

Physics Question Set (class 11)

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Class 11, CBSE Half Yearly – Important Questions

- 1) Friction is a self adjusting force until the object starts moving- explain.
- 2) Define angle of repose and show it with a diagram.
- 3) Show that the coefficient of static friction is equal to the tangent of the angle of repose.
- 4) Show that acceleration of a block on the inclined plane depends on the angle of inclination, but not on the value of mass.
- 5) State the work energy theorem. Derive its expression.
- 6) Show conservation of mechanical energy for a stone thrown upwards, for its entire path.
- 7) Find the work done in moving a particle along a vector $\mathbf{S} = (5\mathbf{i} - \mathbf{j} + 8\mathbf{k})$ meter if applied force $\mathbf{F} = (\mathbf{i} + 2\mathbf{j} - \mathbf{k})$ Newton.



- 8) A constant force $F = (2\mathbf{i} + 3\mathbf{j})$ N displaces a body from position $r_1 = (4\mathbf{i} - 5\mathbf{j})$ to $r_2 = (\mathbf{i} + 3\mathbf{j})$ meter. Find the work done by the force.
- 9) Derive an expression for potential energy of a spring.
- 10) Define conservative force with 2 examples. The work done by the spring force in a cyclic process is zero-show how.
- 11) On an unbanked curved road of radius R and coeff of static friction μ_s , derive the expression of maximum velocity possible without sliding.
- 12) On a banked curved road with zero friction, derive the equation of permissible velocity.
- 13) State Kepler's laws of planetary motion .Derive the expression of law of periods (the 3rd law of Kepler).
- 14) Derive the equation of the Escape Velocity. Show how it varies with the mass of the planet and its radius.
- 15) Derive the expression of total energy of a satellite. If it is negative, explain why?
- 16) Define and write utilities of a) Geostationary or geosynchronous satellite b) Polar satellite



- 17) Show mathematically how weightlessness happens in a satellite.
- 18) Find the scalar and vector products of 2 vectors.
 $A=3i-4j+5k$ and $B=-2i+j-3k$.
- 19) Discuss mathematically the variation of 'g' with depth from the surface of the earth.
- 20) What is projectile? Show that its path is parabolic. Obtain expression for (a) Max^m height (b) Time of flight (c) Horizontal Range.
- 21) State perpendicular axes and parallel axes of theorems for a plane lamina.
- 22) Derive expression of Moment of Inertia for a ring with rotational axis at one of its diameter.
- 23) Obtain an expression for KE of rotation of a body with angular velocity 'w' and hence define M.o.I.
- 24) What is the radius of gyration? What are the factors the Moment of Inertia depends on?
- 25) Derive the equation of **KE** for rolling motion, using radius of gyration. Derive equation for Velocity of centre of mass if a body comes down along an inclined plane of height h.



- 26) Define centre of mass and centre of gravity?
When will they be equal?
- 27) Derive relationship between angular momentum and Torque. What is angular impulse?
- 28) Derive the law of conservation of angular momentum mathematically.
- 29) Moment of linear momentum is angular momentum- show that.
- 30) If a particle is acted upon by a force, $\mathbf{F} = (x \mathbf{i} + y \mathbf{j} + z \mathbf{k})$ N, where x, y, z are in meters, then find the work done by the force when the particle moves from $(2, 2, 2)$ to $(3, 4, 1)$.
- 31) Define/state the following: Gravitational Field, Gravitational field Intensity or strength, Gravitational Potential energy, Gravitational Potential, Law of conservation of energy, Completely Inelastic collision

