1/8/21

HOME ASSIGNMENT

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

(a) 80N (b) 5N (c) 20N (d) 10N

2. ATQ,

Weight = mg = $50 \times 9.8 = 490N$ [mass (m) = 50 given]

∴ So, By 490N force, the rope is pulling the roof.

3. Mass of man = 50kg
Mass of rope = 5kg
Total mass = 50 + 5 = 55kg
Weight = mg = 55 × 9.8 = 539 N
∴ Hence, By 539 N force, the rope is pulling the roof.

(d) goes down with acceleration $1.2\ m/s^2$

$$mg - T = ma$$
$$T = mg - ma$$
$$T = m(g-a)$$
$$T = \frac{50}{1000}(9.8 - 1.2)$$
$$T = 0.43\ N \quad (Ans)$$

(e) does goes down with deceleration $1.2\ m/s^2$

$$T = m(g + a)$$
$$T = \frac{50}{1000}(9.8 + 1.2)$$
$$T = 0.55\ N \quad (Ans)$$

(f) goes down with uniform velocity

$$T = mg$$
$$T = \frac{50}{1000} \times 9.8$$
$$T = 0.49\ N \quad (Ans)$$

5. (a) Mass of monkey, $(m) = 40\,kg$
Accl^n due gravity $(g) = 10\,m/s$
Max. Tension rope can bear, $T_{max.} = 600N$
Accl^n of monkey $(a) = 6\,m/s^2$ upwards.
Using Newton's 2nd Law of motion,
$T - mg = ma$

$T = mg + ma$

$T = m(g+a)$

$T = 40(10 + 6)$

$T = 40(162)$

$T = 6480N$ 6640N

∴ Since $T > T_{max}$, the rope will break in this case.

On 4 A pendulum bod of mass 50 g is suspended from the ceiling of an elevator. Find the tension in the string if the elevator.

(a) goes up with accl^n 1.2 m/s^2

Mass, m = 50 g
Accl^n, a = 1.2 m/s^2
$T - mg = ma$
$T = mg + ma$
$T = m(g+a)$
$T = \frac{50}{1000}(9.8+1.2)$
$T = 0.55\ N$ (Ans)

(b) goes up with deceleration 1.2 m/s^2
$T = m(g-a)$
$T = \frac{50}{1000}(9.8-1.2)$
$T = 0.43N$ (Ans)

(c) goes up with uniform velocity
$T = mg$
$T = \frac{50}{1000} \times 9.8$
$T = 0.49N$ (Ans)