PHYSICS

BOOKS - NEET PREVIOUS YEAR (YEARWISE + CHAPTERWISE)

ROTATIONAL MOTION

Exercise

1. Two discs of same moment of inertia rotating their regular axis passing through

centre and perpendicular to the plane of disc with angular velocities ω_1 and ω_2. They are brought into contact face to the face coinciding the axis of rotation. The expression for loss of enregy during this process is :

A. $\frac{1}{2}l(\omega_1 + \omega_2)^2$

B. $\frac{1}{4}l(\omega_1 - \omega_2)^2$

C. $l(\omega_1 - \omega_2)^2$

D. $\frac{l}{8}(\omega_1 - \omega_2)^2$

Answer: b

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2. From a disc of radius R and $mass M$, a circular hole of diameter R, whose rim passes through the centre is cut. What is the moment of inertia of remaining part of the disc about a perependicular axis, passing through the centre ?

A. $13MR^2/32$

B. $11MR^2/32$

C. $9MR^2/32$

D. $15MR^2/32$

Answer: a

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3. A disc and a solid sphere of same radius but different masses roll off on two inclined planes of the same altitude and length. Which one of the two objects gets to the bottom of the plane first ?

A. Sphere

B. Both reach at the same time

C. Depends on their masses

D. Disc

Answer: a

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4. Two rotating bodies A and B of masses m and $2m$ with moments of inertia I_A and $I_B(I_B > I_A)$ have equal kinetic energy of

rotation. If L_A and L_B be their angular momenta respectively, then

A. $L_A = \frac{L_B}{2}$

B. $L_A = 2L_B$

C. $L_B > L_A$

D. $L_A > L_B$

Answer: c

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5. A solid sphere of mass m and radius R is rotating about its diameter. A solid cylinder of the same mass and same radius is also rotating about its geometrical axis with an angular speed twice that of the sphere. The ratio of their kinetic emergies of rotation $\left(E_{\text{sphere}} / E_{\text{cylinder}}\right)$ will be.

A. $2:3$

B. $1:5$

C. $1:4$

D. $3:1$

Answer: b

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6. 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.

A. $\frac{m_1 m_2}{m_1 + m_2} l^2$

B. $\frac{m_1 + m_2}{m_1 m_2} l^2$

C. $(m_1 + m_2) l^2$

D. $\sqrt{m_1 m_2} l^2$

Answer: a

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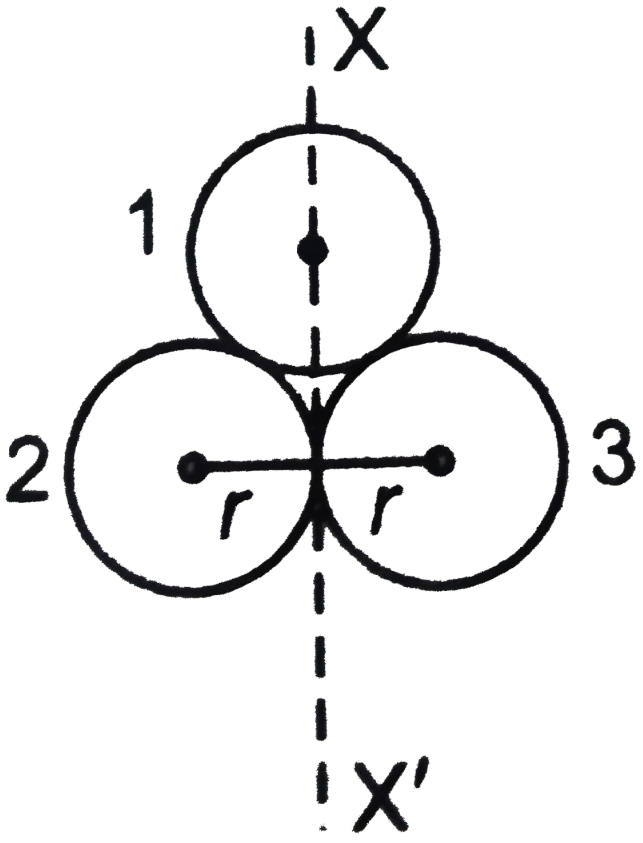
7. Three idential spherical shells each of mass m and radius r are placed as shown in Fig. Consider an axis XX' which is touching the two shells and passing through diameter of third

shell. Moment of Inertia of the system consisting of these three spherical shells about XX' as axis is :



A. $\frac{11}{5}mr^2$

B. $3mr^2$

C. $\frac{16}{5}mr^2$

D. $4mr^2$

Answer: d

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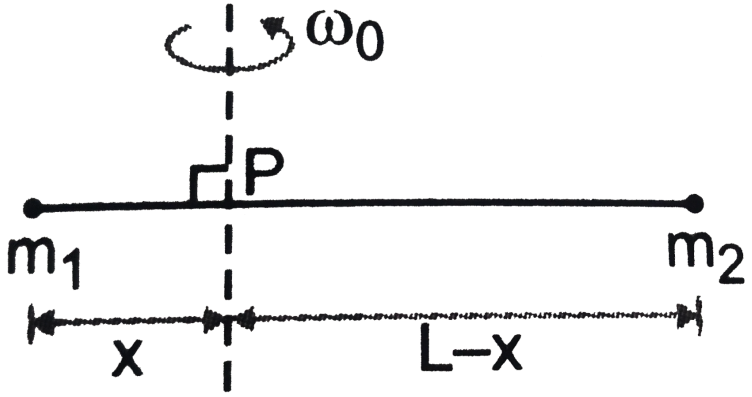
8. Point masses m_1 and m_2 are placed at the opposite ends of a rigid rod of length L, and negligible mass. The rod is to be set rotating about an axis perpendicualr to it. The position

of point P on this rod through which the axis should pass so that the work required to set the rod rotating with angular velocity ω_0 is minimum, is given by :



A. $x = \dfrac{m_1 L}{m_1 + m_2}$

B. $x = \dfrac{m_1}{m_2} L$

C. $x = \dfrac{m_2}{m_1} L$

D. $x = \dfrac{m_2 L}{m_1 + m_2}$

Answer: d

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9. An autmobile moves on road with a speed of $54km/h$. The radius of its wheel is $0.45m$ and the moment of inertia of the wheel about its axis of rotation is $3kgm^2$. If the vehicle is brought to rest in $15s$, the magnitude of average torque tansmitted by its brakes to the wheel is :

A. $6.66kgm^2s^{-2}$

B. $8.58kgm^2s^{-2}$

C. $10.86kgm^2s^{-2}$

D. $2.86kgm^2s^{-2}$

Answer: a

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10. A solid cylinder of mass $50kg$ and radius $0.5m$ is free to rotate about the horizontal axis. A massless string is wound round the

cylinder with one end attached to it and other end hanging freely. Tension in the string required to produce an angular acceleration of 2 revolution s^{-2} is

A. $25N$

B. $50N$

C. $78.5N$

D. $157N$

Answer: d

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11. The ratio of the accelerations for a solid sphere (mass $m,$ and $radius R$) rolling down an incline of angle θ without slipping, and slipping down the incline without rolling is

A. $5:7$

B. $2:3$

C. $2:5$

D. $7:5$

Answer: a

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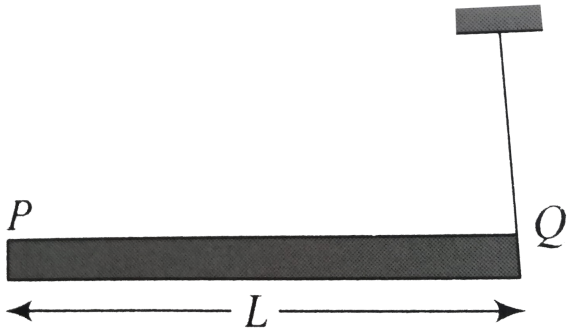
12. A rod PQ of mass M and length L is hinged at end P. The rod is kept horizontal by a massless string tied to point Q as shown in the figure. When string is cut, the initial angular accleration of the rod is.



A. $\frac{3g}{2L}$

B. $\frac{g}{L}$

C. $\frac{2g}{L}$

D. $\frac{2g}{3L}$

Answer: A

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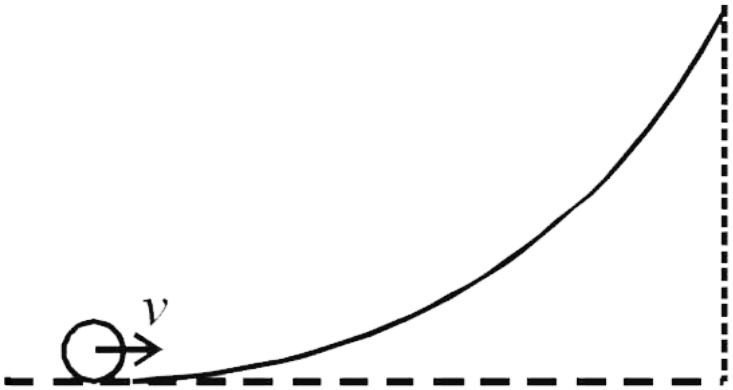
13. A small object of uniform density rolls up a curved surface with an initial velocity v. it reaches up to a maximum height of

`(3v^2)/(4g)



with respect to the initial position. The object is

A. ring

B. solid sphere

C. hollow sphere

D. disc

Answer: d

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

A. a line perpendicular to the plane of rotation

B. the line making an angle of 45° to the plane of rotation

C. the radius

D. the tangent to the orbit

Answer: a

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15. Two persons of masses $55kg$ and $65kg$ respectively are at the opposite ends of a boat. The length of the boat is $3.0m$ and weights $100kg$. The $55kg$ man walks up to the $65kg$ man and sits with him. If the boat is in

still water the centre of mass of the system shifts by.

A. $3m$

B. $2.3m$

C. zero

D. $0.75m$

Answer: c

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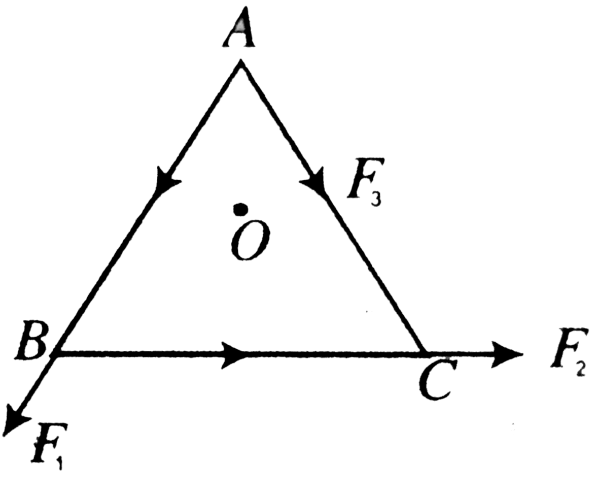
16. O is the centre of an equilateral triangle ABC. F_1, F_2 and F_3 are the three forces acting along the sides AB, BC and AC respectively. What should be the value of F_3 so that the total torque about O is zero?



A. $F_1 + F_2$

B. $F_1 - F_2$

C. $\frac{F_1 + F_2}{2}$

D. $2(F_1 + F_2)$

Answer: A

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17. A particle moves in a circle of radius 5 cm with constant speed and time period $0.2\pi s$. The acceleration of the particle is

A. $25m/s^2$

B. $36m/s^2$

C. $5m/s^2$

D. $15m/s^2$

Answer: c

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18. 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

A. $t = 0.5s$

B. $t = 0.25s$

C. $t = 2s$

D. $t = 1s$

Answer: d

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19. The moment of inertia of a thin uniform rod of mass M and length L about an axis passing through its mid-point and perpendicular to its length isI_0. Its moment of inertia about an axis passing through one of its ends perpendicular to its length is.

A. $I_0 + ML^2/4$

B. $I_0 + 2ML^2$

C. $I_0 + ML^2$

D. $I_0 + ML^2/2$

Answer: a

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20. A circular disc of moment of inertia I_t is rotating in a horizontal plane about its symmetry axis with a constant angular velocity ω_i. Another disc of moment of inertia I_b is dropped co-axially onto the rotating disc. Initially, the second disc has zero angular speed. Eventually, both the discs rotate with a constant angular speed ω_f. Calculate the

energy lost by the initially rotating disc due to friction.

A. $\frac{1}{2}\frac{I_b^2}{(I_t+I_b)}\omega_i^2$

B. $\frac{1}{2}\frac{I_t^2}{(I_t+I_b)}\omega_i^2$

C. $\frac{1}{2}\frac{I_b-I_t}{(I_t+I_b)}\omega_i^2$

D. $\frac{1}{2}\frac{I_bI_t}{(I_t+I_b)}\omega_i^2$

Answer: d

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21. Two particle which are initially at rest move towards each other under the action of their internal attraction. If their speeds are v and $2v$ at any instant, then the speed of centre of mass of the system will be

A. $2v$

B. 0

C. $1.5v$

D. v

Answer: b

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22. A gramphone record is revolving with an angular velocity ω. A coin is placed at a distance R from the centre of the record. The static coefficient of friction is μ. The coin will revolve with the record if

A. $r = \mu g \omega^2$

B. $r < \dfrac{\omega^2}{\mu g}$

C. $r \leq \dfrac{\mu g}{\omega^2}$

D. $r \geq \frac{\mu g}{\omega^2}$

Answer: c

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23. Four identical thin rods each of mass M and length l, from a square frame. Moment of inertia of this frame about an axis through the centre of the square and perpendicular to its plane is

A. $\frac{4}{3}MI^2$

B. $\frac{2}{M}I^2$

C. $\frac{13}{3}MI^2$

D. $\frac{1}{3}MI^2$

Answer: a

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24. Two bodies of mass $1kg$ and $3kg$ have position vectors $\hat{i}+2\hat{j}+\hat{k}$ and $-3\hat{i}-2\hat{j}+\hat{k}$, respectively. The centre of mass of this system has a position vector.

A. $-2\hat{i}+2\hat{k}$

B. $-2\hat{i}-\hat{j}+\hat{k}$

C. $2\hat{i}-\hat{j}-2\hat{k}$

D. $-\hat{i}+\hat{j}+\hat{k}$

Answer: b

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25. A thin circular ring of mass M and radius R is rotating in a horizontal plane about an axis vertical to its plane with a constant

angular velocity ω. If two objects each of mass m be attached gently to the opposite ends of a diameter of the ring, the ring will then rotate with an angular velocity

A. $\frac{\omega(M-2m)}{M+2m}$

B. $\frac{\omega M}{M+2m}$

C. $\frac{\omega(M+2m)}{M}$

D. $\frac{\omega M}{M+m}$

Answer: b

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26. If $\vec{F}$ is the force acting in a particle having position vector $\vec{r}$ and $\vec{\tau}$ be the torque of this force about the origin, then

A. $r.\tau \neq 0$ and $F.\tau = 0$

B. $r.\tau > 0$ and $F.\tau < 0$

C. $r.\tau = 0$ and $F.\tau = 0$

D. $r.\tau = 0$ and $F.\tau \neq 0$

Answer: c

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27. A thin rod of length L and mass M is bent at its midpoint into two halves so that the angle between them is 90°. The moment of inertia of the bent rod about an axis passing through the bending point and perpendicular to the plane defined by the two halves of the rod is.

A. $\frac{ML^2}{24}$

B. $\frac{ML^2}{12}$

C. $\frac{ML^2}{6}$

D. $\frac{\sqrt{2}ML^2}{24}$

Answer: b

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28. The ratio of the radii of gyration of a circular disc to that of a circular ring, each of same mass and radius, around their respective axes is.

A. $\sqrt{3}:\sqrt{2}$

B. $1:\sqrt{2}$

C. $\sqrt{2}:1$

D. $\sqrt{2}:\sqrt{3}$

Answer: b

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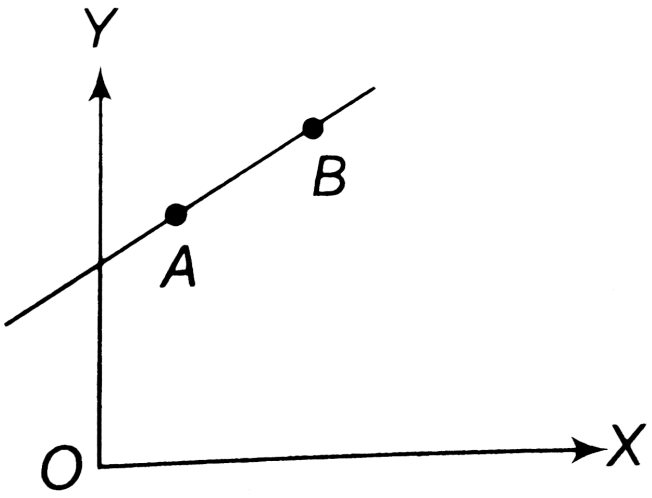
29. A particle of mass m moves in the XY plane with a velocity v along the straight line AB. If the angular momentum of the particle with respect to origin O is L_A when it is at A

and L_B when it is at B, then



A. $L_A > L_B$

B. $L_A = L_B$

C. the relationship between L_A and L_B depends upon the slope of the line AB

D. $L_A < L_B$

Answer: b

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30. A wheel has angular acceleration of $3.0 rad/s^2$ and an initial angular speed of $2.00 rad/s$. In a tine of $2s$ it has rotated through an angle (in radian) of

A. 6

B. 10

C. 12

D. 4

Answer: b

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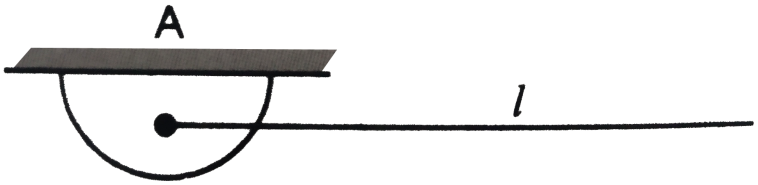
31. A uniform rod of length l and mass m is free to rotate in a vertical plane about A as shown in Fig. The rod initially in horizontal position is released. The initial angular

acceleration of the rod is



A. $\frac{3g}{2l}$

B. $\frac{2l}{3g}$

C. $\frac{3g}{2l^2}$

D. $\mathrm{mg}\frac{l}{2}$

Answer: A

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32. A tube of length L is filled completely with an incomeressible liquid of mass M and closed at both the ends. The tube is then rotated in a horizontal plane about one of its ends with a uniform angular velocity ω. The force exerted by the liquid at the other end is

A. $\frac{ML\omega^2}{2}$

B. $\frac{ML^2\omega}{2}$

C. $ML\omega^2$

D. $\frac{ML^2\omega^2}{2}$

Answer: a

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33. The moment of inertia of a uniform circular disc of radius R and mass M about an axis passing from the edge of the disc and normal to the disc is.

A. $\frac{1}{2}MR^2$

B. MR^2

C. $\frac{7}{2}MR^2$

D. $\frac{3}{2}MR^2$

Answer: d

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34. Two bodies have their moments of inertia I and $2I$ respectively about their axis of rotation. If their kinetic energies of rotation are equal, their angular momenta will be in the ratio.

A. $1:2$

B. $\sqrt{2}:1$

C. $2:1$

D. $1:\sqrt{2}$

Answer: d

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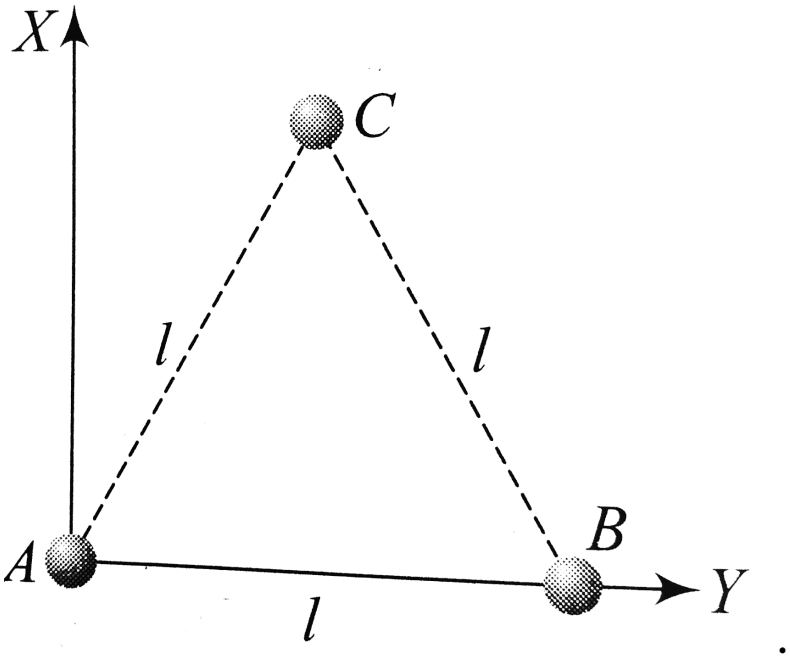
35. Three particles, each of mass m grams situated at the vertices of an equilateral triangle AbC of side I cm (as shown in the figure). The moment of inertia of the system

about a line AX perpendicular to AB and in the plane of ABC, in gram-cm^2 units will be.



A. $\left(\frac{3}{4}\right)ml^2$

B. ml^2

C. $\left(\frac{5}{4}\right)ml^2$

D. $\left(\frac{3}{2}\right)ml^2$

Answer: c

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36. Consider a system of two particles having masses m_1 and m_2. If the particle of mass m_1 is pushed towards the centre of mass of particles through a distance d, by what distance would the particle of mass m_2 move

so as to keep the mass centre of particles at the original position?

A. $\frac{m_1}{m_1 + m_2} d$

B. $\frac{m_1}{m_2} d$

C. d

D. $\frac{m_2}{m_1} d$

Answer: b

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37. A round disc of moment of inertia I_2 about its axis perpendicular to its plane and passing through its centre is placed over another disc of moment of inertia I_1 rotating with an angular velocity ω about the same axis. The final angular velocity of the combination of discs is.

A. $\frac{I_1\omega}{I_1+I_2}$

B. ω

C. $\frac{I_1\omega}{I_1+I_2}$

D. $\frac{(I_1 + I_2)\omega}{I_1}$

Answer: c

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38. The ratio of the radii of gyration of a circular disc about a tangential axis in the plane of the disc and a circular ring of the same radius about a tengential axis in the plane of the ring is

A. $2:3$

B. $2:1$

C. $\sqrt{5}:\sqrt{6}$

D. $1:\sqrt{2}$

Answer: c

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39. A ball rolls without slipping. The radius of gyration of the ball about an axis passing through its centre of mass is k. If radius of the

ball be R, then the fraction of total energy associated with its rotation will be.

A. $\frac{k^2}{k^2 + R^2}$

B. $\frac{R^2}{k^2 + R^2}$

C. $\frac{k^2 + R^2}{R^2}$

D. $\frac{k^2}{R^2}$

Answer: a

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40. A thin circular ring of mass M and radius R is rotating about its axis with a constant angular velocity omega. Four objects each of mass m, are kept gently to the opposite ends of two perpendicular diameters of the ring. The angular velocity of the ring will be

A. $\frac{(M+4m)\omega}{M}$

B. $\frac{(M-4m)\omega}{M+4m}$

C. $\frac{M\omega}{4m}$

D. $\frac{M\omega}{M+4m}$

Answer: d

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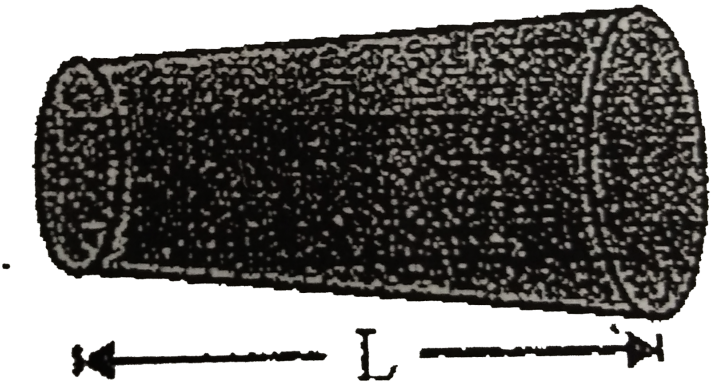
41. A rod of length L is of non uniform cross-section. Its mass per unit length varies linearly with distance from left end. Then its centre of mass from left end is at a distance. (Take linear

density at left end=0).



A. $1.5m$

B. $2m$

C. $2.5m$

D. $3m$

Answer: a

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42. A solid sphere of radius R is placed on a smooth horizontal surface. A horizontal force F is applied at height h from the lowest point. For the maximum acceleration of the centre of mass

A. $h = R$

B. $h = 2R$

C. $h = 0$

D. the acceleration will be same whatever h may be

Answer: d

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43. A circular disc is to be made by using iron and aluminium, so that it acquires maximum moment of inertia about its geometrical axis. It is possible with

A. aluminimum is at the interior and iron surrounds it

B. iron is at the interior and aluminimum surrrounds it

C. aluminium and iron layers are in alternate order

D. sheet of iron is used at both external surfaces and aluminium sheet as inner material

Answer: a

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44. A disc is rotating with angular velocity ω. If a child sits on it, what is conserved?

A. Linear momentum

B. Angular momentum

C. kinetic energy

D. Moment of inertia

Answer: b

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45. A wheel of bicycle is rolling without slipping on a level road. The velocity of the centre of mass is v_{CM}, then true statement is

A. The velocity of point A is $2v_{CM}$ and velocity of point B is zero

B. The velocity of point A is zero and velocity of point B is $2v_{CM}$

C. The velocity of point A is $2v_{CM}$ and velocity of point B is $-v_{CM}$

D. The velocities of both A and V are v_{CM}

Answer: a

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46. A particle of mass M is revolving along a circule of radius R and nother particle of mass m is recolving in a circle of radius r. If time

periods of both particles are same, then the ratio of their angular velocities is

A. 1

B. $\frac{R}{r}$

C. $\frac{r}{R}$

D. $\sqrt{\frac{R}{r}}$

Answer: a

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47. ABC is a right angled triangular plate of uniform thickness. The sides are such that $AB > BC$ as shown in figure. I_1, I_2, I_3 are moments of inertia about AB, BC and AC respectively. Then which of the following relations is correct?

A. $I_1 = I_2 = I_3$

B. $I_2 > I_1 > I_3$

C. $I_3 < I_2 < I_1$

D. $I_3 > I_1 > I_2$

Answer: b

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48. Three identical metal balls each of radius r are placed touching each other on a horizontal surface such that an equilateral triangle is formed, when the center of three balls are joined. The center of mass of system is located at the

A. horizontal surface

B. centre of one of the balls

C. line joining the centres of any two balls

D. point of intersection of the medians

Answer: d

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49. The moment of inertia of a disc of mass M and radius R about a tangent to its rim in its plane is

A. $\frac{2}{3}MR^2$

B. $\frac{3}{2}MR^2$

C. $\frac{4}{5}MR^2$

D. $\frac{5}{4}MR^2$

Answer: d

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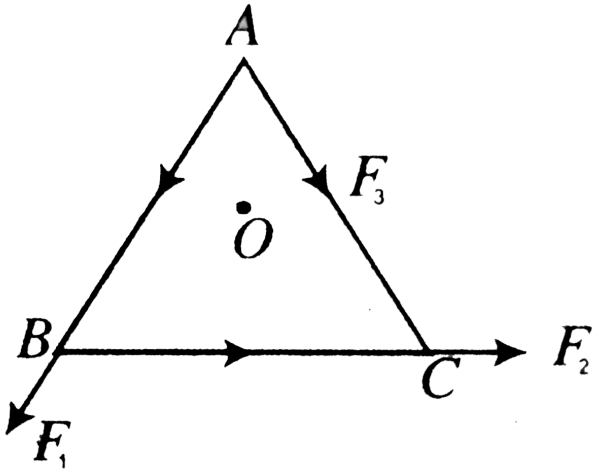
50. O is the centre of an equilateral triangle ABC. F_1, F_2 and F_3 are the three forces acting along the sides AB, BC and AC

respectively. What should be the value of F_3 so that the total torque about O is zero?



A. $\frac{(F_1 + F_2)}{2}$

B. $(F_1 - F_2)$

C. $(F_1 + F_2)$

D. $2(F_1 + F_2)$

Answer: c

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51. A ball of mass $0.25kg$ attached to the end of a string of length $1.96m$ moving in a horizontal circle. The string will break if the tension is more than $25N$. What is the maximum speed with which the ball can be moved.

A. $14m/s$

B. $3m/s$

C. $3.92m/s$

D. $5m/s$

Answer: a

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52. A couple produces.

A. no motion

B. linear and rorarional motion

C. purely rotational motion

D. purely linear motion

Answer: c

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53. A cart of mass M is tied to one end of a massless rope of length $10m$. The other end of the rope is in the hands of a man of mass M. The entire system is on a smooth horizontal surface. The man is at $x = 0$ and the cart at

$x = 10m$. If the man pulls the cart by the rope, the man and the cart will meet at the point

A. they will never meet

B. $x = 10m$

C. $x = 5m$

D. $x = 0$

Answer: c

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54. In a carbon monoxide molecule, the carbon and the oxygen atoms are separated by a distance $1.2 \times 10^{-10} m$. The distance of the centre of mass from the carbon atom is

A. $0.64 \times 10^{-10} m$

B. $0.56 \times 10^{-10} m$

C. $0.51 \times 10^{-10} m$

D. $0.48 \times 10^{-10} m$

Answer: a

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55. If a flywheel makes $120 \ \mathrm{rev}/\mathrm{min}$, then its angular speed will be

A. $8\pi \ \mathrm{rad}/s$

B. $6\pi \ \mathrm{rad}/s$

C. $4\pi \ \mathrm{rad}/s$

D. $2\pi \ \mathrm{rad}/s$

Answer: c

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56. The angular momentum of a body with mass (m) moment of inertia (I) and angular velocity (ω) rad/s is equal to

A. $I\omega$

B. $I\omega^2$

C. $\frac{I}{\omega}$

D. $\frac{1}{\omega^2}$

Answer: a

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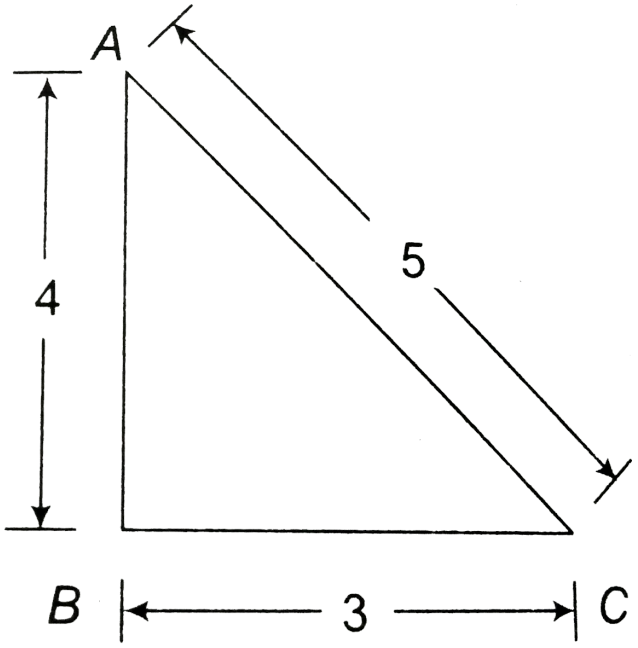
57. ABC is a traiangular plate of uniform thickness. The sides are in the ratio shown in the figure. I_{AB}, I_{BC} and I_{CA} are the moments of inertia of the plate about AB, BC and CA repectively. Which one of the following relations is correct?



A. $I_{AB} > I_{BC}$

B. $I_{BC} > I_{AC}$

C. $I_{AB} + I_{BC} = I_{CA}$

D. I_{CA} is maximum

Answer: B

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58. The angular speed of an engine wheel making $90 \ \text{rev}/\text{min}$ is

A. $1.5\pi \ \text{rad}/s$

B. $3\pi \ \text{rad}/s$

C. $4.5\pi \ \text{rad}/s$

D. $6\pi \ \text{rad}/s$

Answer: b

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59. Two racing cars of masses m and $4m$ are moving in circles of radii r and $2r$ respectively. If their speeds are such that each makes a

complete circle in the same time, then the ratio of the angular speeds of the first to the second car is

A. $8:1$

B. $4:1$

C. $2:1$

D. $1:1$

Answer: d

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60. If a spherical ball rolls on a table without slipping, the fraction of its total energy associated with rotation is

A. $\frac{2}{5}$

B. $\frac{2}{7}$

C. $\frac{3}{5}$

D. $\frac{3}{7}$

Answer: b

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61. A thin uniform circular ring is rolling down an inclined plane of inclination 30° without slipping. Its linear acceleration along the inclined plane will be

A. $\frac{g}{2}$

B. $\frac{g}{3}$

C. $\frac{g}{4}$

D. $\frac{2g}{3}$

Answer: c

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62. Angular momentum is

A. vector (axial)

B. vector (polar)

C. scalar

D. None of these

Answer: a

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63. In a rectangle $ABCD(BC = 2AB)$. The moment of inertia is minimum along axis through

A. BC

B. BD

C. HF

D. EG

Answer: d

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64. A solid sphere, disc and solid cylinder, all of the same mass, are allowed to roll down (from rest) on inclined plane, them

A. solid sphere reaches the bottom first

B. solid sphere reaches the bottom last

C. disc will reach the bottom first

D. all reach the bottom at the same time

Answer: a

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65. The speed of a homogeneous solid sphere after rolling down an inclined plane of vertical height h from rest without slipping will be.

A. $\sqrt{\frac{10}{7}gh}$

B. $\sqrt{gh}$

C. $\sqrt{\frac{6}{5}gh}$

D. $\sqrt{\frac{4}{3}gh}$

Answer: a

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66. A particle of mass $m = 5kg$ is moving with a uniform speed $v = 3\sqrt{2}$ in the XOY plane along the line $Y = X + 4$. The magnitude of the angular momentum of the particle about the origin is

A. 60 unit

B. $40\sqrt{2}$ unit

C. zero

D. 7.5 unit

Answer: a

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67. If a sphere is rolling, the ratio of the translation energy to total kinetic energy is given by

A. $7:10$

B. $2:5$

C. $10:7$

D. $5:7$

Answer: d

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68. The moment of inertia of a body about a given axis is $1.2kgm^2$. Initially, the body is at rest. In order to produce a rotational KE of $1500J$, for how much duration, an acceleration of $25radds^{-2}$ must be applied about that axis ?

A. $4s$

B. $2s$

C. $8s$

D. $10s$

Answer: b

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69. Moment of inertia of a uniform circular disc about a diameter is I. Its moment of inertia about an axis perpendicular to its plane and passing through a point on its rim will be.

A. $5l$

B. $3l$

C. $6l$

D. $4l$

Answer: c

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70. A fly wheel rotating about a fixed axis has a kinetic energy of $360J$. When its angular

speed is $30 rads^{-1}$. The moment of inertia of the wheel about the axis of rotation is

A. $0.6kg - m^2$

B. $0.15kg - m^2$

C. $0.8kg - m^2$

D. $0.7.5kg - m^2$

Answer: c

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71. At any instant, a rolling body may be considered to be in pure rotation about an axis through the point of contact. This axis is translating forward with speed

A. equal to centre of mass

B. zero

C. twice of centre of mass

D. None of the above

Answer: a

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72. A solid cylinder of mass M and radius R rolls down an inclined plane of height h without slipping. The speed of its centre when it reaches the bottom is.

A. $\sqrt{2gh}$

B. $\sqrt{\frac{4gh}{3}}$

C. $\sqrt{\frac{3gh}{4}}$

D. $\sqrt{\frac{4g}{h}}$

Answer: b

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73. A ring of mass m and radius r rotates about an axis passing through its centre and perpendicular to its plane with angular velocity ω. Its kinetic energy is

A. $\frac{1}{2}mr^2\omega^2$

B. $mr\omega^2$

C. $mr^2\omega^2$

D. $\frac{1}{3}mr^2\omega^2$

Answer: a

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74. A solid homogeneous sphere is moving on a rough horizontal surface, partly rolling and partly sliding. During the king of motion of the sphere.

A. total kinetic energy is conserved

B. the angular momentum of the sphere about the point contact with the plane is conserved

C. only the rotational kinetic energy about the centre of mass is conserved

D. angular momentum about the centre of mass is conserved

Answer: b

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