

PHYSICS POINT

ASSIGNMENT: ROTATIONAL MOTION OF SYSTEM OF PARTICLES

CLASS-XI

- Q1. A particle describes uniform circular motion. Find the torque on it about the centre of the circle.
- Q2. From a disc of mass 2 kg and radius 1 m with centre O is extracted. Determine the new moment of inertia about an axis passing through O perpendicular to plane of disc.
- Q3. A circular disc X of radius R is made from iron plate of thickness t, and another disc Y of radius 4R is made from an iron plate of thickness t/4. Determine the relation between moment of inertia I_x and I_y .
- Q4. Let I be the moment of inertia of an uniform square plate about an axis AB that passes through its centre and is parallel to two of its sides. CD is a line in the plane of the plate that passes through the centre of the plate and makes an angle ω with AB. Determine the moment of inertia of the plate about the axis CD.
- Q5. Three point masses each of mass m are placed at the corners of an equilateral triangle of side a. find the moment of inertia of the system about an axis passing along one side of the triangle.
- Q6. The moment of inertia of a rod of length l about an axis passing through its centre of mass and perpendicular to rod is I_0 . find the moment of inertia of hexagonal shape formed by six such rods, about an axis passing through its centre of mass and perpendicular to its plane.
- Q7. A ring, a solid sphere and a thin disc of different masses rotate with the same kinetic energy. Equal torques is applied to stop them. Which will make the least number of rotations before coming to the rest?
- Q8. A smooth uniform rod of length L and mass M has two identical beads of negligible size, each of mass m, which can slide freely along the rod. Initially the two beads are at the centre of the rod and the system is rotating with angular velocity ω_0 about an axis perpendicular to the rod and beads reach the end of the rod. Determine the angular velocity of the system.
- Q9. A uniform disc of mass m and radius R is rolling without slipping up a rough inclined plane which makes an angle 30° with the horizontal. If the coefficient of the static and kinetic friction are each equal to μ and the only force acting on the disc are gravitational and frictional, then find direction and magnitude of the frictional force acting on it.
- Q10. A disc of radius r and mass m rolls without slipping on a fixed horizontal circular path of radius R. the speed of the centre of the disc is v_0 . find the angular velocity of the disc about O. (the centre of the circular track).
-