



# RUBY PARK PUBLIC SCHOOL

## SYLLABUS FOR THE ACADEMIC SESSION 2022-23

### Subject - Physics

### CLASS - XI

Month	Chapter	Topics	Sub Topics
June	I & II	Physical World, Measurement and units	Need for measurement: Units of measurement; systems of units; SI units, fundamental and derived units.; significant figures. Dimensions of physical quantities, dimensional analysis and its applications
		Calculus	Elementary Differential and integral calculus for describing motion
June And July	III	Motion in a Straight line	Frame of reference. Motion in a straight line: Uniform and non-uniform motion, instantaneous velocity.
			Uniformly accelerated motion, velocity-time, position-time graphs, relations for uniformly accelerated motion (graphical treatment).
June And July	IV	Motion in a Plane	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.
			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
July	V	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. lubrication
			Dynamics of uniform circular motion: Centripetal force,

examples of circular motion (vehicle on level circular road, vehicle on banked road).

#### UT I

July and August	VI	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; ; non- conservative forces: elastic and inelastic collisions in one and two dimensions.
August	VII	System of Particles (1)	Centre of mass of a two-particle system, momentum conversation and centre of mass motion. Centre of mass of a rigid body; centre of mass of uniform rod.
August	VII	System of Particles and Rotational Motion (2)	Moment of a force, torque, angular momentum, Law of conservation of angular momentum and its applications.
			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)

#### Block Test 1

September	VIII	Gravitation	Keplar's laws of planetary motion. The universal law of gravitation.
			Acceleration due to gravity and its variation with altitude and depth.
			Gravitational potential energy; gravitational poten- tial. Escape velocity. Orbital velocity of a satellite.
October	IX	Mechanical Properties of Solid	Elastic behavior, Stress-strain relationship, Hooke's law, Young's modulus, bulk modulus, shear, modulus of rigidity. (Qualitative idea only); Poisson's Ratio; Elastic Energy
October	X	Mechanical Properties of Fluid	Pressure due to a fluid column; Pascal's law and its applications (hydraulic lift and hydraulic brakes). Effect of gravity on fluid pressure
			Viscosity, Stokes' law, terminal velocity, streamline and turbulent flow. Bernoulli's theorem and its applications. Critical Velocity
			Surface energy and surface tension, angle of contact, application of surface tension ideas to drops, bubbles and capillary rise. Excsee of pressure across a curved surface.
November	XI	Thermal Properties of matter	Heat, temperature, thermal expansion of solids, liquids and gases, anomalous expansion of water; specific heat - capacity calorimetry; change of state - latent heat. Heat transfer- conduction, convection and radiation, thermal conductivity, Qualitative ideas of blackbody radiation Wien Displacement Law, Stefan's Law

#### UT II

December	XIII	Kinetic Theory Of Gas	Equation of state of perfect gas, work done in compressing a gas. Kinetic theory of gases - assumptions, concept of pressure. Kinetic interpretation of
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			temperature; rms speed of gas molecules; degrees of freedom, law of equipartition of energy (statement only) and application to specific heats of gases; concept of mean free path, Avogadro's number
December	XII	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. Gaseous state of matter; change of condition of gaseous state. Isothermal, adiabatic, reversible, irreversible, cyclic processes
UT III			
January	XIV	Oscillations	Periodic motion time period, frequency, displacement as a function of time. Periodic functions and their applications. Simple harmonic motion (S.H.M) and its equation; phase; oscillations of a loaded spring-restoring force and force constant; energy in S.H.M.-kinetic and potential energies; simple pendulum-derivation of expression for its time period.
	XV	Waves	Wave motion. Longitudinal and transverse waves, speed of travelling wave. Displacement relation for a progressive wave. Principle of superposition of waves, reflection of waves, standing waves in strings and organ pipes, fundamental mode and harmonics, Beats.
Revision			
Block Test 2			

