

Laws of Motion

NEET previous year questions · Physics

4 questions from the official papers: NEET 2026 (2), Re-NEET 2026 (1), NEET 2020 (1). Each is followed by its answer and a worked solution written by BrainIt. Generated on 23 October 2026.



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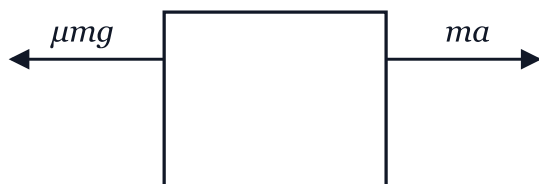
1. NEET 2026 · Q11

A box of mass 15 kg is kept on the floor of a stationary trolley. The coefficient of static friction between the box and the trolley is 0.12. Keeping the box in stationary state over the trolley, the maximum acceleration with which the trolley can be moved horizontally in m s^{-2} is: ($g = 10 \text{ m/s}^2$)

- (1) 2.1 (2) 1.8 (3) 1.5 (4) 1.2

Answer (4)

Sol. The box stays with the trolley only while static friction can supply the force needed to accelerate it. The maximum friction is μmg , so the greatest common acceleration is $a = \mu g = 0.12 \times 10 = 1.2 \text{ m/s}^2$, option (4). The mass cancels out, and beyond this acceleration the box slips relative to the trolley.



2. NEET 2026 · Q22

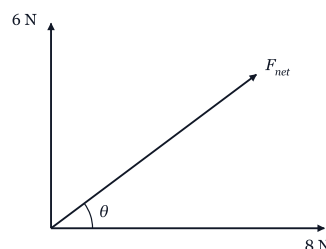
The magnitude and direction of the acceleration produced in a body of mass 5 kg when two mutually perpendicular forces 8 N and 6 N act on it, are respectively:

- (1) 20 m s^{-2} ; $\tan^{-1}(4/3)$ with 8 N force
 (2) 2 m s^{-2} ; $\tan^{-1}(3/4)$ with 6 N force
 (3) 2 m s^{-2} ; $\tan^{-1}(4/3)$ with 8 N force
 (4) 2 m s^{-2} ; $\tan^{-1}(3/4)$ with 8 N force

Answer (4)

Sol. The two perpendicular forces give a resultant $F = \sqrt{8^2 + 6^2} = 10 \text{ N}$, so $a = F/m = 10/5 = 2 \text{ m s}^{-2}$. The resultant makes an angle θ with the 8 N force where $\tan \theta = 6/8 = 3/4$, i.e. $\tan^{-1}(3/4)$ measured

from the 8 N force (option (4)). Option (1) forgets to divide by the mass, and the others attach the angle to the wrong force or invert the ratio.



3. Re-NEET 2026 · Q41

A car travels on a circular racetrack of radius 50 m, which is banked at an angle θ . If the car travels at a speed 10 ms^{-1} , then the wear and tear on its tyres is minimum. Taking the acceleration due to gravity to be 10 ms^{-2} , the value of θ is:

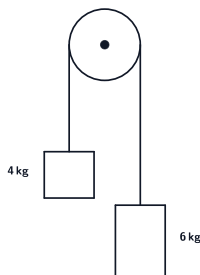
- (1) $\tan^{-1}(\frac{1}{5})$ (2) $\tan^{-1}(\frac{2}{5})$
 (3) $\tan^{-1}(\sqrt{3}/2)$ (4) $\tan^{-1}(2\sqrt{3})$

Answer (1)

Sol. Minimum wear and tear is the exam's way of saying no sideways friction is needed, i.e. the car is at the optimum (design) speed of the banked track. Then the horizontal component of the normal reaction alone supplies the centripetal force, giving $\tan \theta = \frac{v^2}{rg} = \frac{10^2}{50 \times 10} = \frac{1}{5}$, so $\theta = \tan^{-1}(1/5)$. NCERT Class 11, Laws of Motion (motion on a banked road).

4. NEET 2020 · Q156

Two bodies of mass 4 kg and 6 kg are tied to the ends of a massless string. The string passes over a pulley which is frictionless (see figure). The acceleration of the system in terms of acceleration due to gravity (g) is



- (1) $g/2$ (2) $g/5$ (3) $g/10$ (4) g

Answer (2)

Sol. For a system of two masses m_1 and m_2 connected by a massless string over a frictionless pulley, the acceleration a is given by $a = \frac{(m_2 - m_1)g}{m_1 + m_2}$. Substituting $m_1 = 4 \text{ kg}$ and $m_2 = 6 \text{ kg}$, $a = \frac{(6 - 4)g}{4 + 6} = \frac{2g}{10} = \frac{g}{5}$.

Chapter: Laws of Motion.

Why the other options are wrong:

- (1) $g/2$: this divides the net pull $(6 - 4)g = 2g$ by the 4 kg block alone, but both blocks accelerate together, so the full 10 kg must be used.
- (3) $g/10$: this takes the net pull as g , but the unbalanced weight is $(6 - 4)g = 2g$, which gives twice that.
- (4) g : this is free fall. The 4 kg block's weight pulls back against the 6 kg block and the net pull moves all 10 kg, so a must be less than g .

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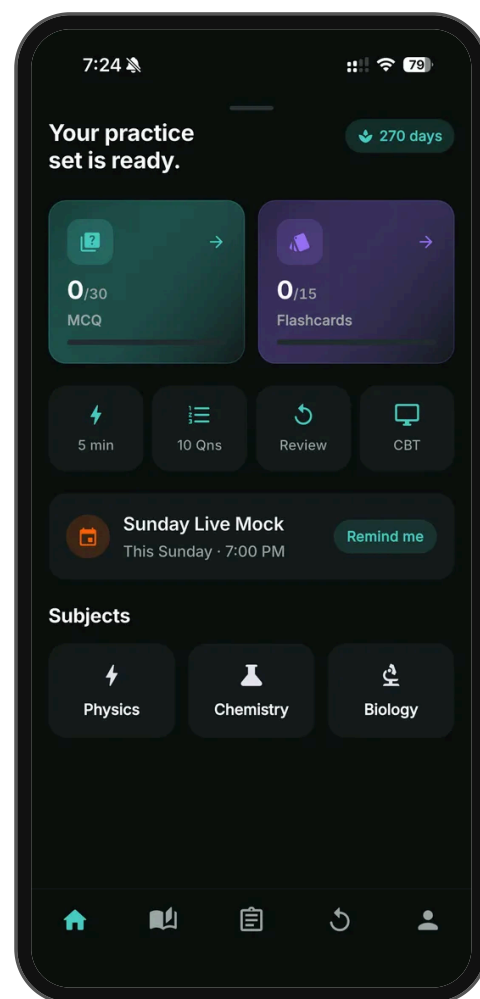
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