

J.E.E./A.I.P.M.T. Foundation - XI Physics Worksheet**Time: 30 min Ch#7 : System of Particles and Rotational Motion-01 Full Marks: 20****Instructions:**

- 1. All questions are compulsory.**
- 2. Please give the explanation for the answer where applicable.**

Q1 - Two masses m_1 and m_2 start moving towards each other due to their mutual force of attraction. What will be the change in their respective centre of mass position?

(1 Mark)

Q2 - What is the S.I. unit of angular momentum?

(1 Mark)

Q3 - Is radius of gyration of a body a constant quantity?

(1 Mark)

Q4 - A child starts running from one end to another end of a trolley which is moving with uniform speed V on a smooth horizontal floor. What is the speed of the C.M. of the (trolley+ child) system?

(2 Marks)

Q5 - Find the moment of inertia of a solid sphere about a tangent to the sphere.

(2 Marks)

Q6 - Prove that the torque experienced by a particle is equal to the product of its moment of inertia and angular acceleration.

(2 Marks)

Q7 - Find the moment of inertia of a rod of length l about an axis passing through its mid point and perpendicular to it?

(3 Marks)

Q8 - A man of mass m_1 is standing on a platform of mass m_2 kept on a smooth horizontal surface. The man starts moving on the platform with a velocity V_r relative to the platform. Find the recoil velocity of the platform.

(3 Marks)

Q9 - A particle traverses its circular path as

$$\theta = 2t^2 + t \text{ where,}$$

θ is the angle made at the centre in radian and t is time in seconds. Find

- (a) angular displacement at $t = 2$ s
- (b) angular velocity at $t = 2$ s
- (c) angular acceleration
- (d) tangential acceleration at $t = 1$ s if radius of circle is 5 m.

(5 Marks)