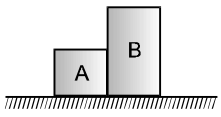
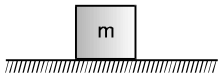
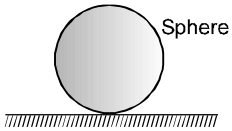
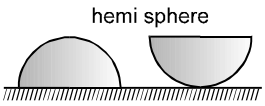
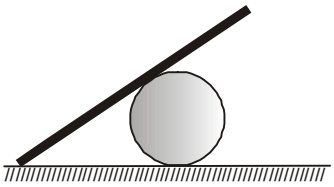
1. Identify the contact surface :

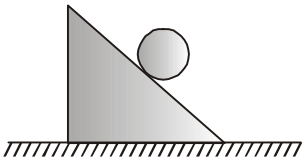
(a) 

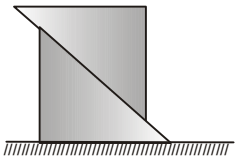
(b) 

(c) 

(d) 

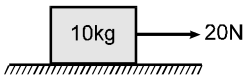
(e) 

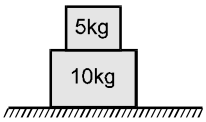
(f) 

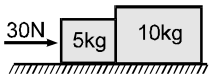
(g) 

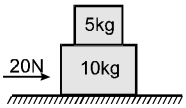
2. Find all the normal reactions and the accelerations :

(All surfaces are friction less)

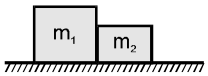
(A) 

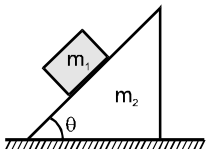
(B) 

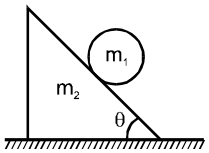
(C) 

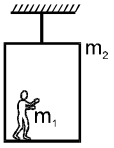
(D) 

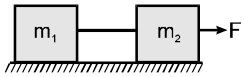
3. Draw the FBD for the following systems :

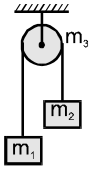
(a) 

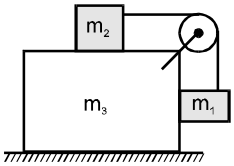
(b) 

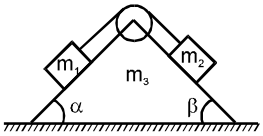
(c) 

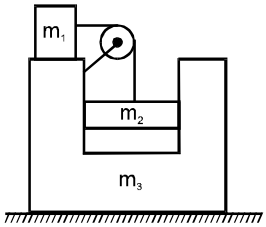
(D) 

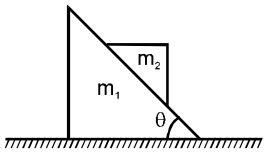
(e) 

(f) 

(g) 

(h) 

(i) 

(j) 

4. Two blocks of mass 4 kg and 6 kg are placed in contact with each other on a frictionless horizontal surface. If we apply a push of 5N on the heavier mass, the force on the lighter mass will be

(A) 2N (B) 4 N (C) 5 N (D) None of these

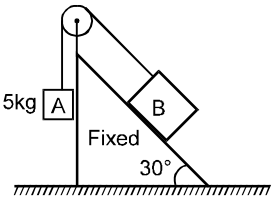
5. Two masses m_1 and m_2 are attached to a string which pass over a frictionless fixed pulley. Given that m_1 = 10 kg and m_2 = 6 kg and g = 10 ms^{-2}, What is the acceleration of the masses ?

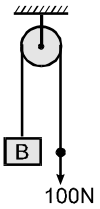
(A) 2.5 ms^{-2} (B) 5 ms^{-2} (C) 20 ms^{-2} (D) 40 ms^{-2}

6. A body is placed over an inclined plane of angle θ. The angle between normal reaction and the weight of the body is

(A) θ (B) $\frac{\pi}{2} - \theta$ (C) $\pi - \theta$ (D) 0

7. Find out the mass of block B to keep the system at rest :

(A) 

(B) 

8. If the resultant of three forces $\mathbf{F}_1 = p\mathbf{i} + 3\mathbf{j} - \mathbf{k}$, $\mathbf{F}_2 = -5\mathbf{i} + \mathbf{j} + 2\mathbf{k}$ and $\mathbf{F}_3 = 6\mathbf{i} - \mathbf{k}$ acting on a particle has magnitude equal to 5 units, then the value(s) of p is (are)

(A) –6 (B) –4 (C) 2 (D) 4

9. Select the incorrect statement

(A) A powerful man pushes a wall and the wall gets deformed. The magnitude of force exerted by the wall on man will be equal to the magnitude of force exerted by man on the wall.

(B) Ten person are pulling horizontally an object on a smooth horizontal surface in different directions. The resultant acceleration of the object is zero. Then the pull of each man is equal to the pull of the other nine men.

(C) A massless object cannot exert force on any other object.

(D) All contact forces are electromagnetic in nature.

10.

(p) force between the earth and the falling stone	(i) Gravitational force
(q) The pressing force between one block and another block	(ii) Electromagnetic force
(r) The stretching force developed in a spring.	(iii) Strong nuclear force
(s) The force between the proton and the neutron in a nuclear	(iv) Weak nuclear force

Answers

RACE # 16

2. (A) N = 100 N, a = 2 m/s^2 (B) N = 50 N, 150 N, a = 0
(C) N = 20 N, a = 2 m/s^{2l} (D) N = 50 N, 150 N, a = 2 m/s^2

4. (A) **5.** (A) **6.** (C) **7.** (a) 10 kg (b) 10 kg **8.** (BC) **9.** (C) **10.** (p-i), (q-ii), (r-ii), (s-iii)