



TARGET : NEET (UG) 2024

Course : SARANSH (Youtube Live CRASH COURSE)

PHYSICS

DPP

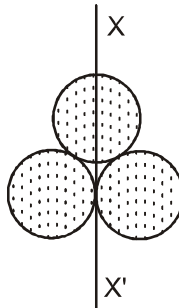
DAILY PRACTICE PROBLEMS

DPP NO. 1

PHYSICS: RBD

DPP No. : 1

1. Three identical spherical shells, each of mass m and radius r are placed as shown in figure. Consider an axis XX' which is touching to two shells and passing through diameter of third shell. Moment of inertia of the system consisting of these three spherical shell about XX' axis is :



- (1) $3 mr^2$ (2) $\frac{16}{5} mr^2$ (3) $4 mr^2$ (4) $\frac{11}{5} mr^2$
2. A force $\vec{F} = \alpha \hat{i} + 3\hat{j} + 6\hat{k}$ is acting at a point $\vec{r} = 2\hat{i} - 6\hat{j} - 12\hat{k}$. The value of α for which angular momentum about origin is conserved is :
- (1) 2 (2) zero (3) 1 (4) -1
3. A light rod of length l has two masses m_1 and m_2 attached to its two ends. The moment of inertia of the system about an axis perpendicular to the rod and passing through the centre of mass is :
- (1) $\sqrt{m_1 m_2} \ell^2$ (2) $\frac{m_1 m_2}{m_1 + m_2} \ell^2$
- (3) $\frac{m_1 m_2}{m_1 + m_2} \ell^2$ (4) $(m_1 + m_2) \ell^2$
4. A solid sphere is rotating freely about its symmetry axis in free space. The radius of the sphere is increased keeping its mass same. Which of the following physical quantities would remain constant for the sphere ?
- (1) Angular velocity (2) Angular momentum
- (3) Rotational kinetic energy (4) Moment of inertia

5. Find the torque about the origin when a force of $3\hat{j}$ N acts on a particle whose position vector is $2\hat{k}$ m
(1) $6\hat{j}$ Nm (2) $-6\hat{i}$ Nm (3) $6\hat{k}$ Nm (4) $6\hat{i}$ Nm
6. The ratio of the moments of inertia of two spheres about their diameter and having same mass and their radii in the ratio 1 : 2 is :
(1) 4 : 1 (2) 1 : 2 (3) 1 : 4 (4) 2 : 1
7. The ratio of radius of gyration of a solid sphere of mass M and radius R about its own axis to the radius of gyration of thin hollow sphere of same mass and radius about its axis is :
(1) 5 : 3 (2) 2 : 5 (3) 5 : 2 (4) 3 : 5
8. A disc is rolling on an inclined plane. What fraction of its total energy will be as rotational energy :
(1) $4/3$ (2) $1/3$ (3) $1/2$ (4) $2/3$
9. If rotational kinetic energy is 50% of translational kinetic energy, then the body is
(1) Ring (2) Cylinder
(3) Hollow sphere (4) Solid sphere
10. A body is given translational velocity and kept on a surface that has sufficient friction. Then:
(1) body will move forward before pure rolling
(2) body will move backward before pure rolling
(3) body will start pure rolling immediately
(4) none of these

