllabus 2020-21

Unit – I Physical World & Measurement

Physics – scope and excitement; nature of physical laws; physics technology and society. Need for measurement; unit of measurement; systems of units; SI units, fundamental and derived units. Length, mass and time measurement; accuracy and precision of measuring instruments; errors in measurement; significant figures.

Dimensions of physical quantities, dimensional analysis and its applications.

(Deleted section for 2020-21 academic year- Physical world & Measurement: dimensional analysis and its applications).

Unit – II Kinematics

Frame of reference (inertial and non-inertial frames). Motion in a straight line ; position- time graph, speed and velocity. Elementary concepts of differentiation and integration for describing motion. Uniform and non- uniform motion, average speed and instantaneous velocity. Uniformly accelerated motion, velocity – time, position-time graphs, relations for uniformity accelerated motion (graphical treatment). Scalar and vector quantities; position and displacement vectors, general vectors and notation, equality of vectors, multiplication of vectors by a real number; addition and subtraction of vectors. Relative velocity. Unit vector; resolution of a vector in a plane – rectangular components. Scalar and vector product of vectors. Motion in a plane. Cases of uniform velocity and uniform acceleration- projectile motion. Uniform circular motion.

(Deleted section for 2020-21 academic year- Kinematics : Motion in a plane, cases of uniform velocity and uniform acceleration - projectile motion . Uniform circular motion).

Unit – III Laws of motion

Intuitive concept of force. Inertia, Newton's first law of motion; momentum and Newton's second law of motion; impulse; Newton's third law of motion. Law of conservation of linear momentum and its applications. Equilibrium of concurrent forces. Static and kinetic friction, laws of friction, rolling friction. Dynamics of uniform circular motion; centripetal force, examples of circular motion (vehicle on level circular road, vehicle on banked road).

(Deleted section for 2020-21 academic year- Laws of Motion: Rolling friction).

Unit- IV: Work, energy and Power

Work done by a constant force and a variable force; kinetic energy, work-energy theorem, power. Notion of potential energy, potential energy of a spring; conservative forces: conservation of mechanical energy

(kinetic and potential energies); non-conservative forces; motion in a vertical circle, elastic and inelastic in one and two dimensions.

(Deleted section for 2020-21 academic year- Motion of system of particles and Rigid Body: momentum conservation and centre of mass motion. Centre of mass of a rigid body, centre of mass of uniform rod).

Unit- V: Motion of System of Particles and Rigid body

Centre of mass of a two-particle system, momentum conservation and centre of mass motion. Centre of mass of a rigid body; centre of mass of uniform rod. Moment of a force, torque, angular momentum, conservation of angular momentum with some examples. Equilibrium of rigid bodies, rigid body rotation and equations of rotational motion, comparison of

Linear and rotational motions; moment of inertia, radius of gyration. Values of moments of inertia for simple geometrical objects (no derivation). Statement of parallel and perpendicular axes theorems and their applications.

(Deleted section for 2020-21 academic year- Work, Energy, and Power: Non-conservative forces; motion in a vertical circle, elastic and inelastic in one and two dimensions).

Unit-VI: Gravitation

Keplar's laws of planetary motion. The universal law of gravitation. Acceleration due to gravity and its variation with attitude, depth and rotation of earth. Gravitational potential energy; gravitational potential. Escape velocity. Orbital velocity of a satellite. Geostationary satellites.

(Deleted section for 2020-21 academic year- Gravitation: Geostationary satellites).

Unit-VII: Properties of Bulk Matter

Elastic behaviour, stress-strain relationship, Hooke's law, Young modulus, bulk modulus, shear, modulus of rigidity, Poisson's ratio; elastic energy. Pressure due to a fluid column; Pascal's law and its applications (hydraulic lift and hydraulic brakes). Effect of gravity on fluid pressure. Viscosity, Stoke's law, terminal velocity, Reynold's number, streamline and turbulent flow. Critical velocity, Bernoulli's theorem and its applications. Surface energy and surface tension, angle of contact, excess of pressure, application of surface tension ideas to drops, bubbles and capillary rise. Heat temperature thermal expansion; thermal expansion of solids, liquids and gases ideal gas laws, isothermal and adiabatic processes; anomalous expansion and its effect, specific heat capacity; C_p , C_v - calorimetry; change of state – specific latent heat capacity. Heat transfer – conduction; convection and radiation, blackbody radiation Kirchoff's law, absorptive and emissive powers and green house effect thermal conductivity, Newton's law of cooling, Wein's displacement law, Stefan's law.

(Deleted section for 2020-21 academic year- Properties of Bulk Matter: Application of surface tension ideas to drops, bubbles and capillary rise, Calorimetry; change of state - specific latent heat capacity and Newton's law of cooling, Wein's displacement law, Stefan's law).

Unit-VIII: Thermodynamics

Thermal equilibrium and definition of temperature (zeroth law of Thermodynamics). Heat, work and internal energy. First law of thermodynamics.

Second law of thermodynamics; reversible and irreversible processes. Heat engines and refrigerators.

(Deleted section for 2020-21 academic year- Thermodynamics: Heat engines and refrigerators).

Unit-IX: Behaviour of Perfect Gas and Kinetic Theory

Equation of state of a perfect gas, work done in compressing a gas. Kinetic theory of gases- assumptions; concept of pressure. Kinetic energy and temperature. Speed of gas molecules; degrees of freedom, law of equilibrium of energy (statement only) and application to specific heats of gases; concept of mean free path, Avagadro's number.

(Deleted section for 2020-21 academic year- Behaviour of Perfect gas and Kinetic Theory: degrees of freedom, law of equilibrium of energy and application to specific heats of gases ; concept of mean free path, Avogadro Number).

Unit- X: Oscillation and waves

Periodic motion – period, frequency, displacement as a function of time periodic functions. Simple harmonic motion (S.H.M) and its equation; phase; oscillations of a spring- restoring force and force constant; energy in S.H.M – kinetic and potential energies simple pendulum – derivation of expression for its time period; free, forced and damped oscillations(qualitative ideas only)resonance. Wave motion Longitudinal and transverse waves, speed of wave motion. Displacement relation for a progressive wave. Principle of superposition of waves, reflection of waves in string and organ pipes, fundamental mode and harmonics, beats, Doppler effect.

(Deleted section for 2020-21 academic year- Oscillation and Waves:free, forced and damped oscillations, resonance).

West Bengal Board Class 11 Physics Practical Syllabus

SECTION A Experiments

Evaluation Scheme:

- 1) Two experiments one from each Section 8+8=16
- 2) Practical record (experiments) -04
- 3) Project with viva - 05
- 4)Viva on experiment-05

Total Marks=30 marks

Section A

- 1) To measure internal diameter, and depth of a given beaker using Vernier Callipers and hence find its volume.
- 2) To measure volume of an irregular lamina using screw gauge.
- 3) To determine radius of curvature of a given spherical surface by a spherometer
- 4) Using a simple pendulum plot $L-T^2$ graphs. Hence, find the effective length of a second's pendulum using graph.

Section -B

- 1) To find the force constant of a helical spring by plotting graph between load and Extension.
 - 2) To determine the surface tension of water by capillary rise method.
 - 3) To find the speed of sound in air at room temperature using a resonance tube by two resonance positions.
 - 4) To study the variation in Volume with pressure for a sample of air at constant temperature by plotting graphs between P and V
- Or
- To study the relationship between the temperature of a hot body and time by plotting a cooling curve