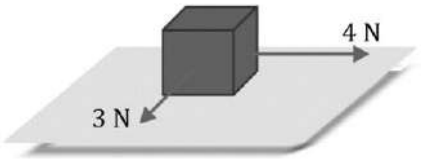
DPP - 2

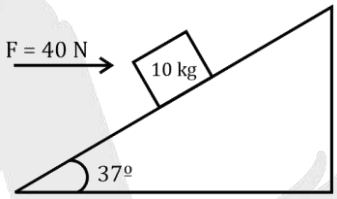
Q.1 Two perpendicular forces of magnitude 3 N and 4 N are applied on an object of mass 1 kg. Find out the acceleration of the object.



Q.2 For the given system, find:

(a) Acceleration of the block

(b) Normal reaction acting on it



Q.3 A body kept on a smooth inclined plane of inclination 1 in x length will remain stationary relative to the inclined plane if the plane is given a horizontal acceleration equal to :-

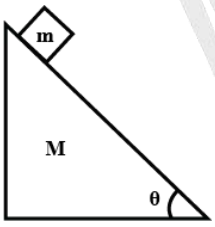
(A) $\sqrt{x^2-1}\,g$

(B) $\frac{\sqrt{x^2-1}}{x}g$

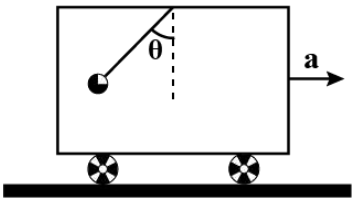
(C) $\frac{gx}{\sqrt{x^2-1}}$

(D) $\frac{-g}{\sqrt{x^2-1}}$

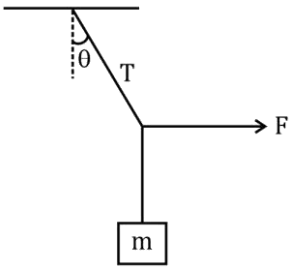
Q.4 What horizontal acceleration should be. provided to the wedge so that the block of mass m kept on wedge remain sat 'rest' w.r.t. wedge?



Q.5 A pendulum of mass m is suspended from the ceiling of a train moving with an acceleration ' a ' as shown in figure. Find the angle θ in the equilibrium position. Also calculate tension in the string.



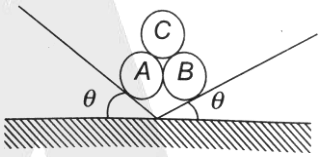
Q.6 If the given system is in equilibrium, find Tension T.



(A) $\sqrt{F^2 + (mg)^2}$ (B) mg tanθ

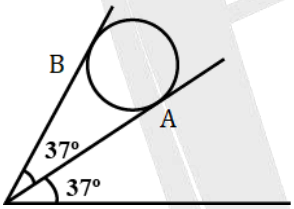
(C) F + mg (D) N.O.T.

Q.7 Three identical rigid circular cylinders A, B and C are arranged on smooth inclined surfaces as shown in figure. The least value of θ that prevents the arrangement from collapsing is



(A) $\tan^{-1}\left(\frac{1}{2}\right)$ (B) $\tan^{-1}\left(\frac{1}{2\sqrt{3}}\right)$ (C) $\tan^{-1}\left(\frac{1}{3\sqrt{3}}\right)$ (D) $\tan^{-1}\left(\frac{1}{4\sqrt{3}}\right)$

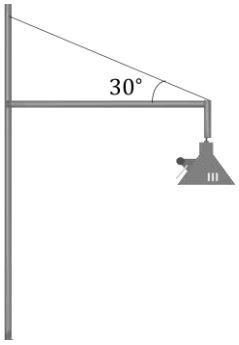
Q.8 A sphere of mass m is held between two smooth inclined walls A and B. For $\sin(37°) = \frac{3}{5}$, the normal reaction of the wall (2) is equal to



(A) mg (B) mg sin(74°) (C) mg cos(74°) (D) None of these

Comprehension 9 to 11

A 20 kg floodlight in a park is supported at the end of a horizontal beam of negligible mass that is hinged to a pole, as shown in figure. A cable at an angle of 30° with the beam helps to support the light. Based on the above facts, answer the following questions.



Q.9 The tension in the cable is

(A) 329 N (B) 239 N (C) 932 N (D) 392 N

Q.10 The horizontal force exerted on the beam by the pole is

(A) 339 N, left (B) 393 N, left (C) 339 N, right (D) 393 N, right

Q.11 The vertical force exerted on the beam by the pole is

(A) zero (B) 196 N, up (C) 392 N, down (D) 196 N, down

ANSWER KEY

1. $5\ m/s^2$ **2.** (a) (2.8) (b) 104 N **3.** (D) **4.** ($a = g \tan \theta$)

5. $m\sqrt{g^2 + a^2}$ **6.** (A)

7. (C) **8.** (A) **9.** (D) **10.** (C) **11.** (A)