YAKEEN NEET 2.0

2026

Newton's Laws of Motion

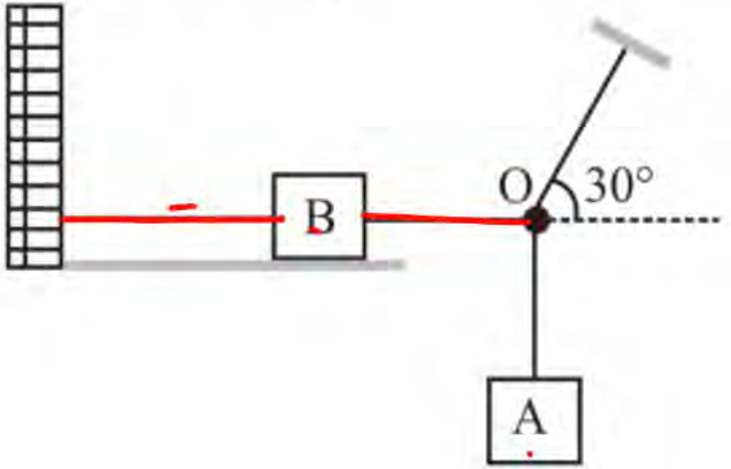
PHYSICS

KPP- -22

By - Saleem Ahmed Sir

Question - 1

The breaking strength of the string connecting wall and block B is 175 N, Find the magnitude of weight of block A for which the system will be stationary. Block B weighs 700 N.



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Ans : $W_A = \frac{175}{\sqrt{3}}$ N

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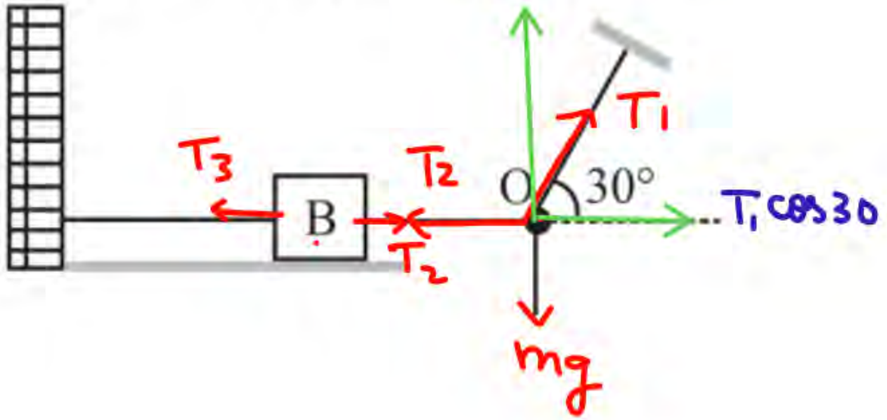


$T_1 \sin 30 = mg$

$T_1 \cos 30 = T_2$

$\tan 30 = \frac{mg}{175}$

$\frac{175}{\sqrt{3}} = mg$

Ans : $W_A = \frac{175}{\sqrt{3}}$ N

Question - 2

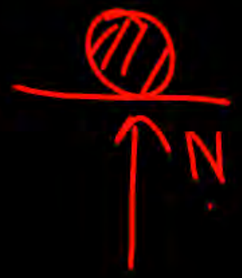
$0^2 = V_1^2 - 2gh$

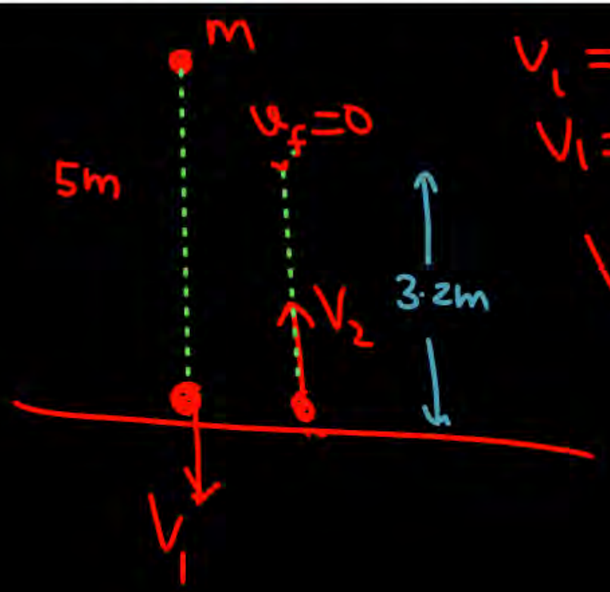
An iron ball of mass $m = 50$ g falls from a height of $h_1 = 5$ m and rises upto $h_2 = 3.2$ m after colliding with the horizontal surface. If the time of contact of the glass half is $\Delta t = 0.02$ s, find the average contact force exerted on the ball by the horizontal surface.

$\vec{F} = \frac{d\vec{P}}{dt}$

$\langle \vec{F} \rangle = \frac{\Delta \vec{P}}{\Delta t} = \frac{\vec{P}_f - \vec{P}_i}{\Delta t}$

$\langle \vec{F} \rangle = \frac{mV_2\hat{j} - mV_1(-\hat{j})}{\Delta t}$





$V_1 = \sqrt{2gx5}$

$V_1 = 10$

$V_2 = \sqrt{2g(3.2)}$

$= 8$

$\langle \vec{F} \rangle = \frac{m(V_2 + V_1)}{\Delta t}$

$= \frac{50 \times 10^{-3}(8+10)}{.02}$

Ans : (45 N)

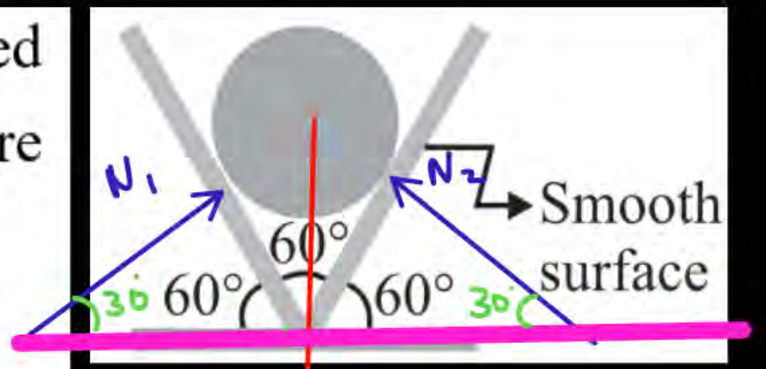
Question – 3

Class

A cylinder of weight W is resting on two inclined planes forming a V-groove as shown in figure. Ignore friction everywhere.

(a) Draw its free body diagram of the sphere.

(b) Calculate normal reactions between the cylinder and two inclined walls.



mg

$N_1 \cos 30 = N_2 \cos 30$

$N_1 = N_2$

$= N$

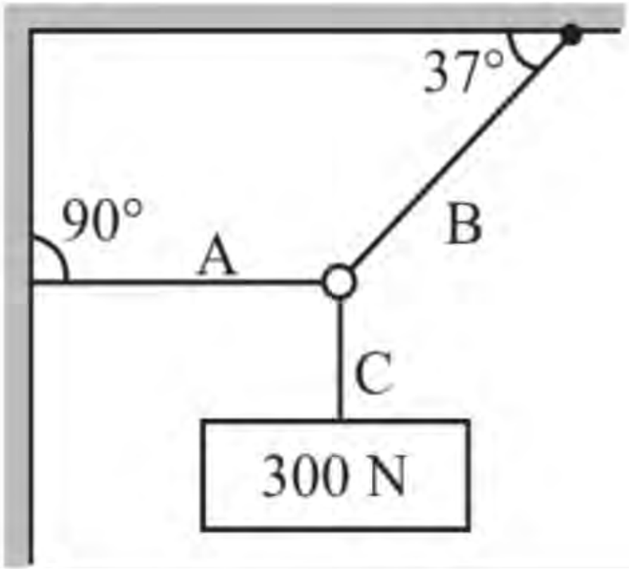
$N_1 \sin 30 + N_2 \sin 30 = mg$

$N = mg$

Ans : N = W

Question - 4

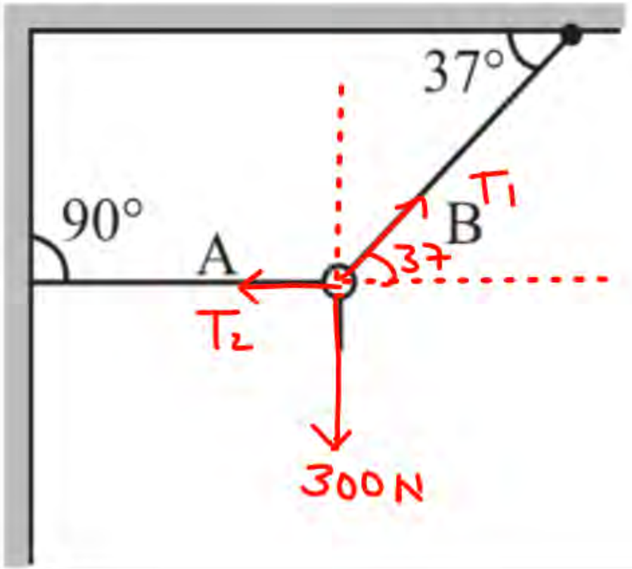
A block of mass 30 kg is suspended by three strings as shown in figure. Find the tension in each string.



Ans : (T_B = 500 N, T_A = 400 N)

Question - 4

A block of mass 30 kg is suspended by three strings as shown in figure. Find the tension in each string.



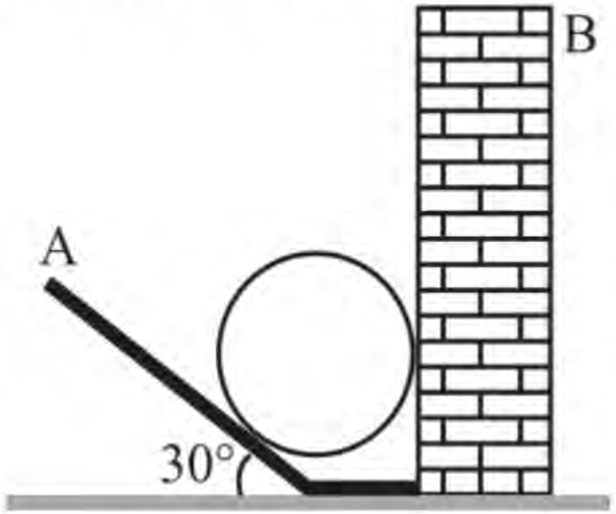
$T_2 = T_1 \frac{4}{5}$

$T_1 \frac{3}{5} = 300$

Ans : (T_B = 500 N, T_A = 400 N)

Question – 5

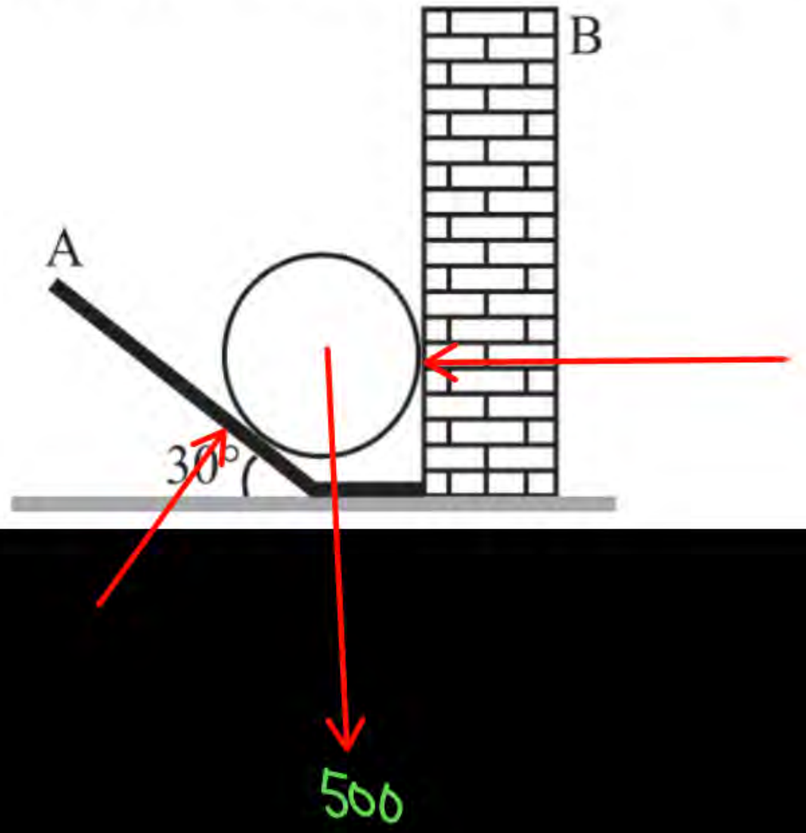
A 50-kg homogeneous smooth sphere rests on the 30° incline A and bears against the smooth vertical wall B. Calculate the contact forces at A and B.



Ans : $N_1 = \frac{500}{\sqrt{3}}$ N, $N_2 = \frac{1000}{\sqrt{3}}$ N

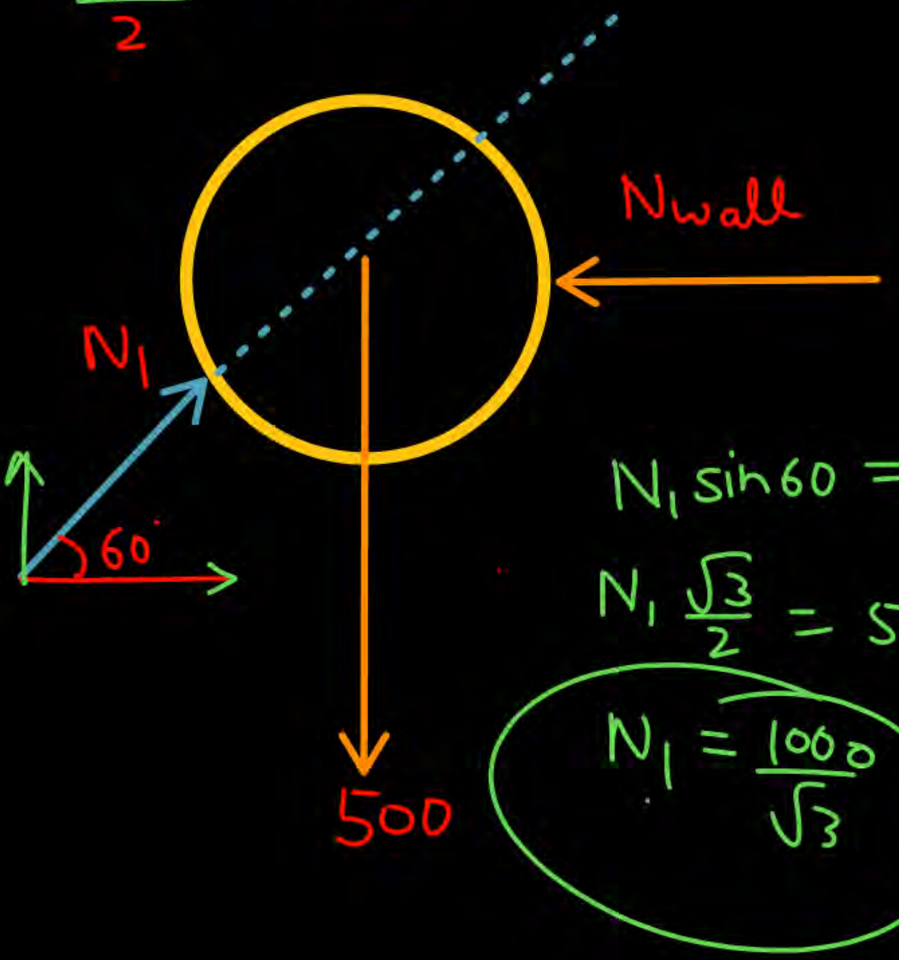
Question – 5

A 50-kg homogeneous smooth sphere rests on the 30° incline A and bears against the smooth vertical wall B. Calculate the contact forces at A and B.



$N_1 \cos 60 = N_{wall}$

$\frac{N_1}{2} = N_{wall}$



$N_1 \sin 60 = 500$

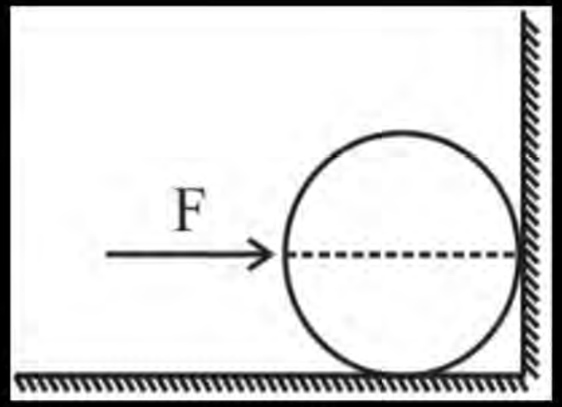
$N_1 \frac{\sqrt{3}}{2} = 500$

$N_1 = \frac{1000}{\sqrt{3}}$

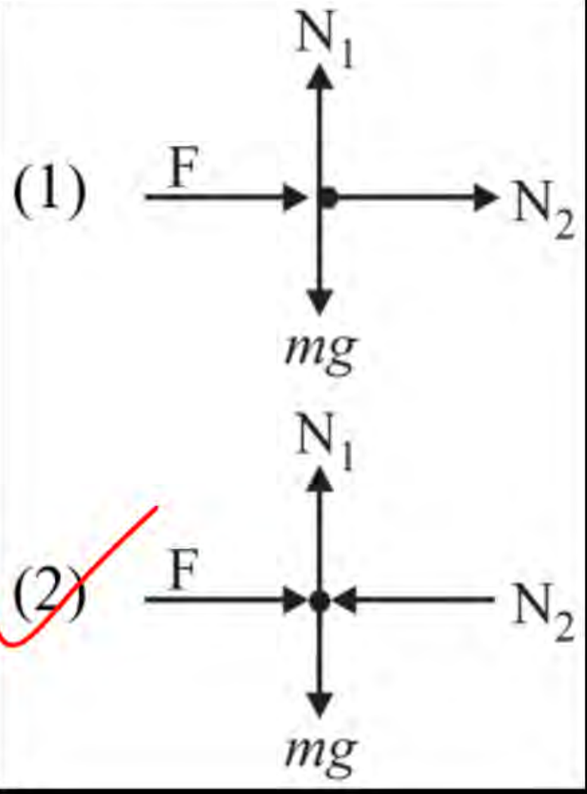
Ans : $N_1 = \frac{500}{\sqrt{3}}$ N, $N_2 = \frac{1000}{\sqrt{3}}$ N

Question – 6

A ball of mass m kept at the corner as shown in the figure, is acted by a horizontal force F. The correct free body diagram of ball is:

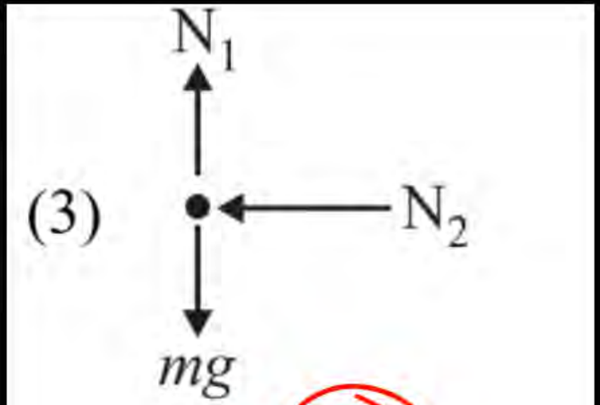


(1)

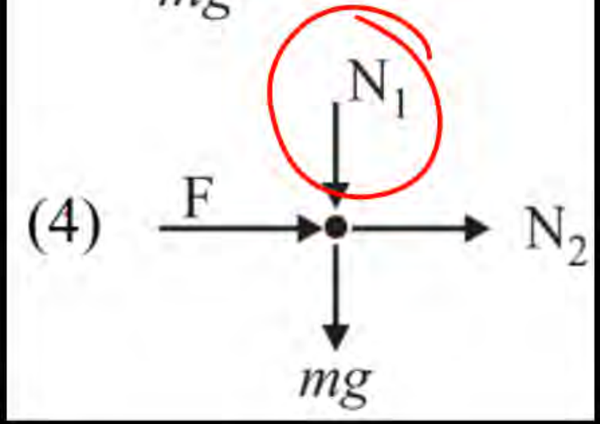


(2)

(3)



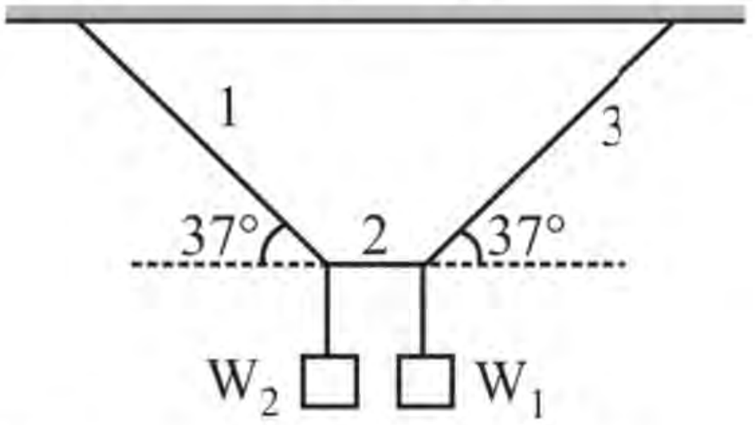
(4)



Ans : (2)

Question - 7

In a given figure system is in equilibrium. If $W_1 = 300$ N. Then W_2 is approximately equal to:



(1) 500 N (2) 400 N

(3) 670 N (4) 300 N

Ans : (4)

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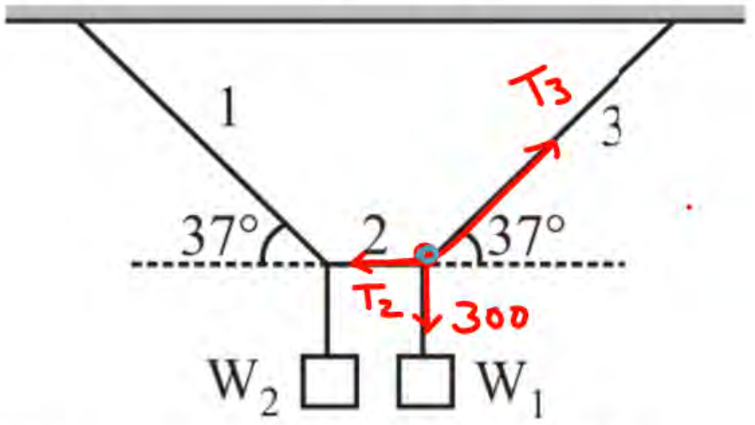
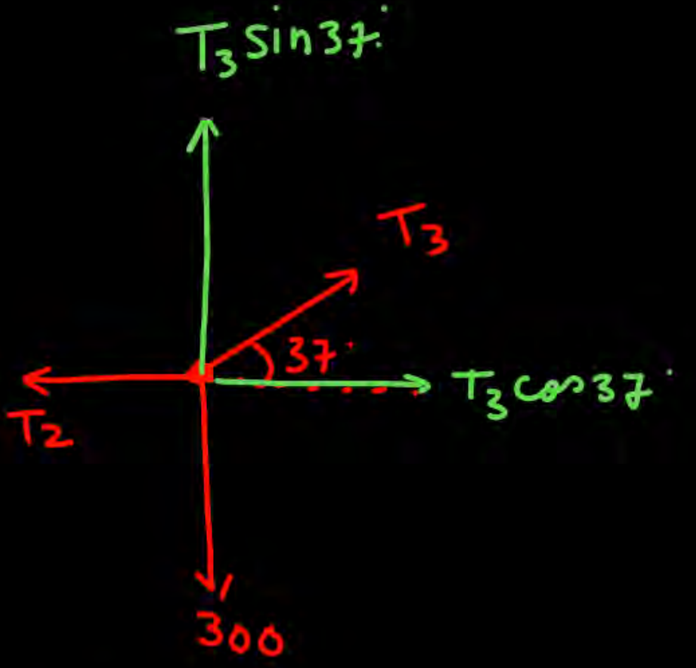


(1) 500 N (2) 400 N

(3) 670 N (4) 300 N



$T_3 \times \frac{3}{5} = 300$

$T_3 = 500$

Ans : (4)

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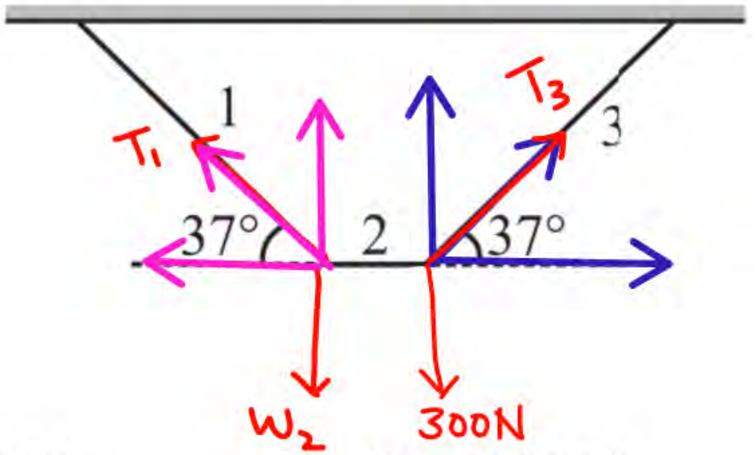


(1) 500 N (2) 400 N

(3) 670 N (4) 300 N

$T_3 \cos 37^\circ = T_1 \cos 37^\circ$

$T_1 = T_3 = T$

$T \sin 37^\circ \times 2 = W_2 + 300$

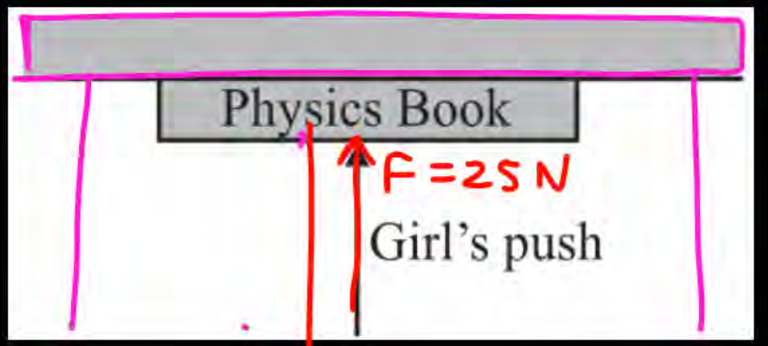
$T \times \frac{3}{5} \times 2 = W_2 + 300$

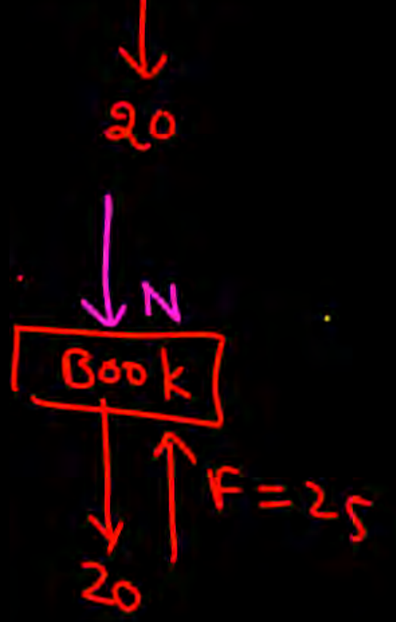
$\frac{500 \times 6}{5} = W_2 + 300$

Ans : (4)

Question – 8

A girl pushes her physics book up against the horizontal ceiling of her room as shown in the figure. The book weighs 20 N and she pushes upwards with a force of 25 N. The choices below list the magnitudes of the contact force F_{CB} between the ceiling and the book, and F_{BH} between the book and her hand. Select the correct pair.





(1) $F_{CB} = 20$ N and $F_{BH} = 25$ N

(2) $F_{CB} = 25$ N and $F_{BH} = 45$ N

(3) $F_{CB} = 5$ N and $F_{BH} = 25$ N

(4) $F_{CB} = 5$ N and $F_{BH} = 45$ N

Ans : (3)

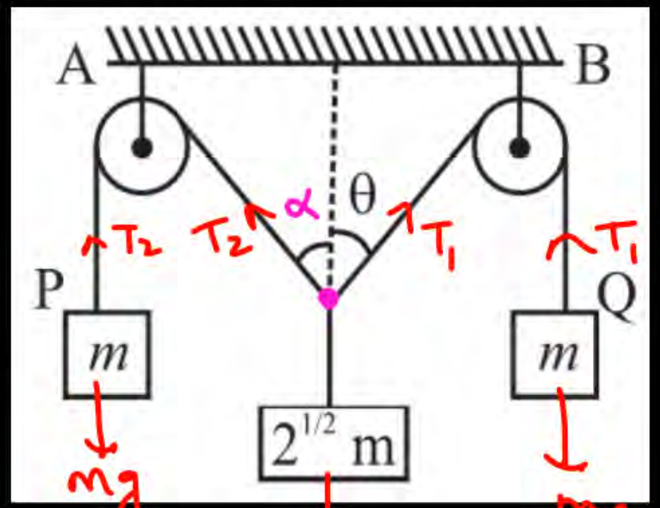
Question – 9

The pulleys and strings shown in the figure are smooth and of negligible mass. For the system to remain in equilibrium, the angle θ should be:

[JEE (Scr) 2001]

(1) 0° (2) 30°

(3) 45° (4) 60°



(1) $T_1 = mg = T_2$

(2) $T_2 \sin\alpha$ ⟷ $T_1 \sin\theta$

$T_2 \sin\alpha = T_1 \sin\theta$

$\alpha = \theta$

(3) $T_1 \cos\theta + T_2 \cos\theta = \sqrt{2}\, mg$

$2mg \cos\theta = \sqrt{2}\, mg$

Ans : (3)

Question – 10

In arrangement shown the block A of mass 15 kg is supported in equilibrium by the block B. Mass of the block B is closest to

(1) 2 kg (2) 3 kg

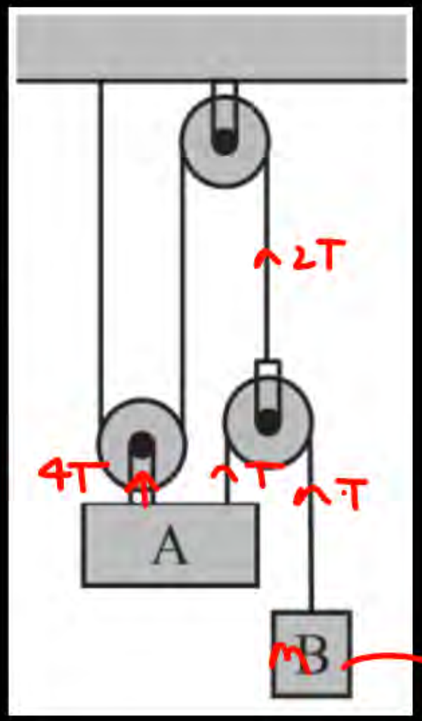
(3) 4 kg (4) 5 kg

$5T = 150$

$T = 30$

$T = m_B g$

$30 = m_B \times 10$

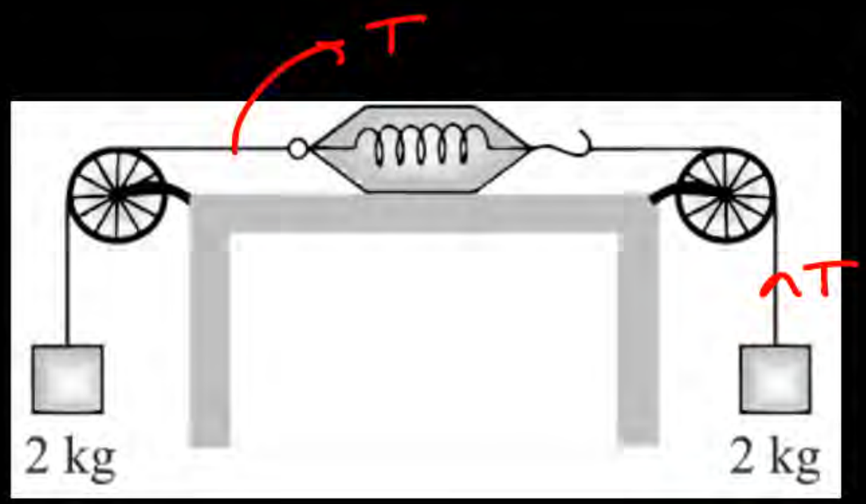


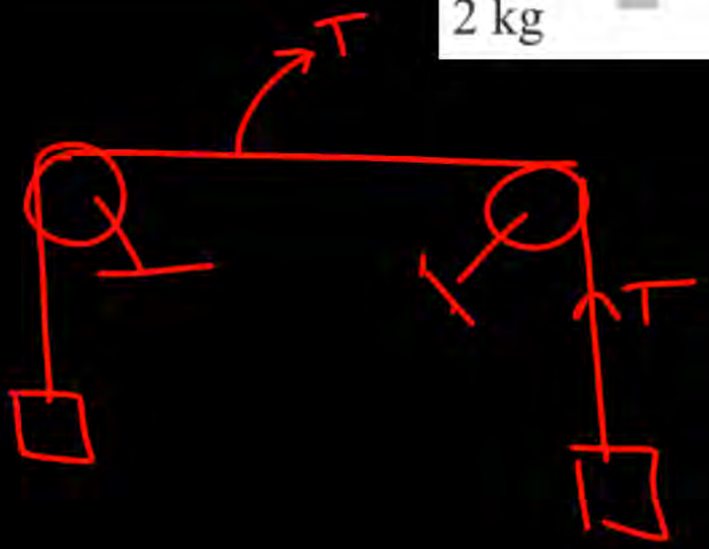
Ans : (2)

Question - 11

As shown in the figure, two equal masses each of 2 kg are suspended from a spring balance. The reading of the spring balance will be:

(1) Zero
(2) 2 kg
(3) 4 kg
(4) Between zero and 2 kg





T=20

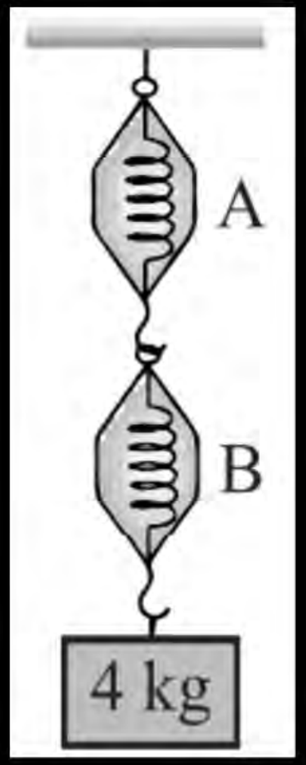
Ans : (2)

Question - 12

A block of mass 4 kg is suspended through two light spring balances A and B. Then A and B will read respectively.

(1) 4 kg and zero kg (2) Zerokg and 4 kg

(3) 4 kg and 4 kg (4) 2 kg and 2 kg

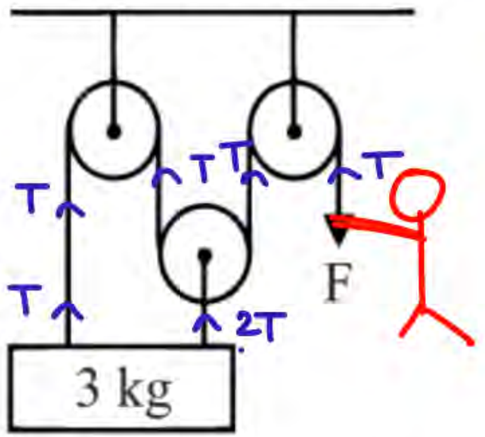


Ans : (3)

Question - 13

A block of mass 3 kg is balanced by pulling force F.

Magnitude of this pulling force F is:



T = F

3T = 30

3F = 30

F = 10

(1) 20 N

(2) 90 N

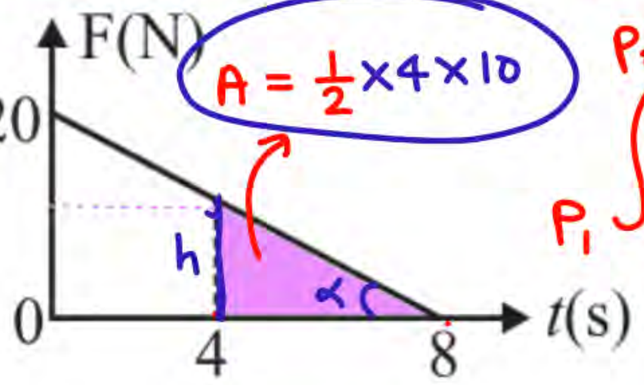
(3) 10 N

(4) 15 N

Ans : (3)

Question - 14

Variation of force F acting on a body with time t is as shown in figure. Change in momentum of the body in the interval 4 s to 8 s is:



$\tan\alpha = \frac{20}{8} = \frac{h}{4}$

$h = 10$

$A = \frac{1}{2} \times 4 \times 10$

$\vec{F} = \frac{d\vec{P}}{dt}$

$\int_{P_1}^{P_2} d\vec{P} = \int_{t_1}^{t_2} \vec{F}\, dt$

$P_2 - P_1 = \Delta\vec{P} = \int_{t_1}^{t_2} F\, dt = \text{Area}$

(1) 10 kgms^{-1} (2) 5 kgms^{-1}

(3) 100 kgms^{-1} (4) 20 kgms^{-1}

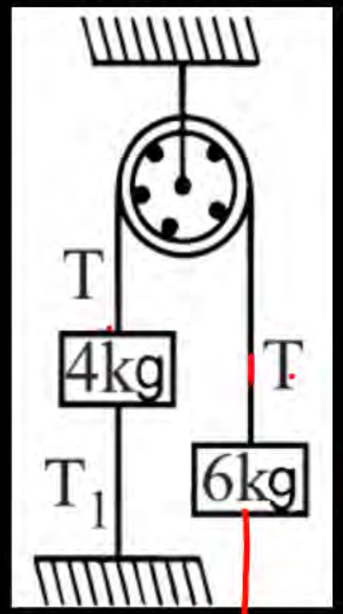
Ans : (4)

Question - 15

Two bodies of mass 4 kg and 6 kg are attached to the ends of a string passing over a pulley (see figure). The 4 kg mass is attached to the table top by another string. The tension in this string T_1 is equal to: (take $g = 10\ m/s^2$).

(1) 20 N (2) 25 N

(3) 10.6 N (4) 10 N



T = 60

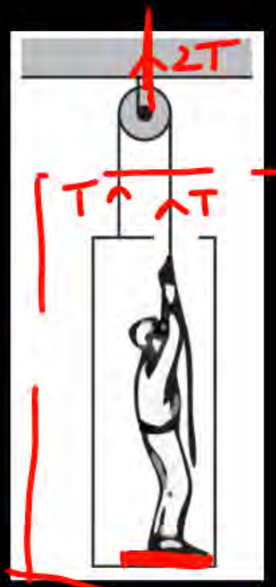
$60 = T_1 + 40$

$T_1 = 20$

Ans : (1)

Question – 16

A carpenter of mass 50 kg is standing on a weighing machine placed in a lift of mass 20 kg. A light string is attached to the lift. The string passes over a smooth pulley and the other end is held by the carpenter as shown. When carpenter keeps the lift moving upward with constant velocity: ($g = 10\ m/s^2$).



$a = 0$

$2T = 700$

$T = 350$

(1) the reading of weighing machine is 15 kg

(2) the man applies a force of 350 N on the string

(3) net force on the man is 150 N

(4) Net force on the weighing machine is 150 N

$T + N = 500$

$350 + N = 500$

$N = 150$

Ans : (1, 2)

Question – 17

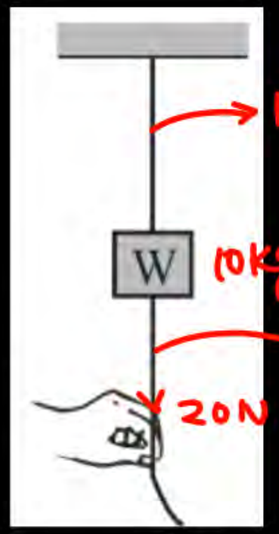
A block of mass m is suspended from a fixed support with the help of a cord. Another identical cord is attached to the bottom of the block. Which of the following statement is /are true?

(1) If the lower cord is pulled suddenly, only the upper cord will break.

(2) If the lower cord is pulled suddenly, only the lower cord will break.

(3) If pull on the lower cord is increased gradually, only the lower cord will break.

(4) If pull on the lower cord is increased gradually, only the upper cord will break.



Ans : (2, 4)

THANK YOU