

PYQSide

JEE MAIN SYSTEM OF PARTICLES AND ROTATIONAL MOTION — MOMENT OF INERTIA AND RADIUS OF GYRATION — PYQS

Max. Marks: 28

Questions: 7

Section A (MCQ)

- Q.1** A solid sphere of mass M and radius R is divided into two unequal parts. The smaller part having mass $M/8$ is converted into a sphere of radius r and the larger part is converted into a circular disc of thickness t and radius $2R$. If I_1 is moment of inertia of a sphere having radius r about an axis through its centre and I_2 is the moment of inertia of a disc about its diameter, the ratio of their moment of inertia $I_2/I_1 = \underline{\hspace{2cm}}$.

[JEE Main 2026 (Online) 4th April Morning Shift]

- (1) 35 (2) 70 (3) 140 (4) 210

Scan or tap for the
full solution



- Q.2** Two small balls with masses m and $2m$ are attached to both ends of a rigid rod of length d and negligible mass. If angular momentum of this system is L about an axis (A) passing through its centre of mass and perpendicular to the rod then angular velocity of the system about A is :

[JEE Main 2026 (Online) 23rd January Morning Shift]

- (1) $\frac{4}{3} \frac{L}{md^2}$ (2) $\frac{3}{2} \frac{L}{md^2}$ (3) $\frac{2L}{5md^2}$ (4) $\frac{2L}{md^2}$

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- Q.3** A rod of linear mass density ' λ ' and length ' L ' is bent to form a ring of radius ' R '. Moment of inertia of ring about any of its diameters is:

[JEE Main 2025 (Online) 8th April Evening Shift]

- (1) $\frac{\lambda L^3}{8\pi^2}$ (2) $\frac{\lambda L^3}{16\pi^2}$ (3) $\frac{\lambda L^3}{4\pi^2}$ (4) $\frac{\lambda L^3}{12}$

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- Q.4** Moment of inertia of a rod of mass ' M ' and length ' L ' about an axis passing through its center and normal to its length is ' α '. Now the rod is cut into two equal parts and these parts are joined symmetrically to form a cross shape. Moment of inertia of cross about an axis passing through its center and normal to plane containing cross is :

[JEE Main 2025 (Online) 2nd April Morning Shift]

- (1) $\alpha/4$ (2) $\alpha/8$ (3) α (4) $\alpha/2$

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Section B (Numerical)

- Q.5** A uniform solid cylinder of length L and radius R has moment of inertia about its axis equal to I_1 . A small concentric cylinder of length $L/2$ and radius $R/3$ carved from this cylinder has moment of inertia about its axis equal to I_2 . The ratio I_1/I_2 is _____.

[JEE Main 2026 (Online) 24th January Evening Shift]

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- Q.6** A circular disc has radius R_1 and thickness T_1 . Another circular disc made of the same material has radius R_2 and thickness T_2 . If the moments of inertia of both discs are the same and $\frac{R_1}{R_2} = 2$ then $\frac{T_1}{T_2} = \frac{1}{\alpha}$. The value of α is _____.

[JEE Main 2026 (Online) 22nd January Morning Shift]

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- Q.7** Two iron solid discs of negligible thickness have radii R_1 and R_2 and moment of inertia I_1 and I_2 , respectively. For $R_2 = 2R_1$, the ratio of I_1 and I_2 would be $1/x$, where $x = \underline{\hspace{2cm}}$.

[JEE Main 2025 (Online) 28th January Morning Shift]

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ANSWER KEY

Section A (MCQ)

Ques.	1	2	3	4						
Ans.	2	2	1	1						

Section B (Numerical)

Ques.	5	6	7				
Ans.	162	16	16				