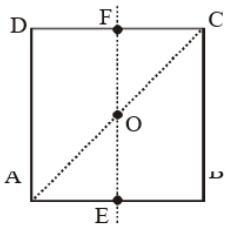
11. What is the moment of inertia for a solid sphere w.r.t a tangent touching to its surface?

(1) $\frac{2}{5}MR^2$ (2) $\frac{7}{5}MR^2$

(3) $\frac{2}{3}MR^2$ (4) $\frac{5}{3}MR^2$

12. For the given uniform square lamina ABCD, whose centre is O,



(1) $I_{AC} = \sqrt{2}I_{EF}$

(2) $\sqrt{2}I_{AC} = I_{EF}$

(3) $I_{AD} = 3I_{EF}$

(4) $I_{AC} = I_{EF}$

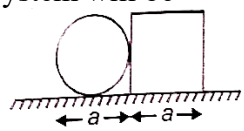
13. One solid sphere A and another hollow sphere B are of same mass and same outer radii. Their moment of inertia about their diameters are respectively I_A and I_B Such that

(1) $I_A < I_B$ (2) $I_A > I_B$

(3) $I_A = I_B$ (4) $\frac{I_A}{I_B} = \frac{d_A}{d_B}$

where d_A and d_B are their densities.

14. A circular plate of diameter 'a' is kept in contact with a square plate of side a as shown. The density of the material and the thickness are same everywhere. The centre of mass of composite system will be



(1) inside the circular plate

(2) inside the square plate

(3) at the point of contact

(4) outside the system

15. A man of mass m starts moving on a plank of mass M with constant velocity v with respect to plank. If the plank lies on a smooth horizontal surface, then velocity of plank with respect to ground is

(1) $\frac{Mv}{m+M}$ (2) $\frac{mv}{M}$

(3) $\frac{Mv}{m}$ (4) $\frac{mv}{m+M}$

16. Two particles A and B initially at rest move towards each other under a mutual force of attraction. At the instant when velocity of A is 3v and that of B is 2v, the velocity of centre of mass of the system

(1) v (2) 2v

(3) 3v (4) zero

17. The moment of inertia of a regular circular disc of mass 0.4 kg and radius 100 cm about an axis perpendicular to the plane of the disc and passing through its centre is

(1) 0.02 kg m^2 (2) 0.002 kg m^2

(3) 0.2 kg m^2 (4) 2 kg m^2

18. Two-point masses m and 3m are placed at distance r. The moment of inertia of the system about an axis passing through the centre of mass of system and perpendicular to the line joining the point masses is

(1) $\frac{3}{5}mr^2$ (2) $\frac{3}{4}mr^2$

(3) $\frac{3}{2}mr^2$ (4) $\frac{6}{7}mr^2$

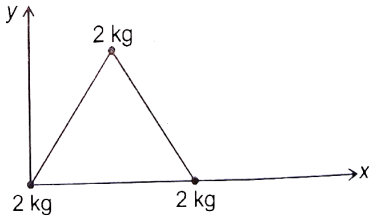
19. Three particles each of mass of 2 kg are placed at corners of an equilateral triangle of side 2 m as shown in figure, y-coordinate of the centre of mass of the system of three particles is

(1) $\sqrt{3}$ m

(2) 1 m

(3) $\frac{1}{\sqrt{3}}$ m

(4) 0.5 m



20. The radius of gyration of a uniform rod of length L about an axis passing through its centre of mass and perpendicular to its length is

(1) $\frac{L}{\sqrt{12}}$ (2) $\frac{L}{2}$

(3) $\frac{L}{\sqrt{3}}$ (4) $\frac{L}{\sqrt{2}}$