Home Assignment

Numerical (1)

1) A 5kg body collides with a 20kg body and exerts 20N force on it. So force exerted by 20kg body on 5kg body is 20N

2. Given, mass of man = 50kg
It is being suspended from roof (Here a = g)
So $g = 9.8\ m/s^2$
So, the force of the rope that pulls the roof = ?
$F = ma$
$\Rightarrow F = 50 \times 9.8$
$\Rightarrow F = 49N$ (Ans)

3. Given, mass of man = 50kg
Mass of rope = 5kg
Total mass = 50 + 5 = 55kg
As it is suspended from the roof, $a = g = 9.8 m/s^2$
So, $F = ma$
$\Rightarrow F = 55 \times 9.8$
$\Rightarrow F = 539N$

CW

Numerical (2)

Given, mass of pendulum bob = 50g

It is suspended from the ceiling of an elevator ($a = g = 9.8\ m/s^2$)

a) If the elevator goes up with acceleration $1.2\ m/s^2$ then tension - ?

$T - mg = ma$

$T = m(g + a)$

$= \frac{50}{1000}(9.8 + 1.2)$

$= \frac{50}{1000} \times 11$

$= 0.55\ N$

(b) The acceleration is upward but negative

$T = m(g - a)$

$T = \frac{50}{1000}(9.8 - 1.2)$

$= 0.05 \times 8.6$

$= 0.43\ N$

(c) It is given velocity is uniform but acceleration is zero so here $T = mg$

$= \frac{50}{1000} \times 9.8$

$= 0.05 \times 9.8$

$= 0.49\ N$

Cw

(d) It is given that acceleration is downward

$T = m(g-a)$

$= \frac{5}{1000}(9.8-1.2)$

$= 0.05 \times 8.6$

$= 0.43\ N$

(e) The acceleration is negative as it moves downwards

$T = m(g+a)$

$= \frac{5}{1000}(9.8-1.2)$

$= 0.05 \times 11$

$= 0.55\ N$

(f) The velocity is constant so acceleration is zero.

$T = \frac{50}{1000} \times 9.8$

$= 0.05 \times 9.8$

$= 0.55\ N$.

CW

Numerical ③

Given,

Mass of monkey = 40 kg

Maximum tension = 600 N

g = 9.8 m/s²

(a) If monkey climbs up with an acceleration of 6 m/s². ~~So~~, Then,

$T = mg + ma$

$= m(g+a)$

$= 40(9.8+6)$

$= 40 \times 15.6$

$= 624\ N$

So, in this case rope will break.

Ans - Option (A)