

NEET SYSTEM OF PARTICLES AND ROTATIONAL MOTION — CONSERVATION OF ANGULAR MOMENTUM — PYQS

Max. Marks: 56
Questions: 14

Section A (MCQ) — 14 questions

Q.1 The Sun rotates around its centre once in 27 days. What will be the period of revolution if the Sun were to expand to twice its present radius without any external influence? Assume the Sun to be a sphere of uniform density. [NEET (UG) 2025]

- (1) 115 days (2) 108 days
(3) 100 days (4) 105 days

Scan or tap for the
full solution



Q.2 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? [NEET 2018]

- (1) Angular velocity
(2) Moment of inertia
(3) Rotational kinetic energy
(4) Angular momentum

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full solution



Q.3 Two discs of same moment of inertia rotating about 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 face coinciding the axis of rotation. The expression for loss of energy during this process is [NEET 2017]

- (1) $\frac{1}{4}I(\omega_1 - \omega_2)^2$ (2) $I(\omega_1 - \omega_2)^2$
(3) $\frac{1}{8}I(\omega_1 - \omega_2)^2$ (4) $\frac{1}{2}I(\omega_1 + \omega_2)^2$

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full solution



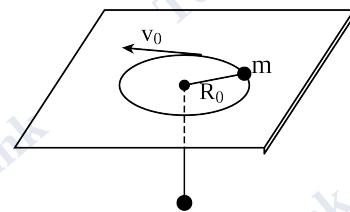
Q.4 A force $\vec{F} = \alpha\hat{i} + 3\hat{j} + 6\hat{k}$ is acting at a point $\vec{r} = 2\hat{i} - 6\hat{j} - 12\hat{k}$. The value of α for which angular momentum about origin is conserved is [AIPMT 2015]

- (1) zero (2) 1 (3) -1 (4) 2

Scan or tap for the
full solution



Q.5 A mass m moves in a circle on a smooth horizontal plane with velocity v_0 at a radius R_0 . The mass is attached to a string which passes through a smooth hole in the plane as shown. The tension in the string is increased gradually and finally m moves in a circle of radius $\frac{R_0}{2}$.



The final value of the kinetic energy is

[AIPMT 2015 (Cancelled)]

- (1) $2mv_0^2$ (2) $\frac{1}{2}mv_0^2$ (3) mv_0^2 (4) $\frac{1}{4}mv_0^2$

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full solution



Q.6 Two discs are rotating about their axes, normal to the discs and passing through the centres of the discs. Disc D_1 has 2 kg mass and 0.2 m radius and initial angular velocity of 50 rad s^{-1} . Disc D_2 has 4 kg mass, 0.1 m radius and initial angular velocity of 200 rad s^{-1} . The two discs are brought in contact face to face, with their axes of rotation coincident. The final angular velocity (in rad s^{-1}) of the system is [NEET 2013 (Karnataka)]

- (1) 60 (2) 100 (3) 120 (4) 40

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full solution



Q.7 A circular platform is mounted on a frictionless vertical axle. Its radius $R = 2 \text{ m}$ and its moment of inertia about the axle is 200 kg m^2 . It is initially at rest. A 50 kg man stands on the edge of the platform and begins to walk along the edge at the speed of 1 m s^{-1} relative to the ground. Time taken by the man to complete one revolution is [AIPMT 2012 (Mains)]

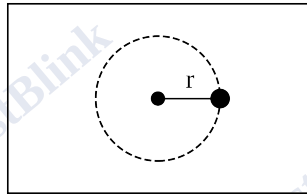
- (1) $\pi \text{ s}$ (2) $\frac{3\pi}{2} \text{ s}$ (3) $2\pi \text{ s}$ (4) $\frac{\pi}{2} \text{ s}$

Scan or tap for the
full solution



- Q.8** A small mass attached to a string rotates on a frictionless table top as shown. If the tension in the string is increased by pulling the string causing the radius of the circular motion to decrease by a factor of 2, the kinetic energy of the mass will

[AIPMT 2011 (Mains)]



- (1) decrease by a factor of 2
- (2) remain constant
- (3) increase by a factor of 2
- (4) increase by a factor of 4

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- Q.9** A thin circular ring of mass M and radius r is rotating about its axis with constant angular velocity ω . Two objects each of mass m are attached gently to the opposite ends of a diameter of the ring. The ring now rotates with angular velocity given by

[AIPMT 2010 (Mains)]

- (1) $\frac{(M+2m)\omega}{2m}$
- (2) $\frac{2M\omega}{M+2m}$
- (3) $\frac{(M+2m)\omega}{M}$
- (4) $\frac{M\omega}{M+2m}$

Scan or tap for the full solution



- Q.10** A circular disk of moment of inertia I_t is rotating in a horizontal plane, about its symmetry axis, with a constant angular speed ω_i . Another disk of moment of inertia I_b is dropped coaxially onto the rotating disk. Initially the second disk has zero angular speed. Eventually both the disks rotate with a constant angular speed ω . The energy lost by the initially rotating disc to friction is

[AIPMT 2010 (Prelims)]

- (1) $\frac{1}{2} \frac{I_b^2}{(I_t + I_b)} \omega_i^2$
- (2) $\frac{1}{2} \frac{I_t^2}{(I_t + I_b)} \omega_i^2$
- (3) $\frac{I_b - I_t}{(I_t + I_b)} \omega_i^2$
- (4) $\frac{1}{2} \frac{I_b I_t}{(I_t + I_b)} \omega_i^2$

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- Q.11** 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

[AIPMT 2009]

- (1) $\frac{\omega M}{M+2m}$
- (2) $\frac{\omega(M+2m)}{M}$
- (3) $\frac{\omega M}{M+m}$
- (4) $\frac{\omega(M-2m)}{M+2m}$

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- Q.12** 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

[AIPMT 2004]

- (1) $\frac{I_2 \omega}{I_1 + I_2}$
- (2) ω
- (3) $\frac{I_1 \omega}{I_1 + I_2}$
- (4) $\frac{(I_1 + I_2) \omega}{I_1}$

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- Q.13** A thin circular ring of mass M and radius r is rotating about its axis with a constant angular velocity ω . 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 :

[AIPMT 2003]

- (1) $\frac{M\omega}{4m}$
- (2) $\frac{M\omega}{M+4m}$
- (3) $\frac{(M+4m)\omega}{M}$
- (4) $\frac{(M-4m)\omega}{M+4m}$

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- Q.14** A disc is rotating with angular speed ω . If a child sits on it, what is conserved

[AIPMT 2002]

- (1) linear momentum
- (2) angular momentum
- (3) kinetic energy
- (4) potential energy

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ANSWER KEY

Ques.	1	2	3	4	5	6	7	8	9	10	11
Ans.	2	4	1	3	1	2	3	4	4	4	1
Ques.	12	13	14								
Ans.	3	2	2								