1. A square plate is kept in yz-plane. Then according to perpendicular axis theorem

(A) $I_z = I_x + I_y$ (B) $I_x = I_y + I_z$ (C) $I_y = I_x + I_z$ (D) All

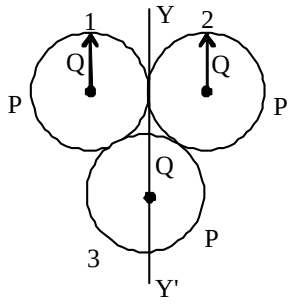
2. Two loops P and Q are made from a uniform wire. The radii of P and Q are r_1 and r_2 respectively, and their moments of inertia are I_1 and I_2 respectively. If $I_2 = 4I_1$, then $\frac{r_2}{r_1}$ equals

(A) $4^{2/3}$ (B) $4^{1/3}$ (C) $4^{-2/3}$ (D) $4^{-1/3}$

3. Two discs have same mass and thickness. Their materials are of densities ρ_1 and ρ_2. The ratio of their moment of inertia about central axis will be

(A) $\rho_1 : \rho_2$ (B) $\rho_1\rho_2 : 1$ (C) $1 : \rho_1\rho_2$ (D) $\rho_2 : \rho_1$

4. Three rings, each of mass P and radius Q are arranged as shown in the figure. The moment of inertia of the arrangement about YY' axis will be



(A) $\frac{7}{2}PQ^2$ (B) $\frac{2}{7}PQ^2$ (C) $\frac{2}{5}PQ^2$ (D) $\frac{5}{2}PQ^2$

5. The moment of inertia depends upon

(A) angular velocity of the body

(B) angular acceleration of the body

(C) only mass of the body

(D) distribution of mass and the axis of rotation of the body

6. A particle, moving along a circular path has equal magnitudes of linear and angular acceleration. The diameter of the path is : (in meters)

(A) 1 (B) π (C) 2 (D) 2π

7 A stone of mass 4 kg is whirled in a horizontal circle of radius 1m and makes 2 rev/sec. The moment of inertia of the stone about the axis of rotation is

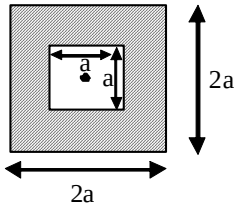
(A) 64 kg × m^2 (B) 4 kg × m^2 (C) 16 kg × m^2 (D) 1 kg × m^2

8 A circular disc A of radius r is made from an iron plate of thickness t and another circular disc B of radius 4r is made from an iron plate of thickness t/4. The relation between the moments of inertia I_A and I_B is

(A) $I_A > I_B$ (B) $I_A = I_B$

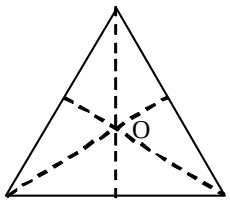
(C) $I_A < I_B$ (D) depends on the actual values of t and r

9 A square of side 'a' is cut from a square of side '2a' as shown in the figure. Mass of this square with hole is M. Then its moment of inertia about an axis passing through its CM and perpendicular to its plane will be



(A) $\frac{Ma^2}{6}$ (B) $\frac{2Ma^2}{6}$ (C) $\frac{4Ma^2}{6}$ (D) $\frac{5Ma^2}{6}$

10 A rod of mass M kg and length L metre is bent in the form of an equilateral triangle as shown in the figure. The moment of inertia of triangle about a vertical axis to perpendicular to the plane of triangle and passing through the centre (in units of kg-m^2) is

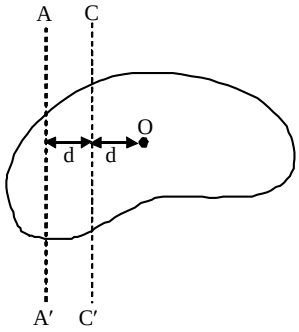


(A) $\frac{ML^2}{12}$ (B) $\frac{ML^2}{54}$ (C) $\frac{ML^2}{162}$ (D) $\frac{ML^2}{108}$

11 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. The moment of inertia of the plate about axis CD is then equal to

(A) I_1 (B) $I_1 \sin^2\theta$ (C) $I_1\cos^2\theta$ (D) $I_1\cos^2(\theta/2)$

12 Figure shows a body of arbitrary shape 'O' is the centre of mass of the body and mass of the body is M. If $I_{CC'} = I_0$ then $I_{AA'}$ will be equal to



(A) $I_{CC'} + Md^2$ (B) $I_{CC'} - Md^2$ (C) $I_{CC'} + 3Md^2$ (D) $I_{CC'} + 4Md^2$

Answers

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1. (B) **2.** (B) **3.** (D) **4.** (A) **5.** (D) **6.** (C) **7.** (B) **8.** (C) **9.** (D) **10.** (B)
11. (A) **12.** (C)