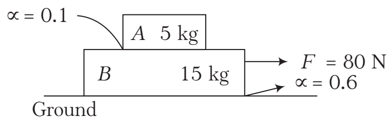
24 Find the value of friction forces between the blocks A and B; and between B and ground. (Take, $g = 10\ \text{ms}^{-2}$)

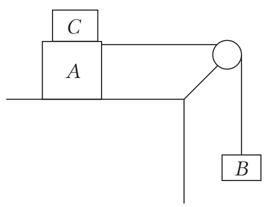


(a) 90 N, 5 N (b) 5 N, 90 N (c) 5 N, 75 N (d) 0 N, 80 N

25 A block of mass 5 kg is kept on a horizontal floor having coefficient of friction 0.09. Two mutually perpendicular horizontal forces of 3 N and 4 N act on this block. The acceleration of the block is (Take, $g = 10\ \text{ms}^{-2}$)

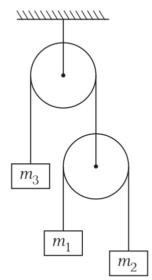
(a) zero (b) $0.1\ \text{ms}^{-2}$ (c) $0.2\ \text{ms}^{-2}$ (d) $0.3\ \text{ms}^{-2}$

26 Two masses A and B of 10 kg and 5 kg respectively are connected with a string passing over a frictionless pulley fixed at the corner of a table as shown in figure. The coefficient of friction of A with the table is 0.2. The minimum mass of C that may be placed on A to prevent it from moving is equal to



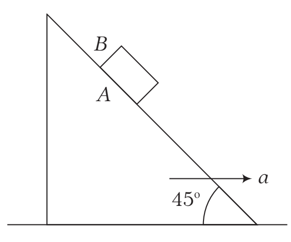
(a) 15 kg
(b) 10 kg
(c) 5 kg
(d) 20 kg

27 In the figure, pulleys are smooth and strings are massless, $m_1 = 1\text{kg}$ and $m_2 = \frac{1}{3}$ kg. To keep m_3 at rest, mass m_3 should be



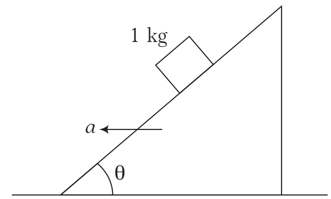
(a) 1 kg
(b) $\frac{2}{3}$ kg
(c) $\frac{1}{4}$ kg
(d) 2 kg

28 If the coefficient of friction between A and B is $\propto$, the maximum acceleration of the wedge A for which B will remain at rest with respect to the wedge is



(a) $\propto g$ (b) $g\left(\frac{1+\propto}{1-\propto}\right)$ (c) $g\left(\frac{1-\propto}{1+\propto}\right)$ (d) $\frac{g}{\propto}$

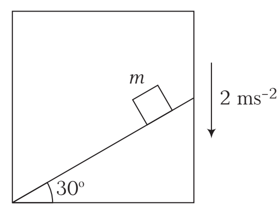
29 A block of mass 1 kg is at rest relative to a smooth wedge moving leftwards with constant acceleration $a = 5\ \text{ms}^{-2}$.



Let N be the normal reaction between the block and the wedge. Then, (Take, $g = 10\ \text{ms}^{-2}$)

(a) $N = 5\sqrt{5}$ N
(b) $N = 15$ N
(c) $\tan\theta = \frac{1}{3}$
(d) $\tan\theta = 2$

30 A block of mass m is kept on an inclined plane of a lift moving down with acceleration of $2\ \text{ms}^{-2}$. What should be the coefficient of friction to let the block move down with constant velocity relative to lift?



(a) $\propto = \frac{1}{\sqrt{3}}$ (b) $\propto = 0.4$ (c) $\propto = 0.8$ (d) $\propto = \frac{\sqrt{3}}{2}$

31 Two blocks of mass 5 kg and 3 kg are attached to the ends of a string passing over a smooth pulley fixed to the ceiling of an elevator. The elevator is accelerated upwards. If the acceleration of the blocks is $\frac{9}{32}g$, the acceleration of the elevator is

(a) $\frac{g}{3}$ (b) $\frac{g}{4}$ (c) $\frac{g}{8}$ (d) $\frac{g}{6}$

32 A balloon of weight w is falling vertically downward with a constant acceleration a ($< g$). The magnitude of the air resistance is

(a) w
(b) $w\left(1+\frac{a}{g}\right)$
(c) $w\left(1-\frac{a}{g}\right)$
(d) $w\frac{a}{g}$

33 A smooth inclined plane of length L, having an inclination θ with horizontal is inside a lift which is moving down with retardation a. The time taken by a block to slide down the inclined plane from rest will be