

JEE MAIN LAWS OF MOTION — DYNAMICS OF CIRCULAR MOTION (BANKING OF ROADS, CONICAL PENDULUM) — PYQS

Max. Marks: 24

Questions: 6

Section A (MCQ) — 4 questions

- Q.1** A car moving with a speed of 54 km/h takes a turn of radius 20 m. A simple pendulum is suspended from the ceiling of the car. Determine the angle made by the string of the pendulum with the vertical during the turning. (Take $g = 10 \text{ m/s}^2$)

[JEE Main 2026 (Online) 8th April Evening Shift]

- (1) $\tan^{-1}(0.5)$ (2) $\tan^{-1}(0.75)$
(3) $\tan^{-1}(1.125)$ (4) $\tan^{-1}(0.25)$

 Scan or tap for the
full solution


- Q.2** A 0.5 kg mass is in contact against the inner wall of a cylindrical drum of radius 4 m rotating about its vertical axis. The minimum rotational speed of the drum to enable the mass to remain stuck to the wall (without falling) is 5 rad/s. The coefficient of friction between the drum's inner wall surface and mass is _____. (Take $g = 10 \text{ m/s}^2$)

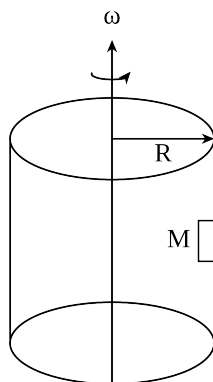
[JEE Main 2026 (Online) 2nd April Evening Shift]

- (1) 0.1 (2) 0.5 (3) 0.7 (4) 0.3

 Scan or tap for the
full solution


- Q.3** A large drum having radius R is spinning around its axis with angular velocity ω , as shown in figure. The minimum value of ω so that a body of mass M remains stuck to the inner wall of the drum, taking the coefficient of friction between the drum surface and mass M as μ , is :

[JEE Main 2026 (Online) 21st January Evening Shift]



- (1) $\sqrt{\frac{2g}{\mu R}}$ (2) $\sqrt{\frac{g}{2\mu R}}$
(3) $\sqrt{\frac{\mu g}{R}}$ (4) $\sqrt{\frac{g}{\mu R}}$

 Scan or tap for the
full solution

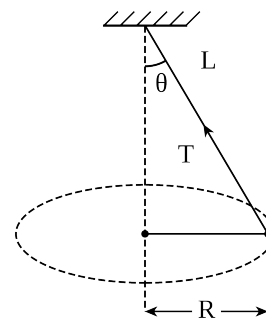

- Q.4** A car of mass ' m ' moves on a banked road having radius ' r ' and banking angle θ . To avoid slipping from banked road, the maximum permissible speed of the car is v_0 . The coefficient of friction μ between the wheels of the car and the banked road is

[JEE Main 2025 (Online) 24th January Morning Shift]

- (1) $\mu = \frac{v_0^2 + rg \tan \theta}{rg + v_0^2 \tan \theta}$ (2) $\mu = \frac{v_0^2 - rg \tan \theta}{rg - v_0^2 \tan \theta}$
(3) $\mu = \frac{v_0^2 - rg \tan \theta}{rg + v_0^2 \tan \theta}$ (4) $\mu = \frac{v_0^2 + rg \tan \theta}{rg - v_0^2 \tan \theta}$

 Scan or tap for the
full solution


Section B (Numerical) — 2 questions

Q.5

A string of length L is fixed at one end and carries a mass of M at the other end. The mass makes $\left(\frac{3}{\pi}\right)$ rotations per second about the vertical axis passing through end of the string as shown. The tension in the string is _____ ML .

[JEE Main 2025 (Online) 24th January Evening Shift]

 Scan or tap for the
full solution


- Q.6** A tube of length 1 m is filled completely with an ideal liquid of mass $2M$, and closed at both ends. The tube is rotated uniformly in horizontal plane about one of its ends. If the force exerted by the liquid at the other end is F then angular velocity of the tube is $\sqrt{\frac{F}{\alpha M}}$ in SI unit. The value of α is _____.

[JEE Main 2025 (Online) 22nd January Evening Shift]

Scan or tap for the
full solution



ANSWER KEY

Section A (MCQ) — 4 questions

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

Section B (Numerical) — 2 questions

Ques.	5	6									
Ans.	36	1									