
YAKEEN
NEET 2.0
2026
[redacted] Newton's Laws of Motion
PHYSICS
KPP- 23
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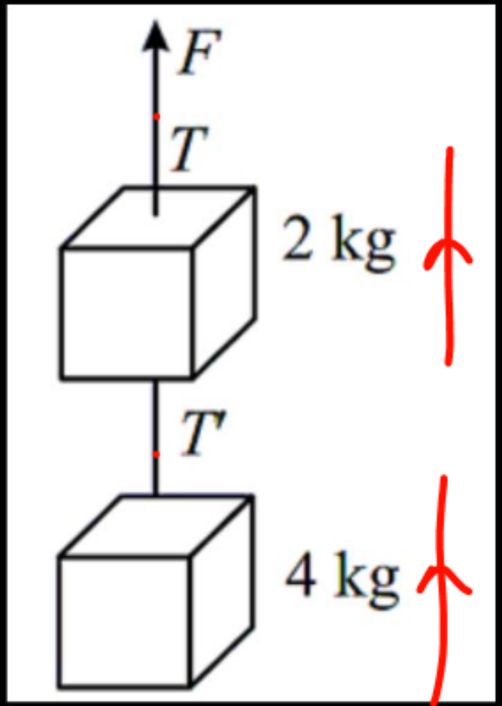
Physics Wallah

QUESTION – 01

Two blocks are connected by a string as shown in the diagram. The upper block is hung by another string. A force F applied on the upper string produces an acceleration of 2 m/s^2 in the upward direction in both the blocks. If T and T' be the tensions in the two parts of the string, then.



a = 2

a = 2

(1) T = 70.8 N and T′= 47.2 N

(2) T = 58.8 N and T′= 47.2 N

(3) T = 70.8 N and T′ = 58.8 N

(4) T = 70.8 N and T′ = 0

$T' - 40 = 4 \times 2$

$T' = 48$

$F - 60 = 6 \times 2$

$F = 72$

$g = 9.8$

Ans: (1)

QUESTION - 02

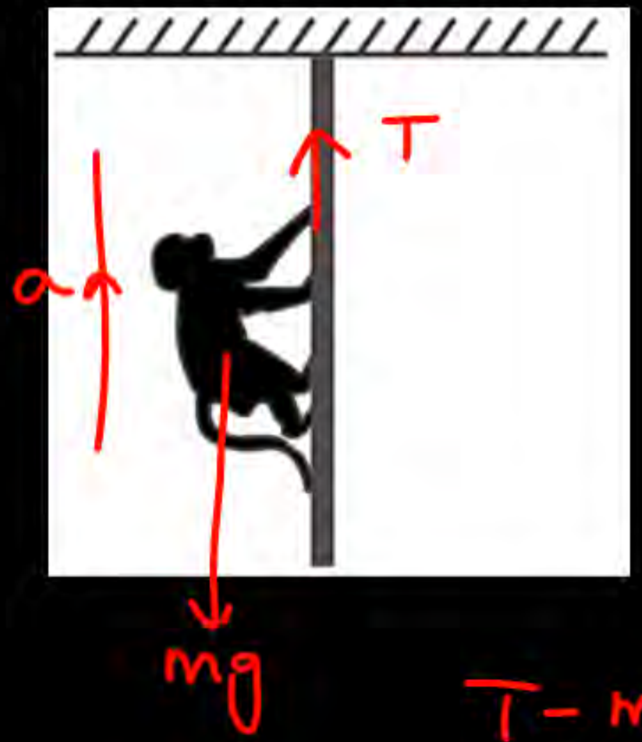
A monkey of mass 40 kg climbs on a rope which can withstand a maximum tension of 600 N. In which of the following cases will the rope break the monkey.

(1) Climbs up with an acceleration of 6 ms^{-2}

(2) Climbs down with an acceleration of 4 ms^{-2}

(3) Climbs up with an uniform speed of 5 ms^{-1}

(4) Falls down the rope nearly freely under gravity



$T - mg = ma$

$600 - 400 = 40a$

$a = 5$

Aw $a > 5$

Ans: (1)

QUESTION - 03

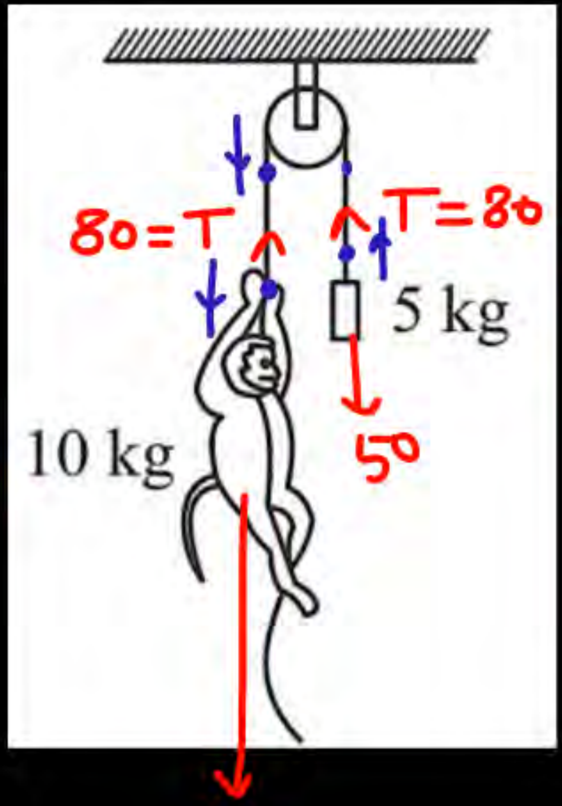
In the figure shown acceleration of monkey relative to the rope if it exerts a force of 80 N on string will be:

(1) 2 m/s² downwards

(2) 4 m/s² upwards

(3) 4 m/s² downwards

(4) 8 m/s² downwards



$a = \frac{100-80}{10} = 2$

$a' = \frac{80-50}{5} = 6$

Bandar ke hath me $\Rightarrow a_{rope} = -6\hat{j}$

$a_{monkey} = -2\hat{j}$

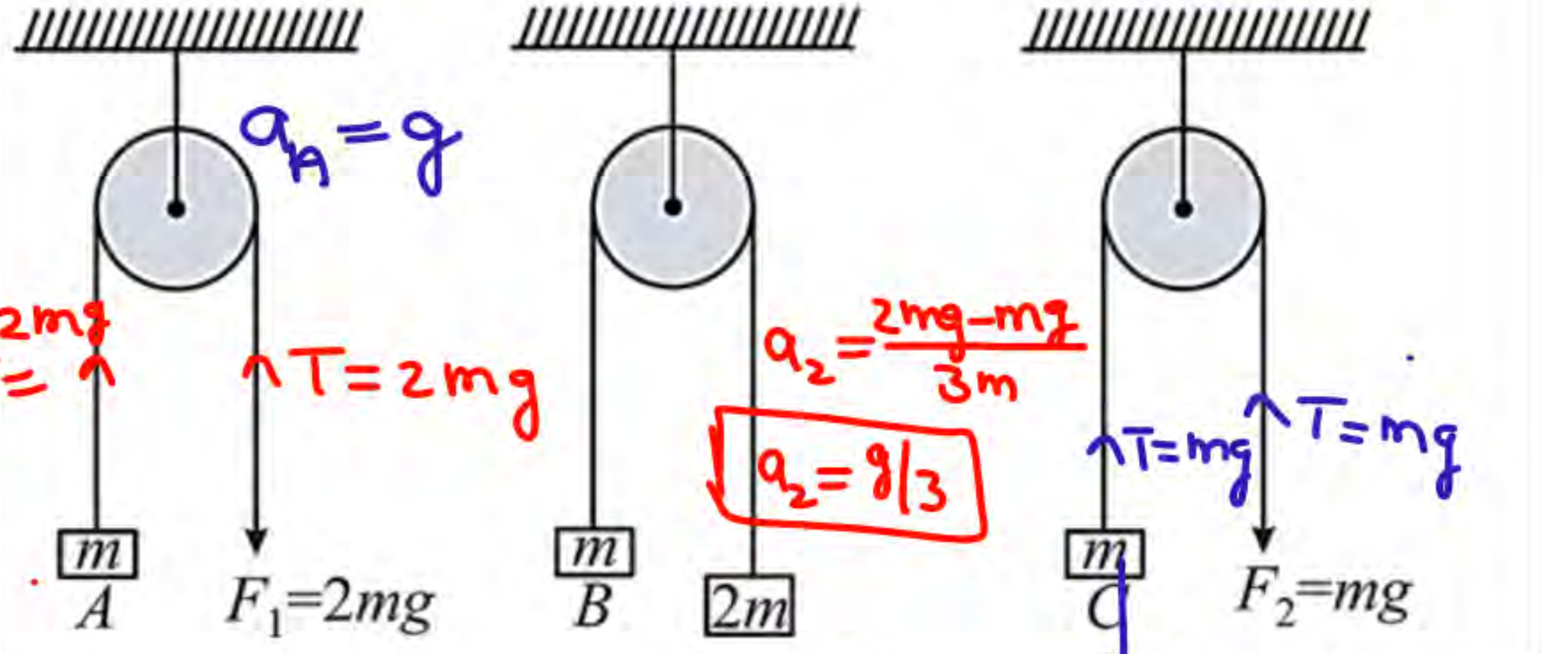
$a_{m/r} = a_m - a_r = -2\hat{j} - (-6\hat{j}) = 4\hat{j}$

Ans: (2)

QUESTION - 04

In the figure, the blocks A, B and C of mass m each have acceleration a_1, a_2 and a_3 respectively. F_1 and F_2 are external forces of magnitudes 2 mg and mg respectively.

$a_B = g/3$ $\quad$ $a_c = 0$



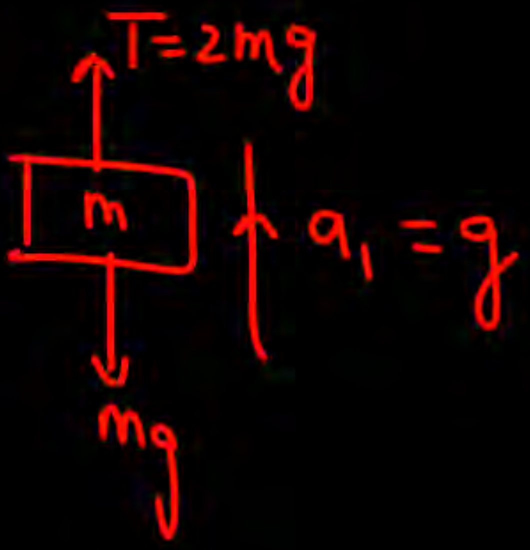
(1) $a_1 = a_2 = a_3$ $\qquad$ (2) $a_1 > a_2 > a_3$

(3) $a_1 = a_2, a_2 > a_3$ $\qquad$ (4) $a_1 > a_2, a_2 = a_3$

$T = \frac{2m_1m_2}{m_1+m_2}g$

(2)

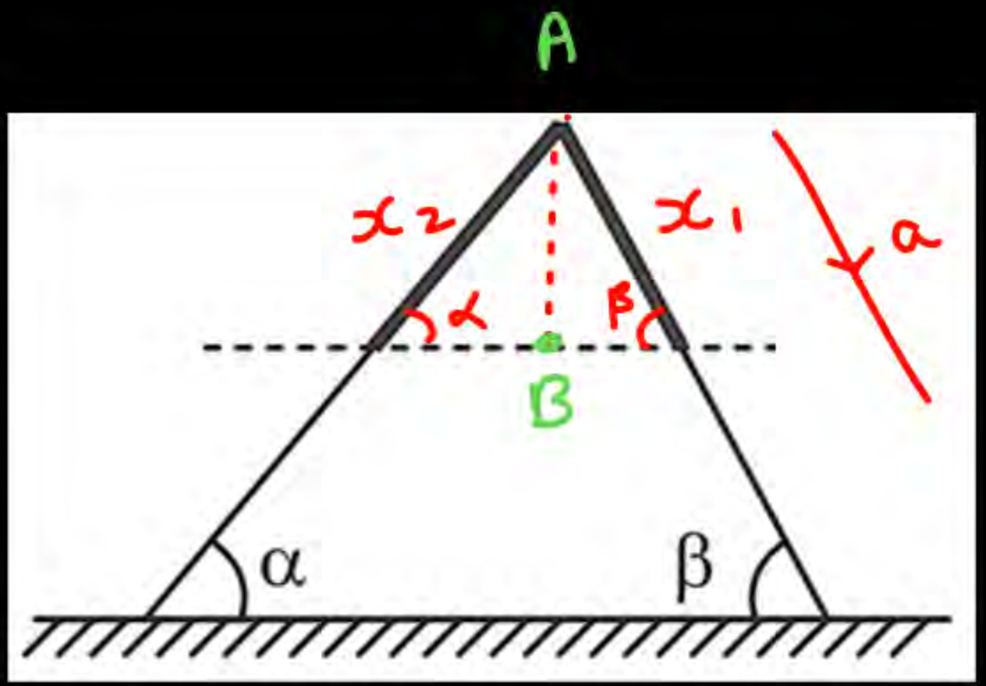
(1)



Ans: (2)

QUESTION - 05

A uniform rope of length L and mass M is placed on a smooth fixed wedge as shown. Both ends of rope are at same horizontal level. The rope is initially released from rest, then the magnitude of initial acceleration of rope is:



(1) Zero
(2) $M(\cos\alpha - \cos\beta)\,g$
(3) $M(\tan\alpha - \tan\beta)g$
(4) None of these

$$a = \frac{\frac{m}{L}x_1 g\sin\beta - \frac{m}{L}x_2 g\sin\alpha}{m}$$

$$= \frac{mg}{Lm}\left(\cancel{x_1\sin\beta} - \cancel{x_2\sin\alpha}\right)$$

$$=$$

$L \longrightarrow m$

$1 \longrightarrow \frac{m}{L}$

$x \longrightarrow \frac{m}{L}x$

Ans: (1)

QUESTION - 06

A balloon of gross weight w newton is falling vertically downward with a constant acceleration $a(<g)$. The magnitude of the air resistance is: (Neglecting buoyant force).

mg

(1) w

(2) $w\left(1+\dfrac{a}{g}\right)$

(3) $w\left(1-\dfrac{a}{g}\right)$ ✓

(4) $w\dfrac{a}{g}$

$$a = \frac{mg - f}{m}$$

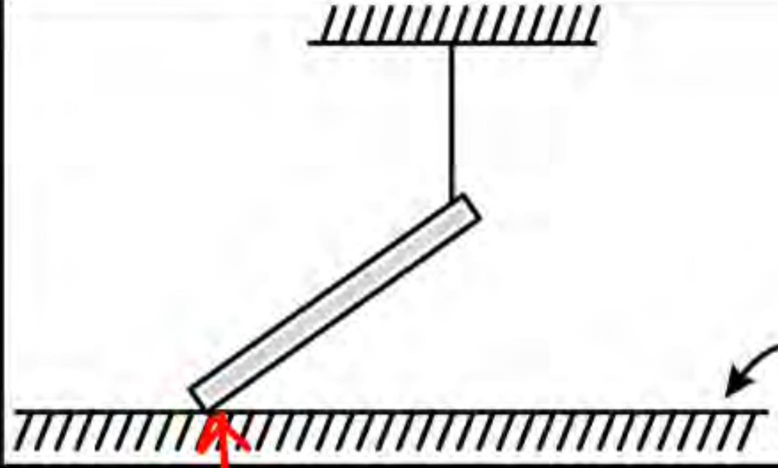
$$ma = mg - f$$

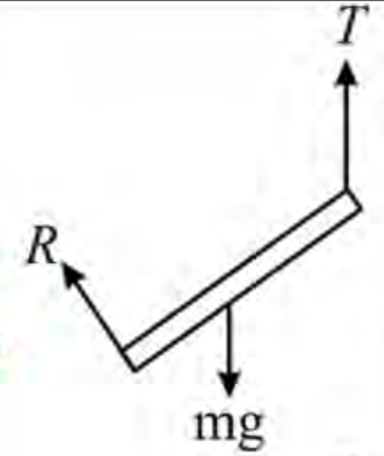
$$f = mg - ma = mg\left(1 - \frac{a}{g}\right)$$

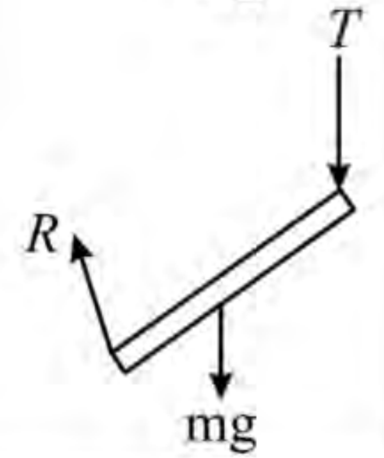
Ans: (3)

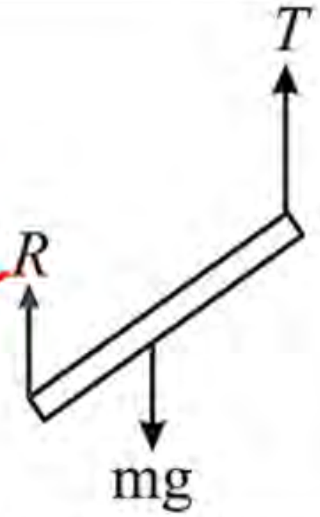
QUESTION - 07

Which figure represents the correct F.B.D. of rod of mass m as shown in figure:



(1) 

(2) 

(3) 

(4) None of these

3

Ans: (~~1~~)

QUESTION - 08

In the system shown in the figure, the acceleration of the 1 kg mass and the tension in the string connecting between A and B is:

(1) $\frac{g}{4}$ downwards, $\frac{8g}{7}$

(2) $\frac{g}{4}$ upwards, $\frac{g}{7}$

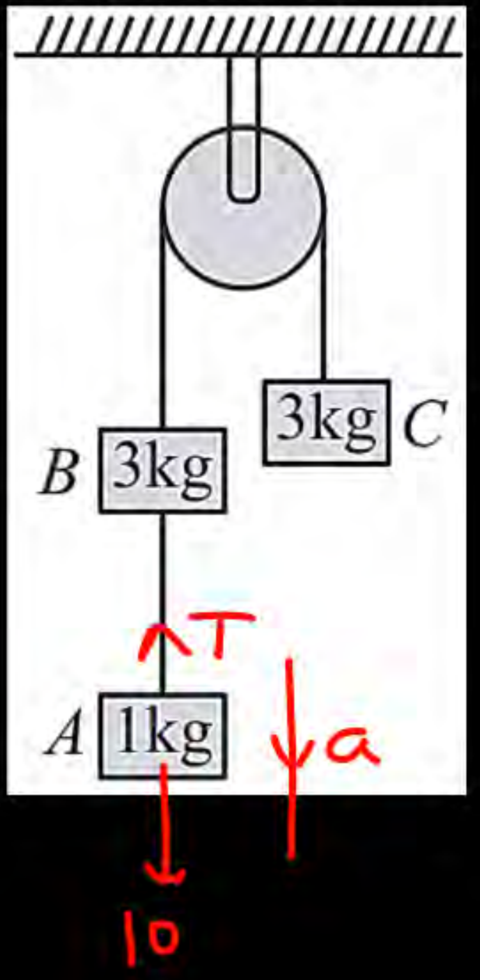
(3) $\frac{g}{7}$ downwards, $\frac{6}{7}g$

(4) $\frac{g}{2}$ upwards, g

$$a = \frac{40-30}{3+3+1} = \frac{10}{7}$$

$$10 - T = 1 \times a$$

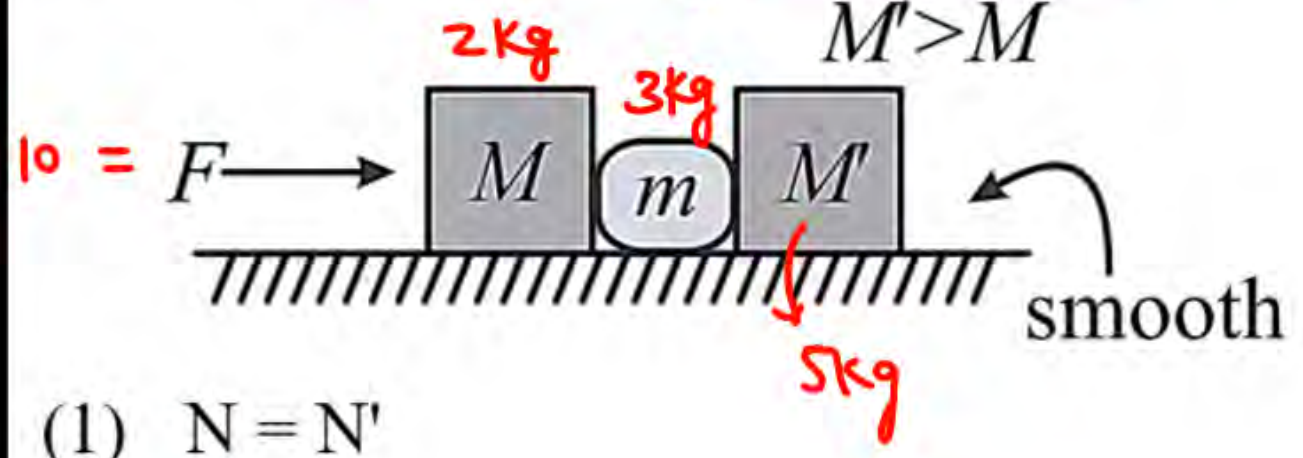
$$T = 10 - \frac{10}{7} = \frac{60}{7}$$



Ans: (3)

QUESTION - 09

A constant force F is applied in horizontal direction as shown. Contact force between M and m is N and between m and M' is N' then $a = 1$



(1) N = N'

(2) N > N'

(3) N' > N

(4) Cannot be determined

$N' = 5 \times 1 = 5$

$10 = F \rightarrow \boxed{M} \leftarrow N$

$10 - N = 2 \times 1$

$N = 8$

Ans: (2)

QUESTION - 10

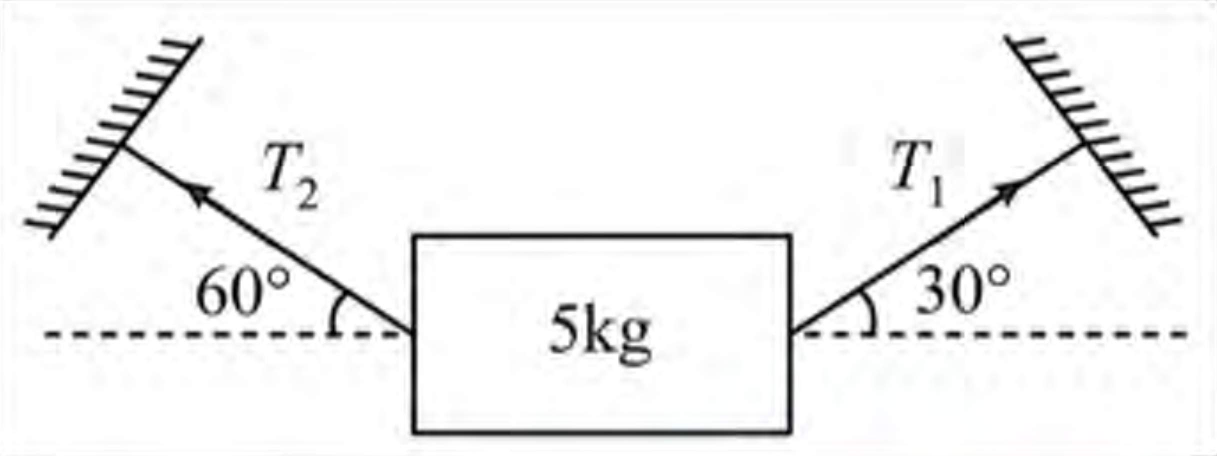
A body of mass 5 kg is suspended by the strings making angles 60° and 30° with the horizontal

(A) $T_1 = 25$ N

(B) $T_2 = 25$ N

(C) $T_1 = 25\sqrt{3}$ N

(D) $T_2 = 25\sqrt{3}$ N



(1) A, B	(2) A, D
(3) C, D	(4) B, C

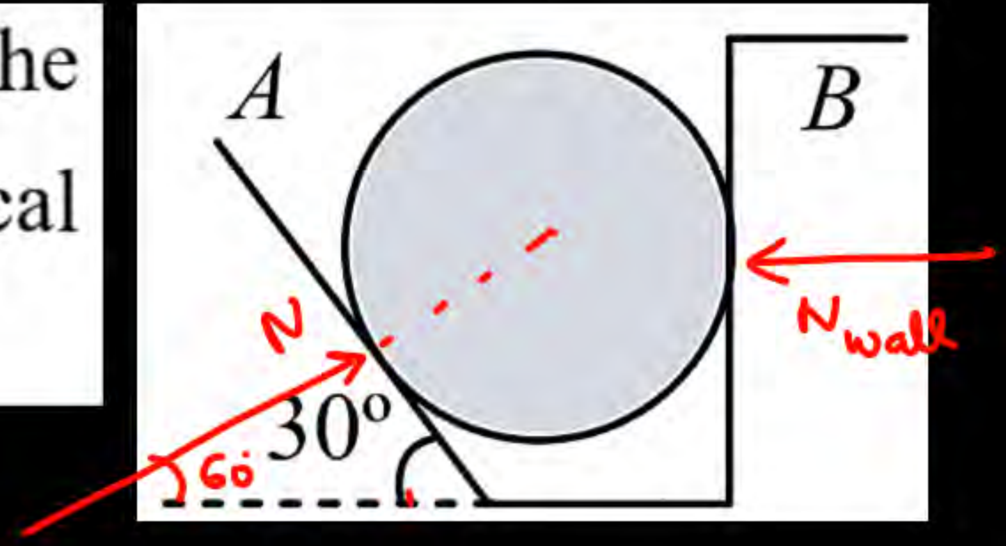
$T_1 \cos 30 = T_2 \cos 60$

$T_1 \sin 30 + T_2 \sin 60 = 50$

Ans: (2)

QUESTION - 11

The 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.

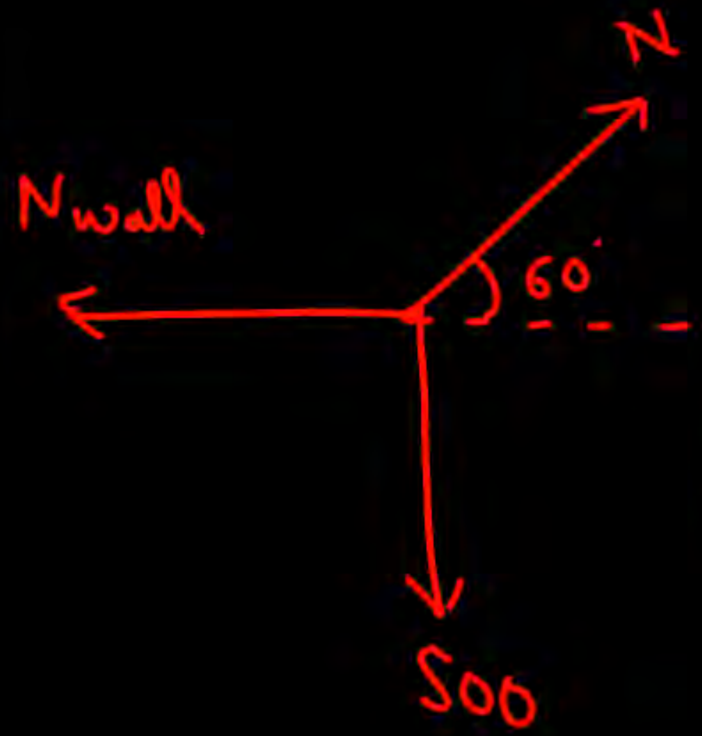


(1) $N_B = \frac{1000}{\sqrt{3}} N, N_A = \frac{500}{\sqrt{3}} N$

(2) $N_A = \frac{1000}{\sqrt{3}} N, N_B = \frac{500}{\sqrt{3}} N$

(3) $N_A = \frac{100}{\sqrt{3}} N, N_B = \frac{500}{\sqrt{3}} N$

(4) $N_A = \frac{1000}{\sqrt{3}} N, N_B = \frac{50}{\sqrt{3}} N$



$N \cos 60 = N_{wall}$

$N \sin 60 = 500$

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

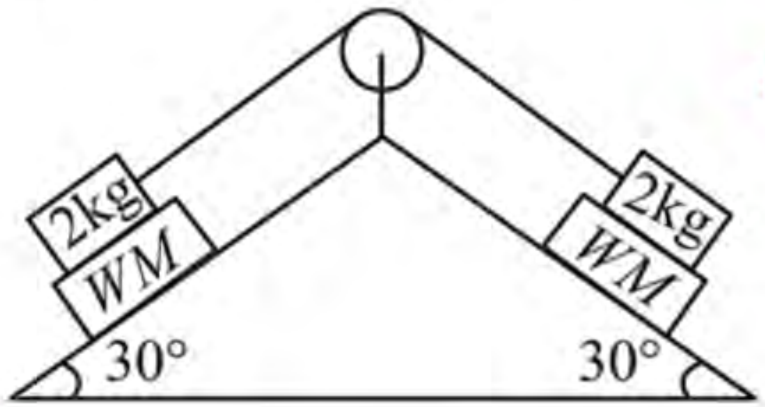
$N \frac{\sqrt{3}}{2} = 500$

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

Ans: (2)

QUESTION - 12

Find out the reading of the weighing machine in the following cases.



$20 \times \cos 30$

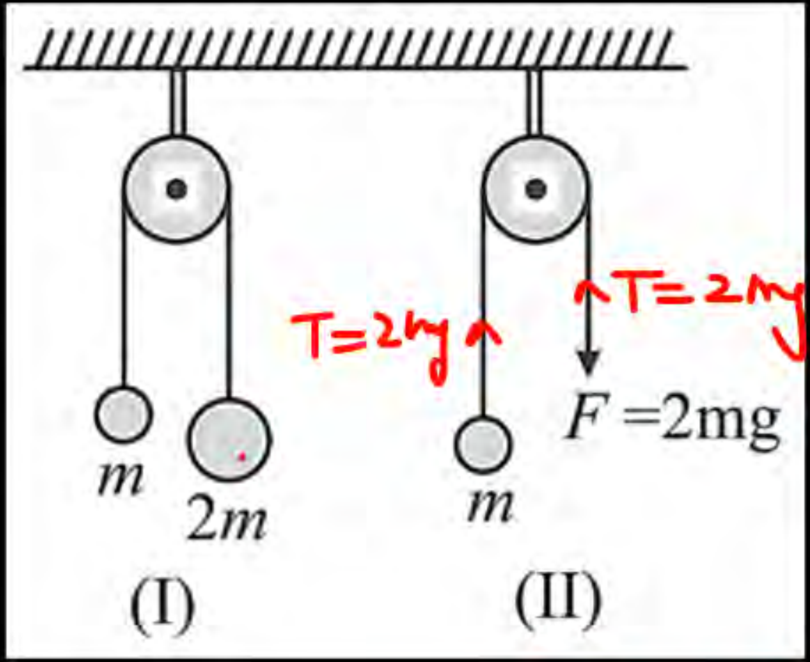
$= 20 \frac{\sqrt{3}}{2}$

(1) $10\sqrt{3}$
(2) $10\sqrt{2}$
(3) $20\sqrt{3}$
(4) $30\sqrt{3}$

Ans: (1)

QUESTION - 13

The pulley arrangements shown in figure are identical, the mass of the rope being negligible. In case-I, the mass m is lifted by attaching a mass $2m$ to the other end of the rope. In case-II, the mass m is lifted by pulling the other end of the rope with a constant downward force F = $2mg$, where g is acceleration due to gravity. The acceleration of mass in case-I is:



$$a = \frac{2mg - mg}{m} = g$$

$$a = \frac{2mg - mg}{3m} = g/3$$

(1) Zero

(2) More than that in case-II

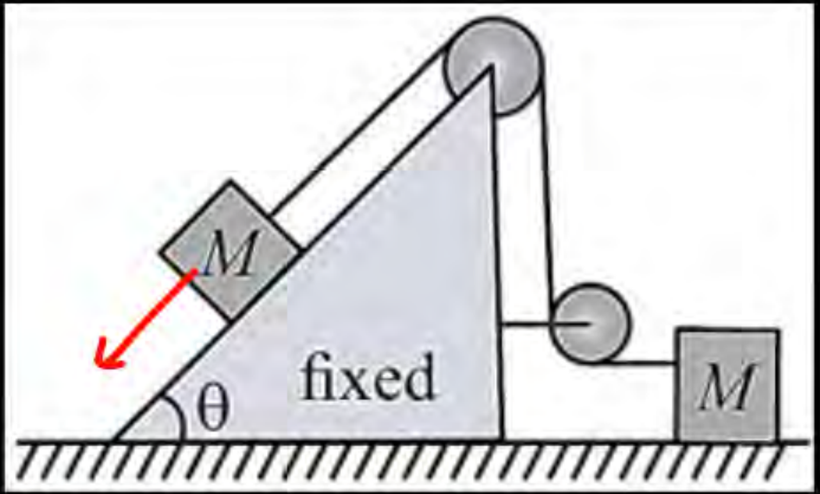
(3) Less than that in case-II

(4) Equal to that in case-II

Ans: (3)

QUESTION - 14

Two blocks, each having mass M, rest on frictionless surfaces as shown in the figure. If the pulleys are light and frictionless, and M on the incline is allowed to move down, then the tension in the string will be:



(1) $\frac{2}{3}Mg\sin\theta$ (2) $\frac{3}{2}Mg\sin\theta$

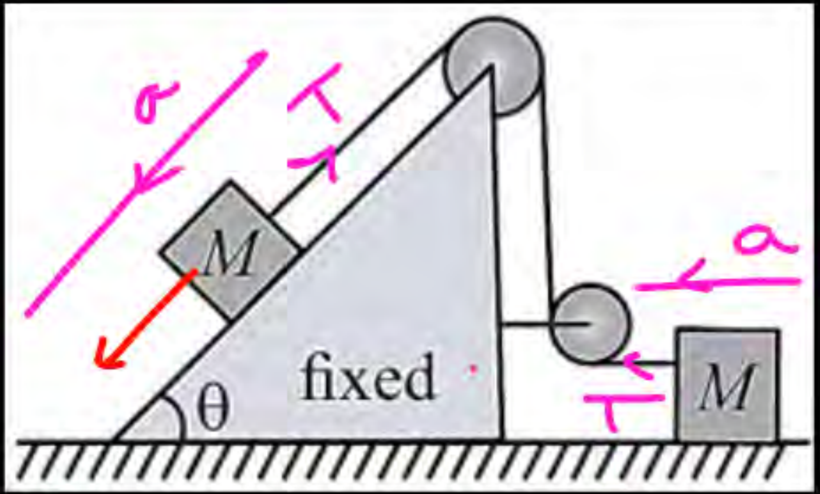
(3) $\frac{Mg\sin\theta}{2}$ (4) $2\,Mg\sin\theta$

$$a = \frac{mg\sin\theta}{m+m} = \frac{g\sin\theta}{2}$$

Ans: (3)

QUESTION - 14

Two blocks, each having mass M, rest on frictionless surfaces as shown in the figure. If the pulleys are light and frictionless, and M on the incline is allowed to move down, then the tension in the string will be:



(1) $\frac{2}{3}Mg\sin\theta$

(2) $\frac{3}{2}Mg\sin\theta$

(3) $\frac{Mg\sin\theta}{2}$

(4) $2\,Mg\sin\theta$

$a = \frac{mg\sin\theta}{m+m} = \frac{g\sin\theta}{2}$

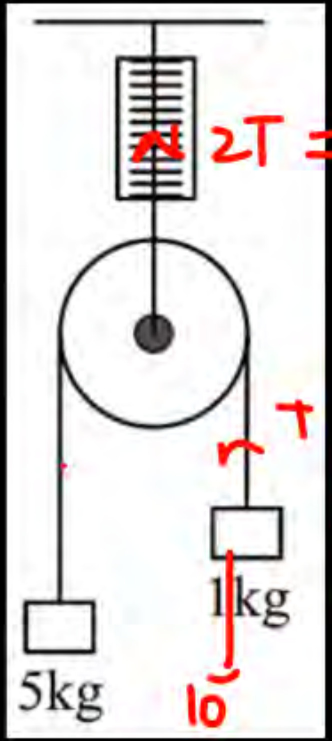
$mg\sin\theta - T = ma$

$T = mg\sin\theta - m \times \frac{g\sin\theta}{2} = \frac{mg\sin\theta}{2}$

Ans: (3)

QUESTION - 15

In the figure a smooth pulley of negligible weight is suspended by a spring balance. Weights of 1 kg and 5 kg are attached to the opposite ends of a string passing over the pulley and move with acceleration because of gravity. During the motion, the spring balance reads a weight of



(1) 6 kg
(2) Less than 6 kg
(3) More than 6 kg
(4) May be more or less than 6 kg

$2T = \frac{100}{3} = \frac{10}{3} g \Rightarrow 3.33 \text{ kg}$

a

$T - 10 = 1 \times \frac{20}{3}$

$T = 10 + \frac{20}{3} = \frac{50}{3}$

$a = \frac{50-10}{6} = \frac{20}{3}$

$T = \frac{2m_1m_2}{m_1+m_2} g = \frac{2 \times 5}{6} \times 10 = \frac{100}{6}$

Ans: (2)

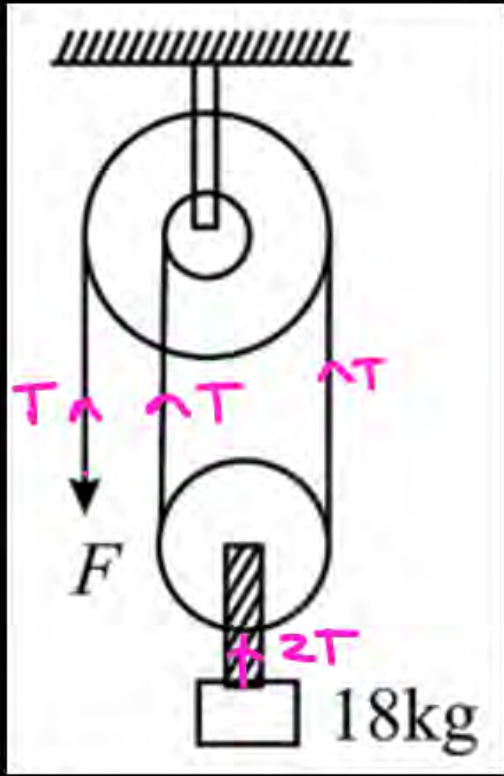
QUESTION - 16

In the figure at the free end a force F is applied to keep the suspended mass of 18 kg at rest. The value of F is:

(1) 180 N	(2) 90 N
(3) 60 N	(4) 30 N

$2T = 180$

$T = 90$



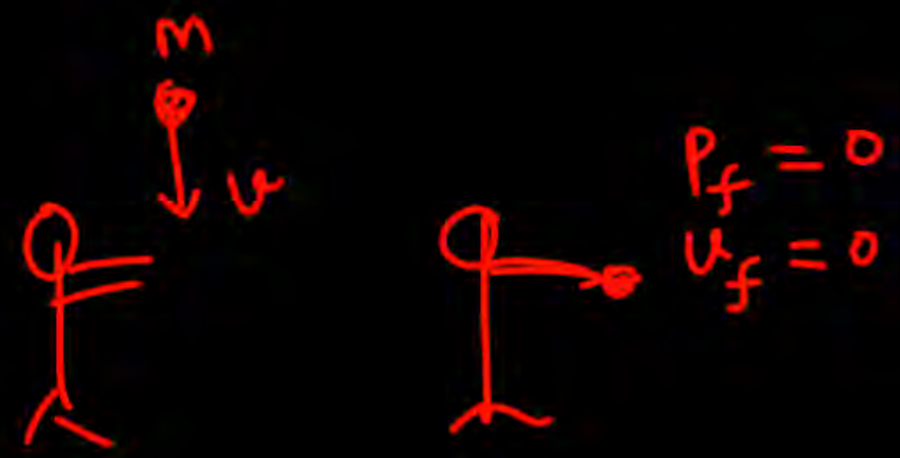
Ans: (2)

QUESTION - 17

A cricket player catches a ball of mass 120 g moving with 25 m/s speed. If the catching process is completed in 0.1 s then the magnitude of force exerted by the ball on the hand of player will be (in SI unit): **[Feb 1, 2024 (II)]**

(1) 30 (2) 24

(3) 12 (4) 25



$$\Delta \vec{P} = \vec{P_f} - \vec{P_i}$$

$$= 0 - (-mv) = mv$$

$$\langle F \rangle = \frac{\Delta P}{\Delta t} = \frac{P_f - P_i}{\Delta t} = \frac{mv}{\Delta t}$$

$$= \frac{.120 \times 25}{.1} = \underline{1.2 \times 25} = \underline{30.0}$$

Ans: (1)

QUESTION - 18

A body of mass 4 kg experiences two forces $\vec{F}_1 = 5\hat{i} + 8\hat{j} + 7\hat{k}$ and $\vec{F}_2 = 3\hat{i} - 4\hat{j} - 3\hat{k}$.

The acceleration acting on the body is:

[01 Feb, 2024 (Shift-II)]

$\frac{\vec{F}_1 + \vec{F}_2}{m}$

(1) $-2\hat{i} - \hat{j} - \hat{k}$

(2) $4\hat{i} + 2\hat{j} + 2\hat{k}$

(3) $2\hat{i} + \hat{j} + \hat{k}$

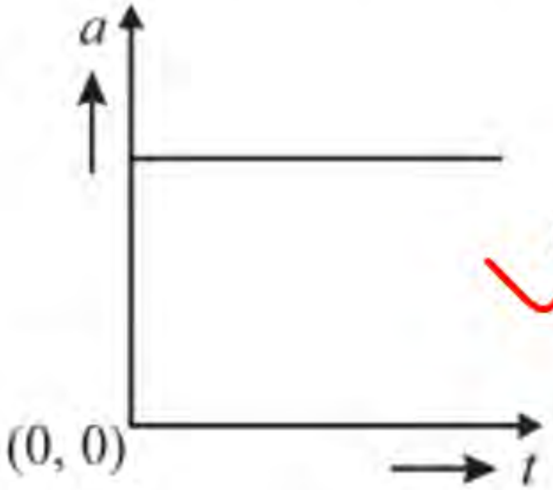
(4) $2\hat{i} + 3\hat{j} + 3\hat{k}$

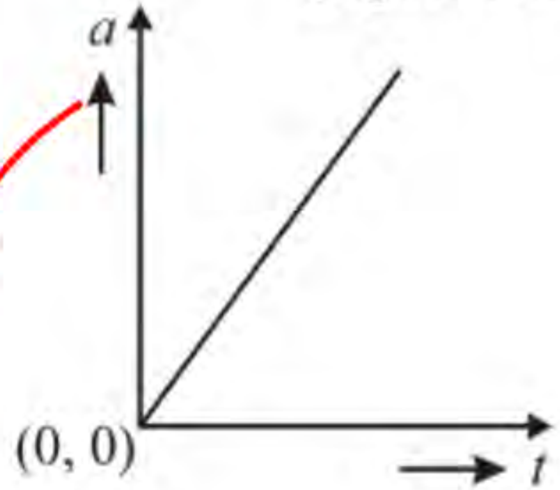
Ans: (3)

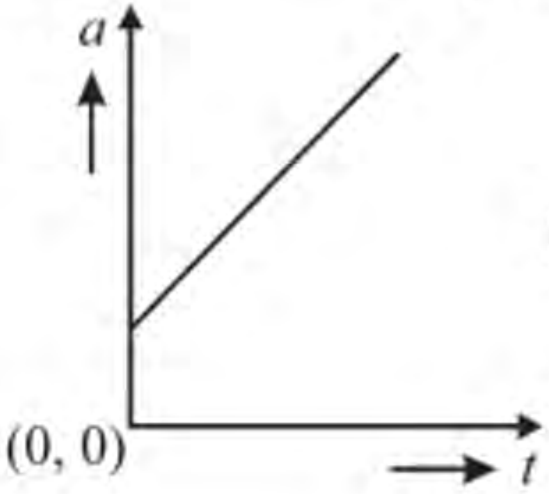
QUESTION - 19

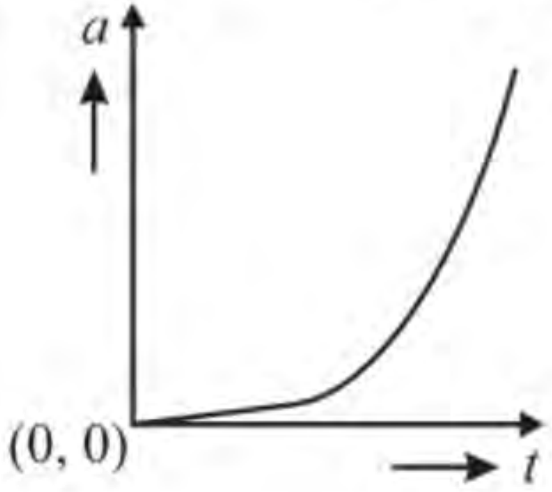
A wooden block, initially at rest on the ground, is pushed by a force which increases linearly with time t. Which of the following curve best describes acceleration of the block with time:

[April 4, 2024 (I)]

(1)


(2)


(3)


(4)


2kg

$$F = 5t$$

$$a = \frac{F}{m} = \frac{5t}{m} = \frac{5t}{2}$$

Ans: (2)

QUESTION - 20

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

A particle moves in $x - y$ plane under the influence of a force $\vec{F}$ such that its linear momentum is $\vec{p}(t) = \hat{i}\cos(kt) - \hat{j}\sin(kt)$. If k is constant, the angle between $\vec{F}$ and $\vec{p}$ will be:

[April 5, 2024 (II)]

(1) $\pi/2$ (2) $\pi/6$

(3) $\pi/4$ (4) $\pi/3$

$\vec{P} = \cos kt\,\hat{i} - \sin kt\,\hat{j} = \vec{A}$

$\vec{F} = -k\sin kt\,\hat{i} - k\cos kt\,\hat{j} = \vec{B}$

$\vec{A}\cdot\vec{B} = AB\cos\theta$

$(-k\,\cancel{\sin kt}\cos kt) + k\,\cancel{\sin kt}\cos kt = AB\cos\theta$

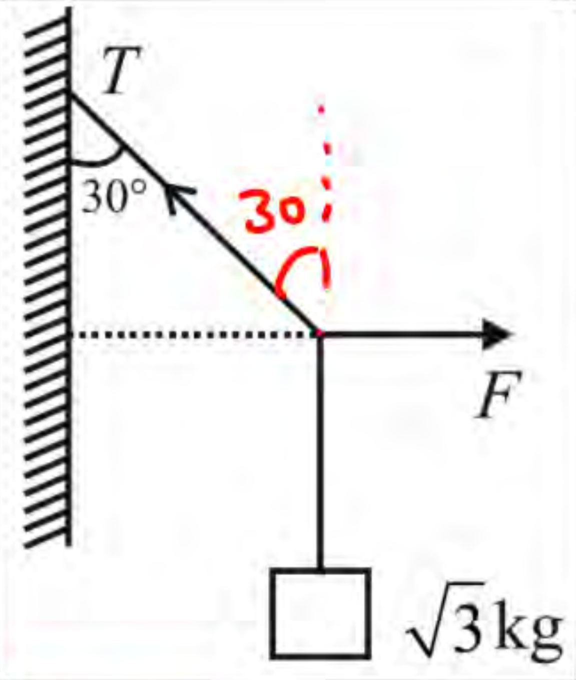
$\boxed{\theta = 90^\circ}$

Ans: (1)

QUESTION - 21

A block of $\sqrt{3}$ kg is attached to a string whose other end is attached to the wall. An unknown force F is applied so that the string makes an angle of 30° with the wall. The tension T is:
(Given $g = 10\ \text{ms}^{-2}$) **[Jan 30, 2023 (II)]**

(1) 20 N (2) 25 N
(3) 10 N (4) 15 N



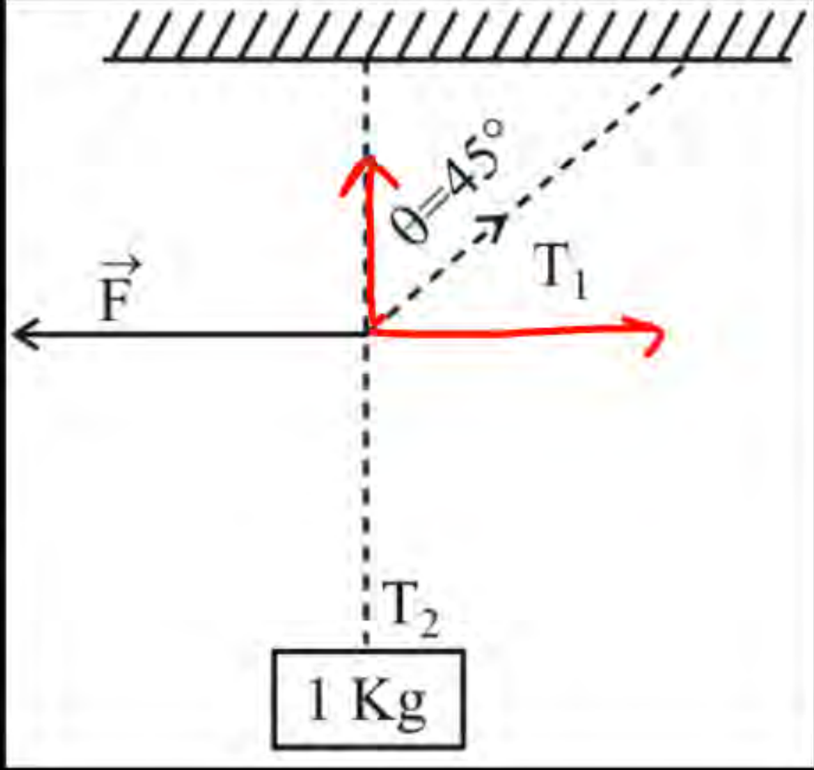
$T\cos 30 = \sqrt{3} \times 10$

$T\sin 30 = F$

Ans: (1)

QUESTION - 22

A 1 kg mass is suspended from the ceiling by a rope of length 4m. A horizontal force 'F' is applied at the mid point of the rope so that the rope makes an angle of 45° with respect to the vertical axis as shown in figure. The magnitude of F is: **[April 9, 2024 (II)]**



(1) $\frac{10}{\sqrt{2}}$ N

(2) 1 N

(3) $\frac{1}{10\times\sqrt{2}}$ N

(4) 10 N

Ans: (4)

QUESTION - 23

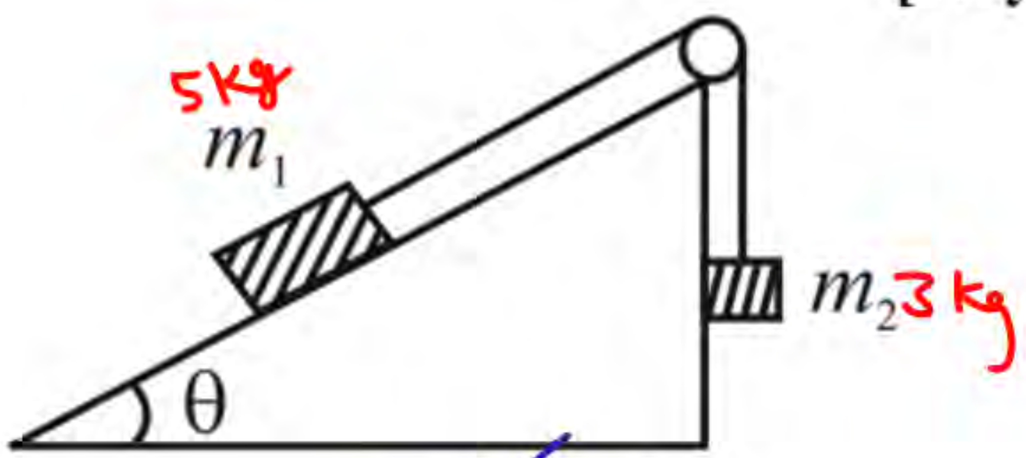
Two bodies of masses $m_1 = 5$ kg and $m_2 = 3$ kg are connected by a light string going over a smooth light pulley on a smooth inclined plane as shown in the figure. The system is at rest. The force exerted by the inclined plane of the body of mass m_1 will be:

[Take $g = 10\ \text{ms}^{-2}$] $N = mg\cos\theta = 50 \times \frac{4}{5} = 40$

[July 29, 2022 (II)]

$30 = 50\sin\theta$

$\theta = 37°$



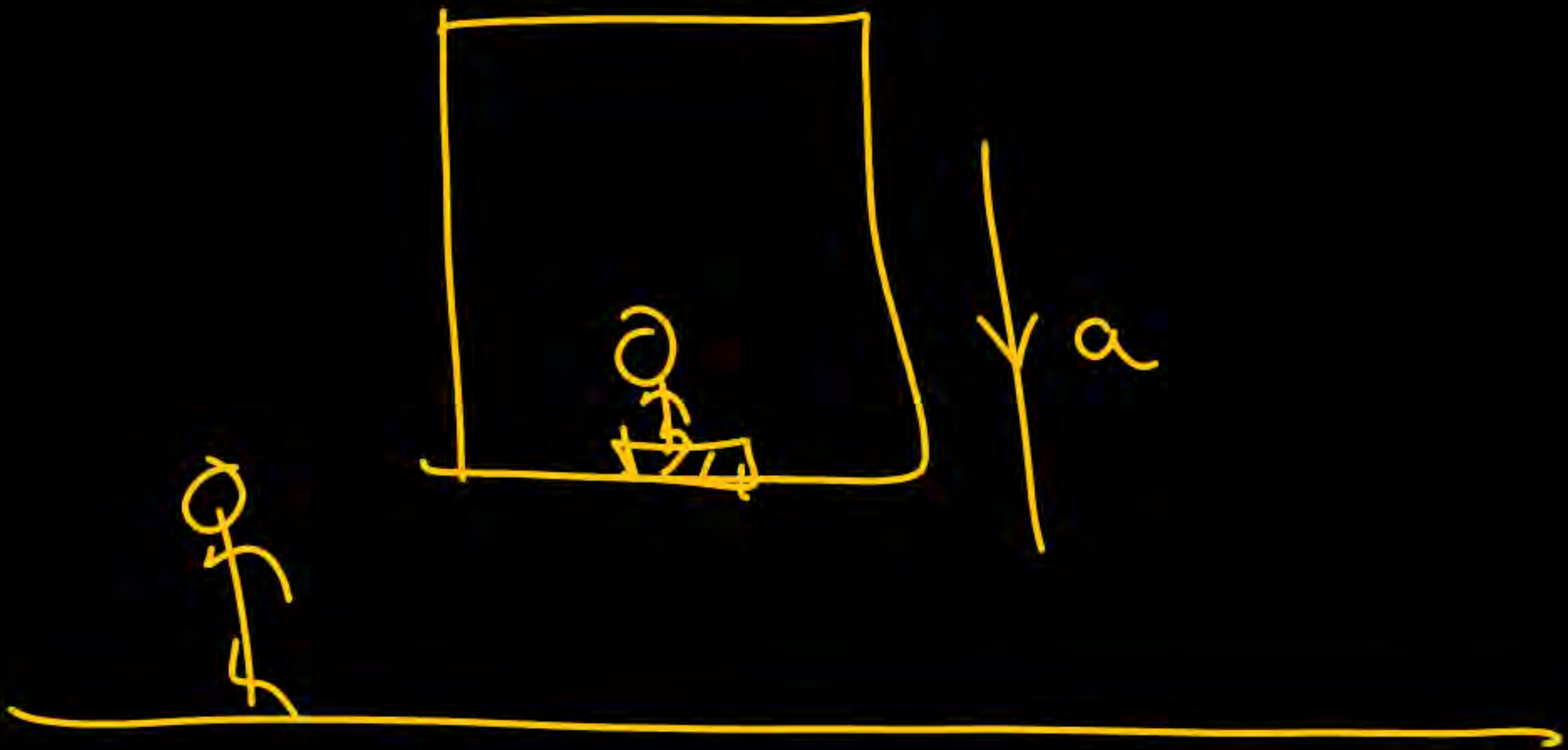
(1) 30 N (2) 40 N
(3) 50 N (4) 60 N

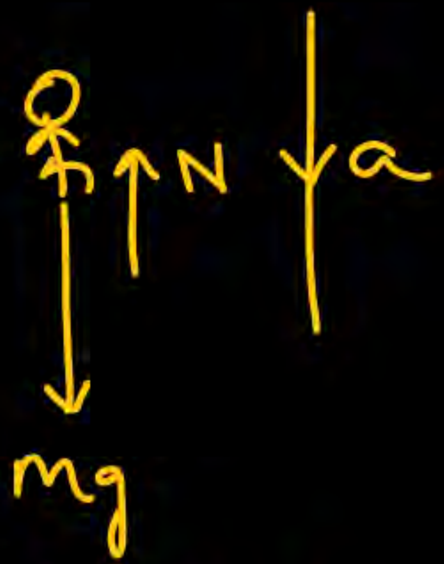
Ans: (2)

QUESTION - 24

A person standing on a balance inside a stationary lift measures 60 kg. The weight of that person if the lift descends with uniform downward acceleration of 1.8 m/s^2 will be ________ N. [$g = 10\ m/s^2$]

[26 Feb, 2021 (Shift-I)]





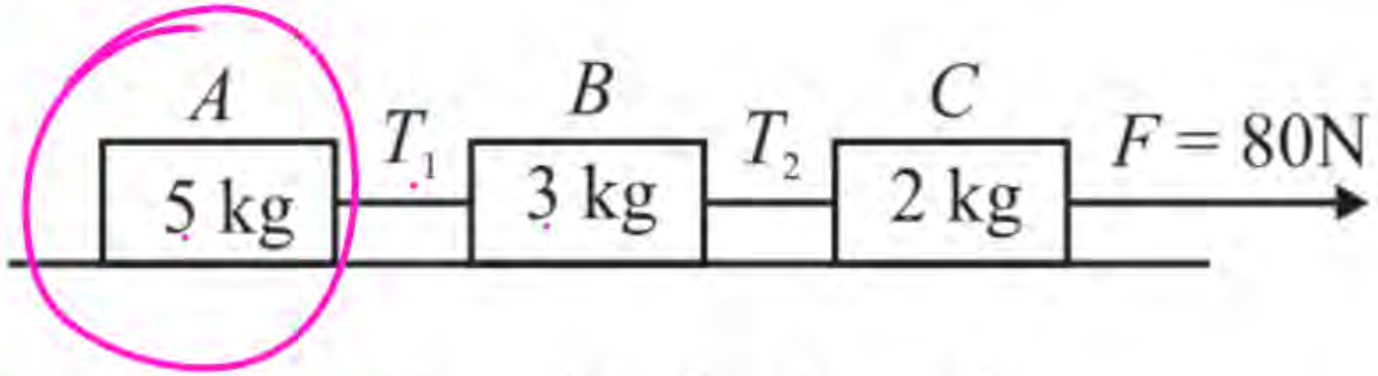
$mg - N = ma$

$600 - N = 60 \times 1.8$

Ans: (492)

QUESTION - 25

Three blocks A, B and C are pulled on a horizontal smooth surface by a force of 80 N as shown in figure



The tensions T_1 and T_2 in the string are respectively

[Jan 30, 2024 (II)]

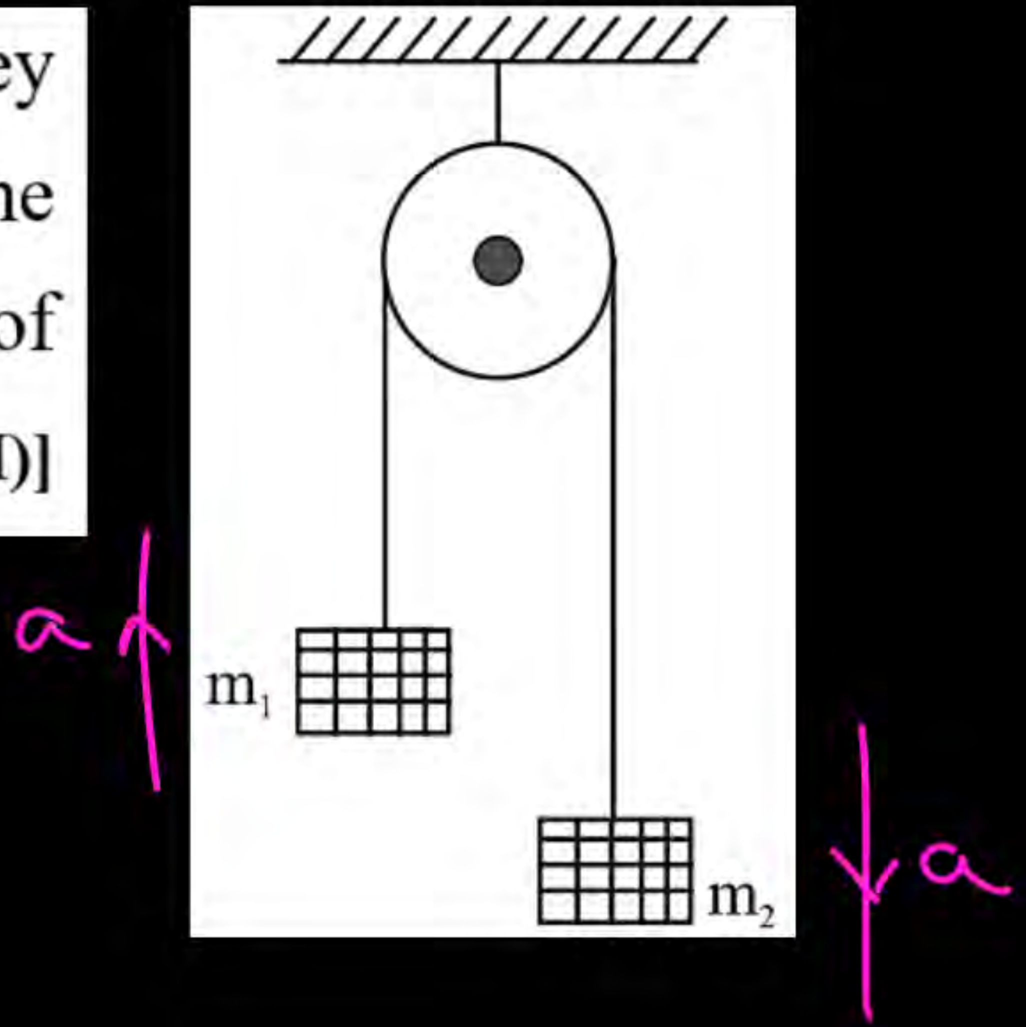
(1) 40 N, 64 N (2) 60 N, 80 N

(3) 88 N, 96 N (4) 80 N, 100 N

Ans: (1)

QUESTION - 26

A light string passing over a smooth light fixed pulley connects two blocks of masses m_1 and m_2. If the acceleration of the system is $g/8$, then the ratio of masses is: [31 Jan, 2024 (Shift-II)]



(1) 9/7 (2) 8/1

(3) 4/3 (4) 5/3

$$a = \frac{m_2 g - m_1 g}{m_1 + m_2} = \frac{g}{8}$$

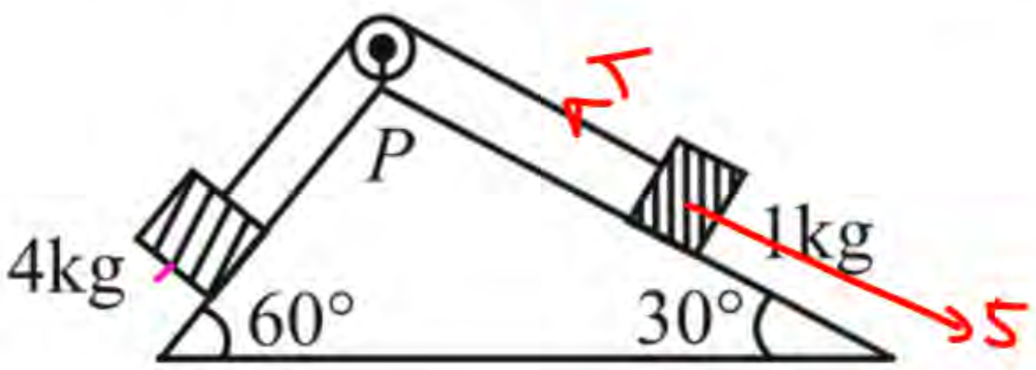
$$8m_2 - 8m_1 = m_1 + m_2$$

$$\boxed{7m_2 = 9m_1}$$

Ans: (1)

QUESTION - 27

As per given figure, a weightless pulley P is attached on a double inclined frictionless surface. The tension in the string (massless) will be (if $g = 10\ \text{m/s}^2$). **[Jan 24, 2023 (I)]**



(1) $\left(4\sqrt{3}+1\right)$N (2) $4\left(\sqrt{3}+1\right)$N

(3) $4\left(\sqrt{3}-1\right)$N (4) $\left(4\sqrt{3}-1\right)$N

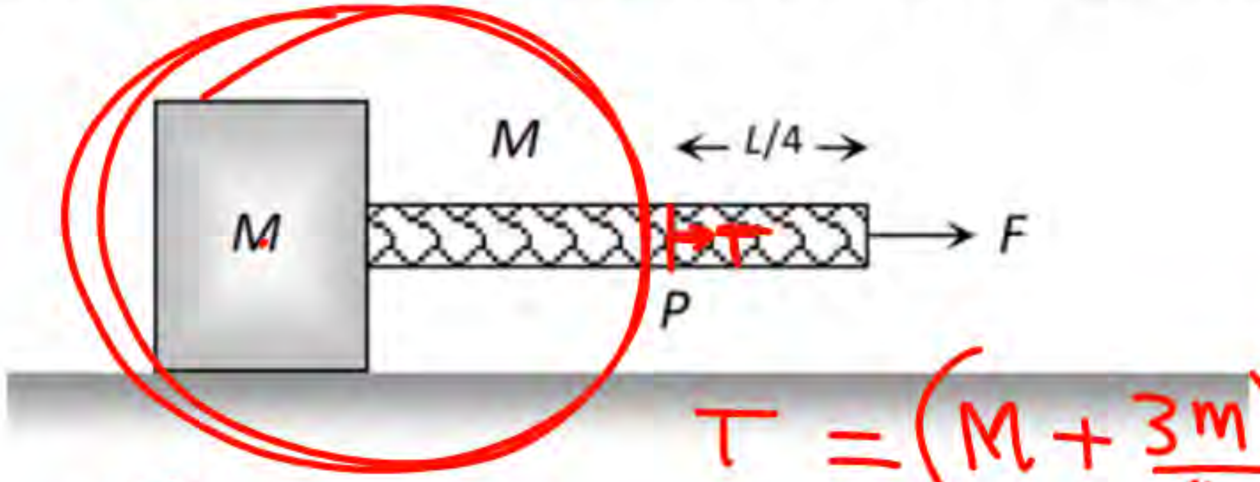
$$a = \frac{\frac{40\sqrt{3}}{2} - 5}{5} = 4\sqrt{3}-1$$

$$T - 5 = 1 \times \left(4\sqrt{3}-1\right)$$

Ans: (2)

QUESTION - 28

A block of mass M is pulled by a uniform chain of mass M tied to it by applying a force F at the other end of the chain. The tension at a point distant quarter of the length of the chain from free end will be:



$a = \frac{F}{2m}$

$T = \left(M + \frac{3m}{4}\right) a$

$= \frac{7m}{4} \times \frac{F}{2m}$

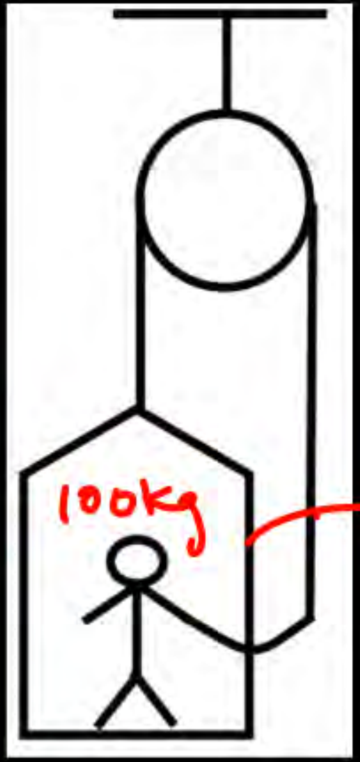
(1) $\frac{7F}{8}$ (2) $\frac{4F}{5}$

(3) $\frac{3F}{4}$ (4) $\frac{6F}{7}$

Ans: (1)

QUESTION - 29

A painter is raising himself and the crate on which he stand with an acceleration of 5 m/s^2 by a massless rope and pulley arrangement. Mass of the painter is 100 kg and that of the crate is 50 kg. If $g = 10\ m/s^2$, then the



(i) tension in rope is 2250 N

(ii) tension in rope is 1125 N

(iii) force of contact between the painter and the floor is 750 N

(iv) force of contact between the painter and the floor is 375 N

(1) (i), (ii) (2) (ii), (iv)

(3) (i), (iv) (4) (ii), (iii)

$T + N - 1000 = 100 \times 5$

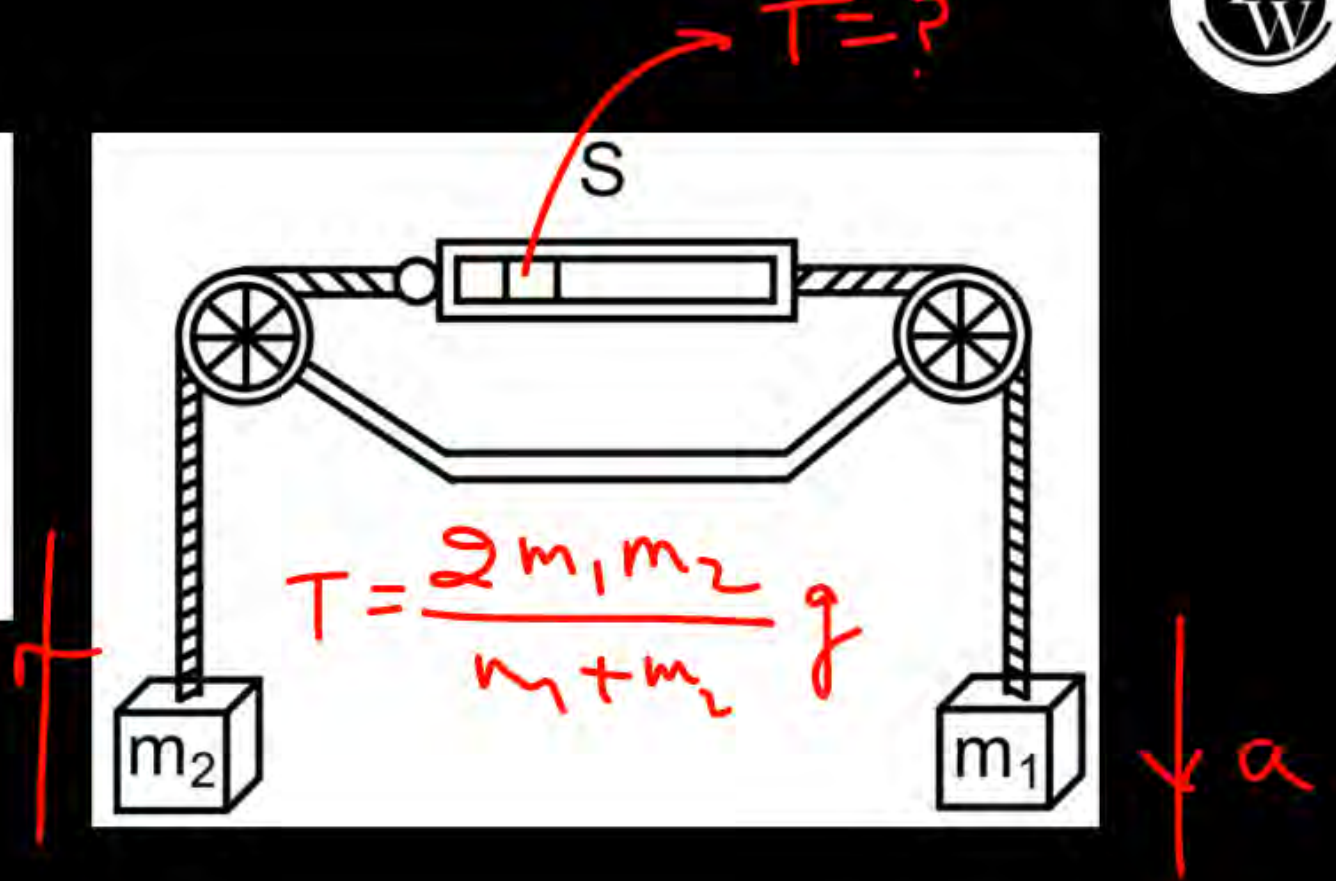
$T - N - 500 = 50 \times 5$

$2T - 1500 = 750$

Ans: (2)

QUESTION - 30

In the arrangement shown, the pulleys are fixed and ideal, the strings are light, $m_1 > m_2$ and S is a spring balance which is itself massless. The reading of S (in units of mass) is:



(1) $m_1 - m_2$

(2) $\frac{1}{2}(m_1 + m_2)$

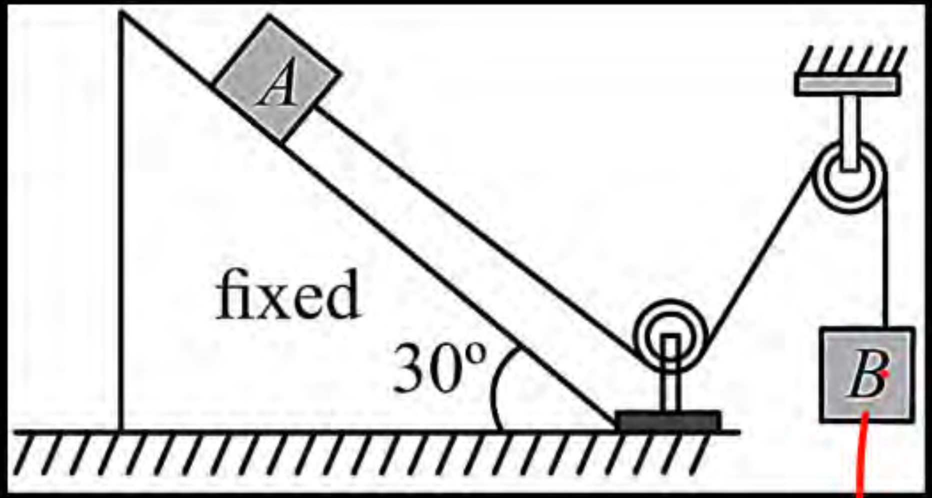
(3) $\frac{m_1 m_2}{m_1 + m_2}$

(4) $\frac{2m_1 m_2}{m_1 + m_2}$

Ans: (4)

QUESTION - 31

Two blocks A and B of equal mass m are connected through a massless string and arranged as shown in figure. Friction is absent everywhere. When the system is released from rest.



(1) Tension in string is $\frac{mg}{2}$

(2) Tension in string is $\frac{mg}{4}$

(3) Acceleration of A is $\frac{g}{2}$

(4) Acceleration of A is $\frac{3}{4}g$

$$a = \frac{mg + mg\sin\theta}{2m} = \frac{g + g/2}{2} = \frac{3g}{4}$$

$$mg - T = ma$$

$$T = mg - ma = mg - m\frac{3g}{4}$$

Ans: (2, 4)

THANK YOU