Resonance®
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TARGET : NEET (UG) 2024

Course : SARANSH (Youtube Live CRASH COURSE)

PHYSICS
DPP
DAILY PRACTICE PROBLEMS
DPP NO. 2

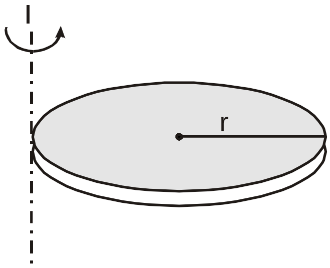
PHYSICS: RBD

DPP No. : 2

1. If $\vec{\tau} \times \vec{L} = 0$ for a rigid body, where $\vec{\tau}$ = resultant torque & $\vec{L}$ = angular momentum about a point and both are non - zero. Then :

(1) $\vec{L}$ = constant
(2) $|\vec{L}|$ = constant
(3) $|\vec{L}|$ will increase
(4) $|\vec{L}|$ may increase

2. A solid sphere of radius R has moment of inertia I about its geometrical axis. If it is melted into a disc of radius r and thickness t. If it's moment of inertia about the tangential axis (which is perpendicular to plane of the disc), is also equal to I, then the value of r is equal to :



(1) $\frac{2}{\sqrt{15}}R$
(2) $\frac{2}{\sqrt{5}}R$
(3) $\frac{3}{\sqrt{15}}R$
(4) $\frac{\sqrt{3}}{\sqrt{15}}R$

3. The instantaneous angular position of a point on a rotating wheel is given by the equation $\theta(t) = 2t^3 - 6t^2$. The torque on the wheel becomes zero at :

(1) t = 1s
(2) t = 0.5 s
(3) t = 0.25 s
(4) t = 2s

4. When a mass is rotating in a plane about a fixed point, its angular momentum is directed along :

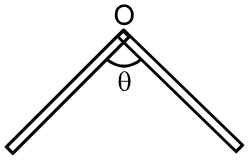
(1) a line perpendicular to the plane of rotation
(2) the line making an angle of 45° to the plane of rotation.
(3) the radius
(4) the tangent to the orbit.

5. The moment of inertia of a body depends upon
(1) mass only
(2) angular velocity only
(3) distribution of particles only
(4) mass and distribution of mass about the axis

6. All the particles of a rigid body in a rotatory motion have axis of rotation:
(1) Passing from any point inside the object
(2) Passing from any point outside the object
(3) Passing from any point
(4) Passing from centre of mass of object

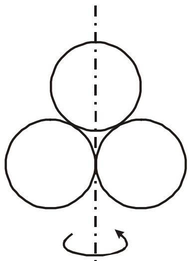
7. Rotational power in rotational motion is
(1) $\vec{\omega} \cdot \vec{\tau}$ (2) $\vec{\omega} \times \vec{\tau}$ (3) $\vec{\tau} \cdot \vec{\alpha}$ (4) $\vec{\tau} \times \vec{\alpha}$

8. A thin rod of length L and mass M is bend at the middle point O as shown in figure. Consider an axis passing through two middle point O and perpendicular to the plane of the bent rod. Then moment of inertia about this axis is :



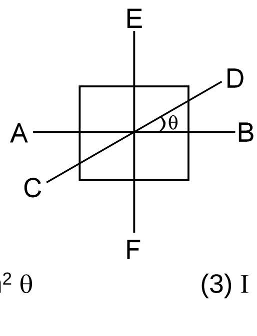
(1) 2/3 mL^2 (2) 1/3 mL^2 (3) 1/12 mL^2 (4) 1/24 mL^2

9. Three rings each of mass m and radius r are so placed that they touch each other. The radius of gyration of the system about the axis as shown in the figure is :



(1) $\sqrt{\frac{6}{5}}r$ (2) $\sqrt{\frac{5}{6}}r$ (3) $\sqrt{\frac{6}{7}}r$ (4) $\sqrt{\frac{7}{6}}r$

10. Let I be the moment of inertia of a 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 θ with AB as shown in figure. The moment of inertia of the plate about the axis CD is then equal to



(1) I (2) I $\sin^2 \theta$ (3) I $\cos^2 \theta$ (4) I $\cos^2 (\theta/2)$