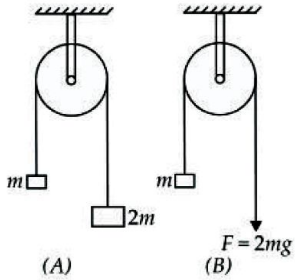
AVIRAL CLASSES
IIT-JEE | NEET | FOUNDATIONS

PHYSICS
CRASH COURSE

LECTURE - 04

TOPICS : Newton's Law of Motion

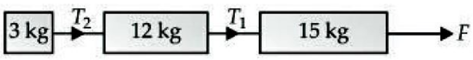
1. Two pulley arrangements (A) and (B) are as shown in the figure. Neglect the masses of the ropes and pulleys and the friction at the axle of the pulleys. The ratio of the acceleration of mass m in arrangement (A) to that in arrangement (B) is



(a) 1 : 1 (b) 1 : 2

(c) 1 : 3 (d) 2 : 15

2. If the surfaces shown in figure are frictionless, the ratio of T_1 and T_2 is



(a) $\sqrt{3}:2$ (b) $1:\sqrt{3}$

(c) 1 : 15 (d) 5 : 1

3. A body of mass 10 kg is acted upon by two perpendicular forces, 6 N and 8 N. The resultant acceleration of the body is

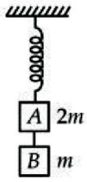
(a) 1 ms^{-2} at an angle of $\tan^{-1}\left(\frac{3}{4}\right)$ w.r.t 8 N force

(b) 0.2 ms^{-2} at an angle of $\tan^{-1}\left(\frac{3}{4}\right)$ w.r.t 8 N force

(c) 1 ms^{-2} at an angle of $\tan^{-1}\left(\frac{5}{4}\right)$ w.r.t 8 N force

(d) 0.2 ms^{-2} at an angle of $\tan^{-1}\left(\frac{5}{4}\right)$ w.r.t 8 N force

4. Two blocks A and B of masses 2 m and m, respectively are connected by a massless and inextensible string. The whole system is suspended by a massless spring as shown in the figure. The magnitudes of acceleration A and B immediately after the string is cut, are respectively



(a) $g, \frac{g}{2}$ (b) $\frac{g}{2}, g$

(c) g,g (d) $\frac{g}{2}, \frac{g}{2}$

5. A block of mass 10 kg is placed on rough horizontal surface whose coefficient of friction is 0.5. If a horizontal force of 100 N is applied on it, then acceleration of block will be [Take g = 10 ms^{-2}]

(a) 10 ms^{-2} (b) 5 ms^{-2}

(c) 15 ms^{-2} (d) 0.5 ms^{-2}

6. A gramophone record is revolving with 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) $r < \frac{\omega^2}{\mu g}$

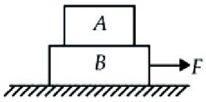
(c) $r \le \frac{\mu g}{\omega^2}$ (d) $r \ge \frac{\mu g}{\omega^2}$

7. A person of mass 50 kg stands on a weighing scale on a lift. If th e lift is descending with a downward acceleration of 9 ms^{-2}, what would be the reading of the weighing scale ? [Take g = 10 ms^{-2}]

(a) 50 kg (b) 5 kg

(c) 95 kg (d) 100 kg

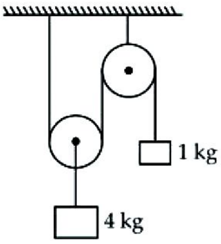
8. In figure, the coefficient of friction between the floor and the block B is 0.1 The coefficient of friction between the blocks B and A is 0.2. The mass of A is m/2 and of B is m. What is the maximum horizontal force F can be applied to the block B so that two blocks move together ?



(a) 0.15 mg (b) 0.05 mg

(c) 0.1 mg (d) 0.45 mg

9. In the system shown in the adjoinig figure, the acceleration of 1 kg mass is



(a) $\frac{g}{4}$downward (b) $\frac{g}{2}$downward

(c) $\frac{g}{2}$upwards (d) $\frac{g}{4}$upwards

10. Three blocks of masses m_1, m_2 and m_3 are placed in contact with each other on a frictionless table. A force F is applied on the heaviest mass m_1, the acceleration of m_3 will be

(a) $\frac{F}{m_1}$ (b) $\frac{F}{m_1+m_2}$

(c) $\frac{F}{m_2+m_3}$ (d) $\frac{F}{m_1+m_2+m_3}$

11. The rear side of a truck is open and a box of mass 20 kg is placed on the truck 4 m away from the open end. The coefficient of friction between the box and the surface is 0.15. The truck starts from rest with an acceleration of 2 m s^{-2} on a straight road. The box will fall off the truck when it is at a distance from the starting point equal to

(a) 4 m (b) 8 m

(c) 16 m (d) 32 m