YAKEEN NEET 2.0

2026

Laws of Motion

Physics

Assignment Solution 01

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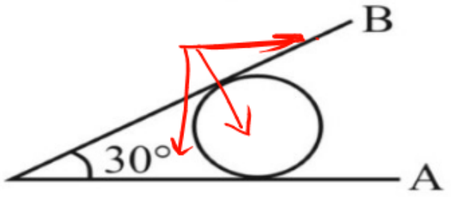
Sangharsh Assignment -1

Laws of Motion

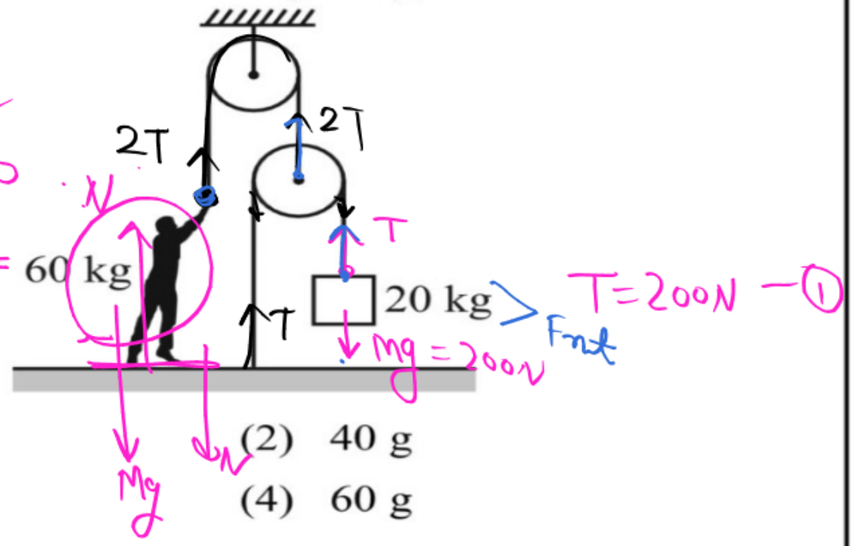
1. An sphere weighs 10 N and rest in V shaped though whose sides form an angle 30°. Normal reaction excerted by wall B on sphere is:



(1) 10 N (2) $5\sqrt{3}$ N

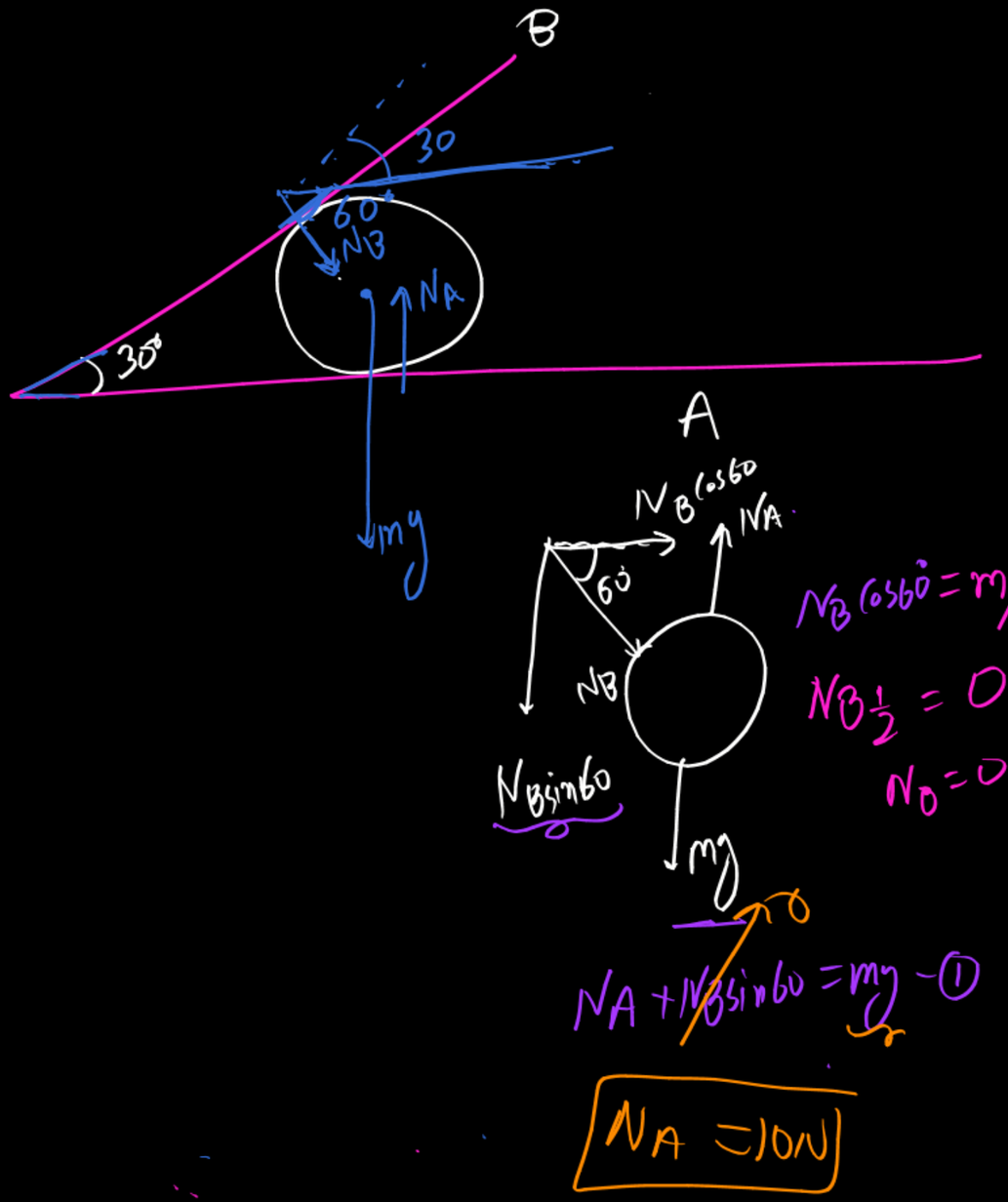
(3) 5 N (4) Zero

2. A man of mass 60 kg is standing on a massless plank and holding a string passing over a system of ideal pulley such that the system is in equilibrium. The force exerted by the plank on the man is:
(g = acceleration due to gravity)



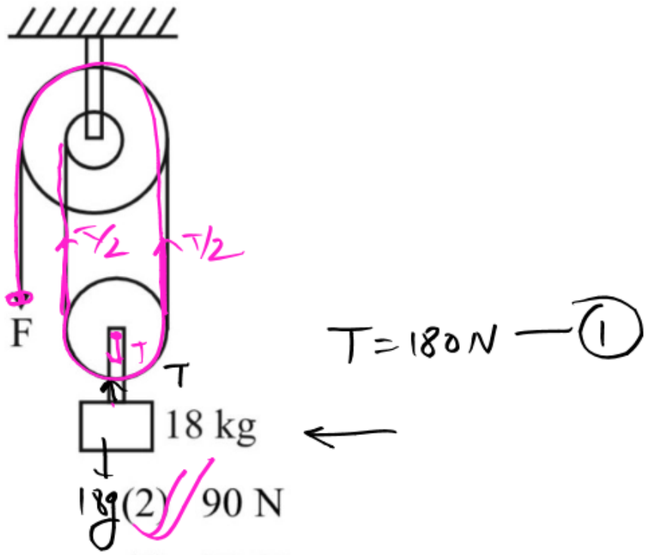
(1) 20 g (2) 40 g

(3) 45 g (4) 60 g



(3) 45 g (4) 60 g

3. 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:



$F = T/2$

$F = \frac{180}{2}$

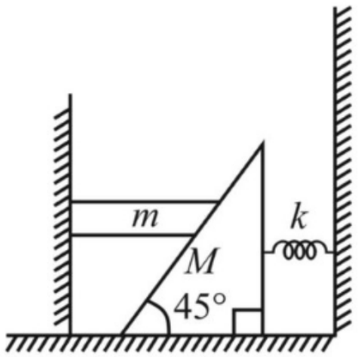
$T/2$ $T/2$

$T = 180\,N$ — (1)

(1) 180 N (2) 90 N

(3) 60 N (4) 30 N

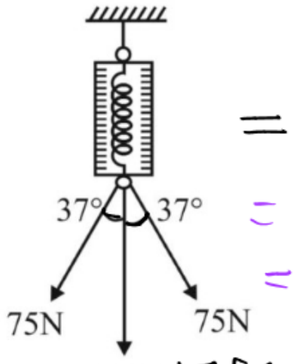
4. All surfaces shown in the figure are smooth. If the whole system is in equilibrium, the compression in spring will be



(1) $\frac{mg}{\sqrt{2}k}$ (2) $\frac{mg}{2k}$

(3) $\frac{(M+m)g}{\sqrt{2}k}$ (4) $\frac{mg}{k}$

5. The scale in figure is being pulled on by three ropes. What net force (in N) does the spring scale read?

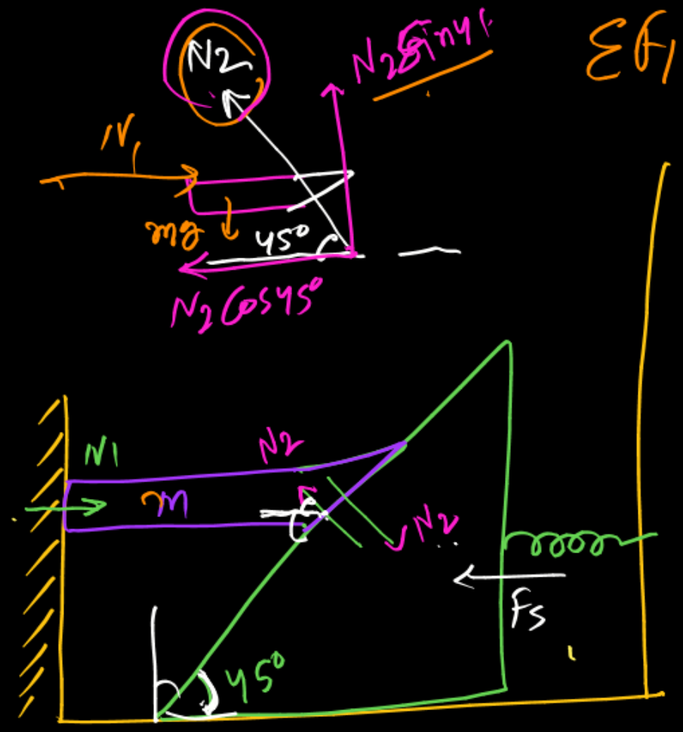


150N + 75cos37° + 75cos37°

$= 150 + 75 \times \frac{4}{5} + 75 \times \frac{4}{5}$

$= 150 + 120$

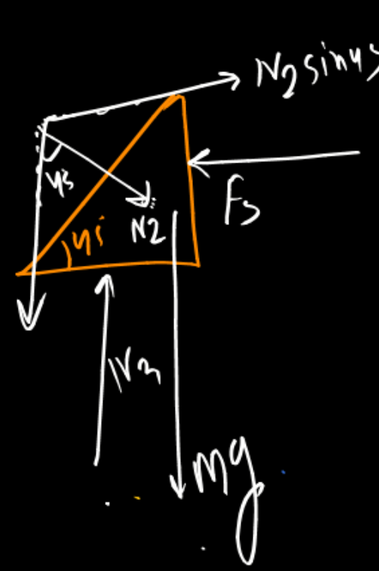
$= 270N$



$\Sigma F_y = 0$

$N_2 \sin 45° = mg$

$N_2 = \frac{mg}{\sin 45°}$ — (1)



$\Sigma F_x = 0$

$N_2 \sin 45° = f_s$

$\frac{mg}{\sin 45°} \sin 45° = f_s$

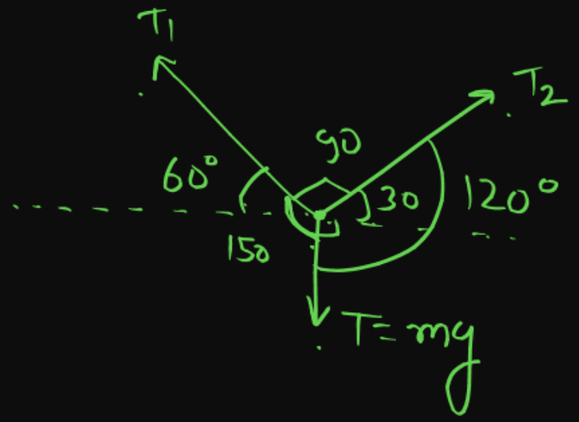
$mg = kx$

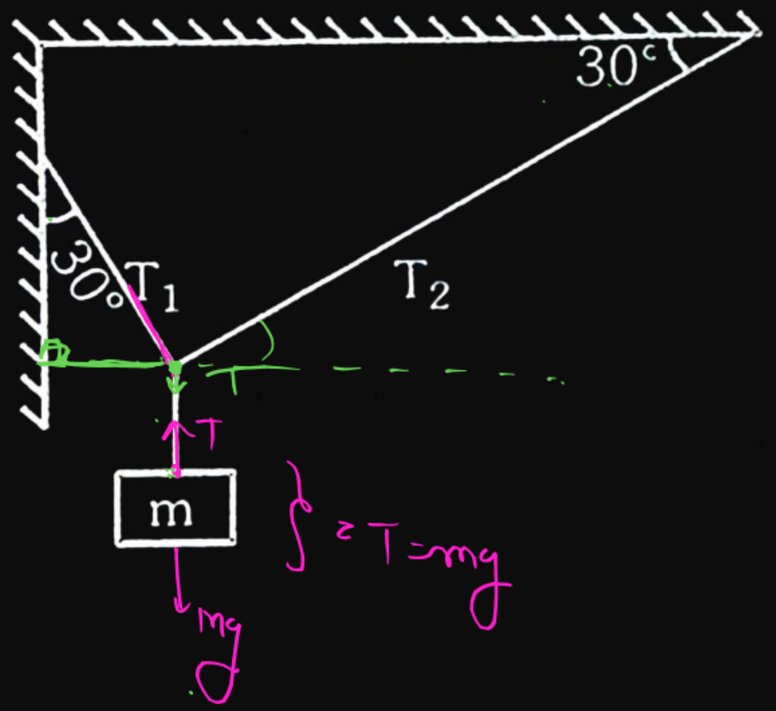
$x = \frac{mg}{k}$

Question

Calculate T_1 & T_2.

(6)





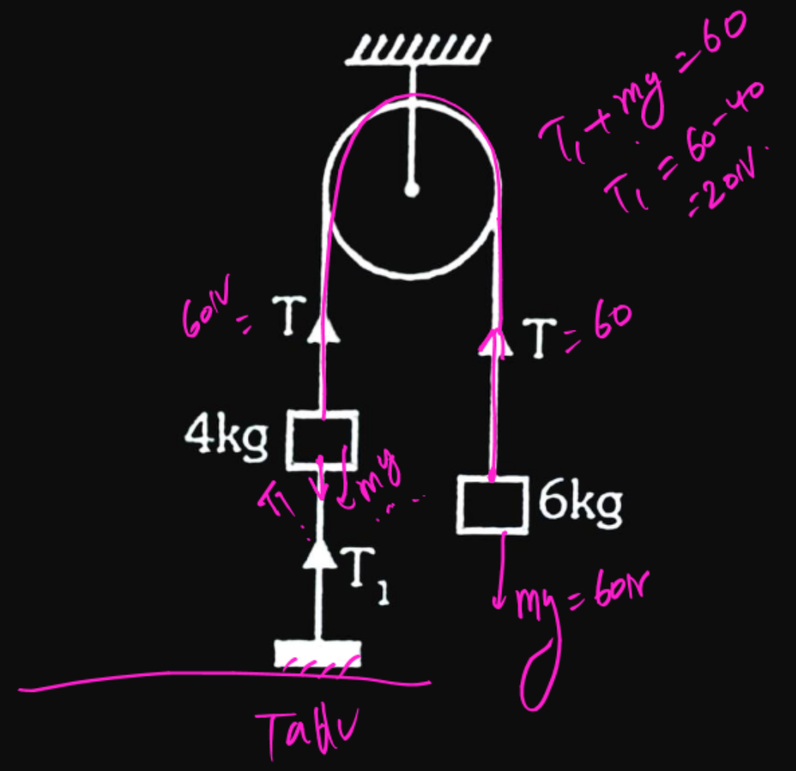
$$\frac{T_1}{\sin 120} = \frac{mg}{\sin 90^\circ}$$

$$T_1 = mg\frac{\sqrt{3}}{2}$$

Question

7 Two bodies of mass 4 kg and 6 kg are attached to the ends of a string passing over a pulley. The 4 kg mass is attached to the table top by other string. The tension in this string T_1 is equal to

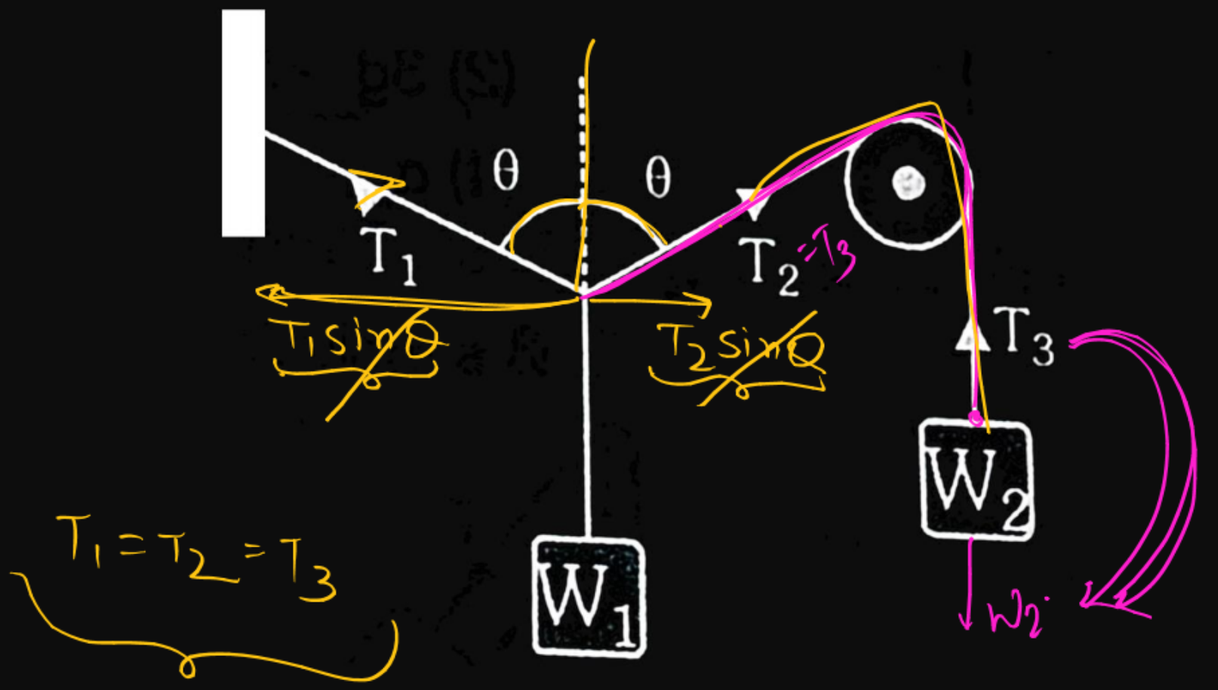
1. 10 N
2. 10.6 N
3. 25 N
4. 20 N



Question

8 In the following figure, the pulley is massless and frictionless. The relation between T_1, T_2 and T_3 will be:

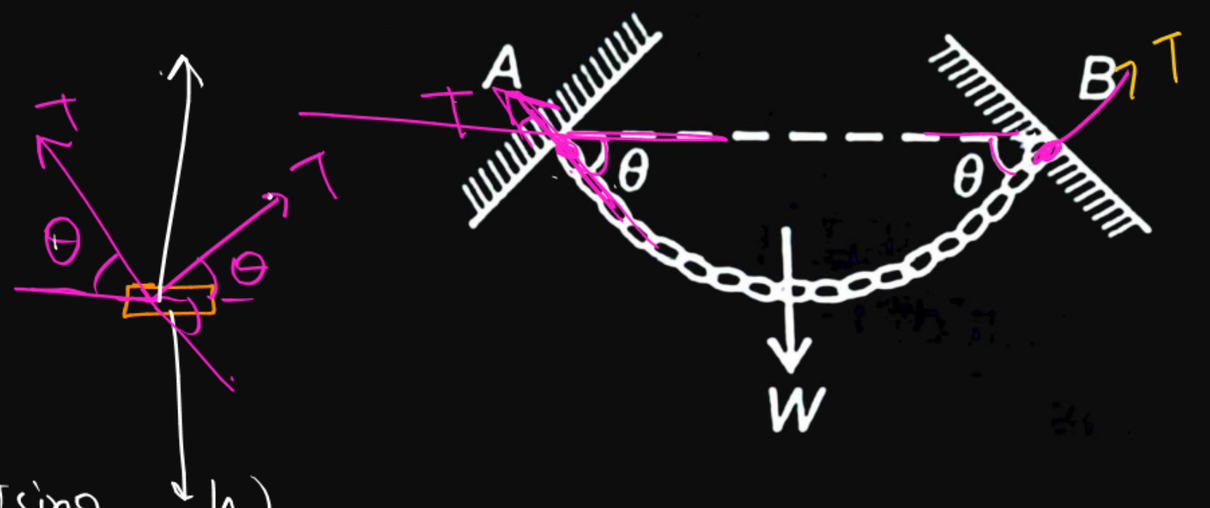
1. $T_1 = T_2 \neq T_3$
2. $T_1 \neq T_2 = T_3$
3. $T_1 \neq T_2 \neq T_3$
4. $T_1 = T_2 = T_3$



Question

9 A flexible chain of weight W hangs between two fixed points A and B at the same level. The inclination of the chain with the horizontal at the two points of support is θ. What is the tension of the chain at the endpoint?

1. $\frac{W}{2}\operatorname{cosec}\theta$
2. $\frac{W}{2}\sec\theta$
3. $W\cos\theta$
4. $\frac{W}{2}\sin\theta$



$T\sin\theta + T\sin\theta = W$

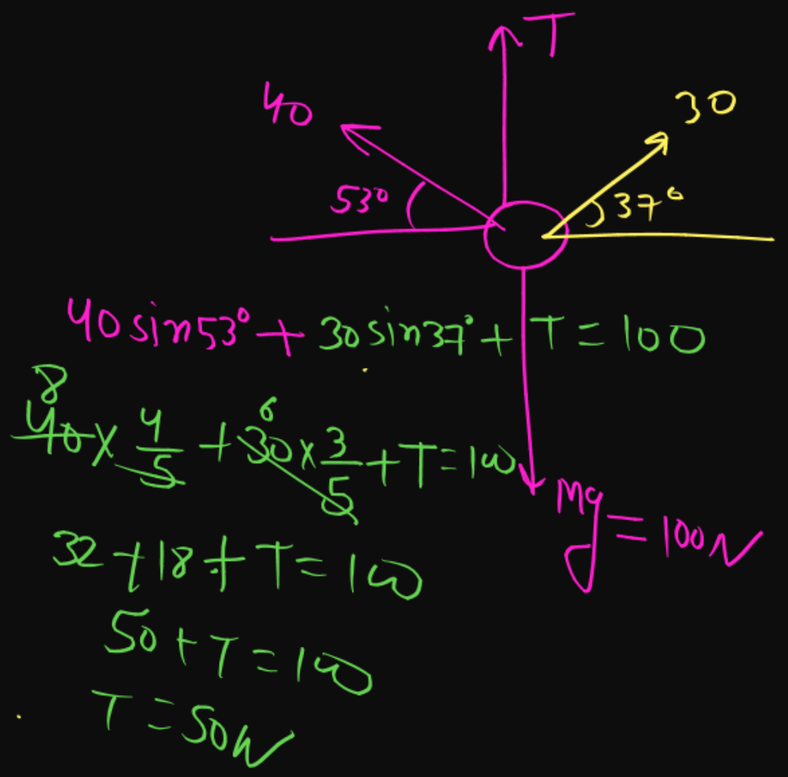
$2T\sin\theta = W$

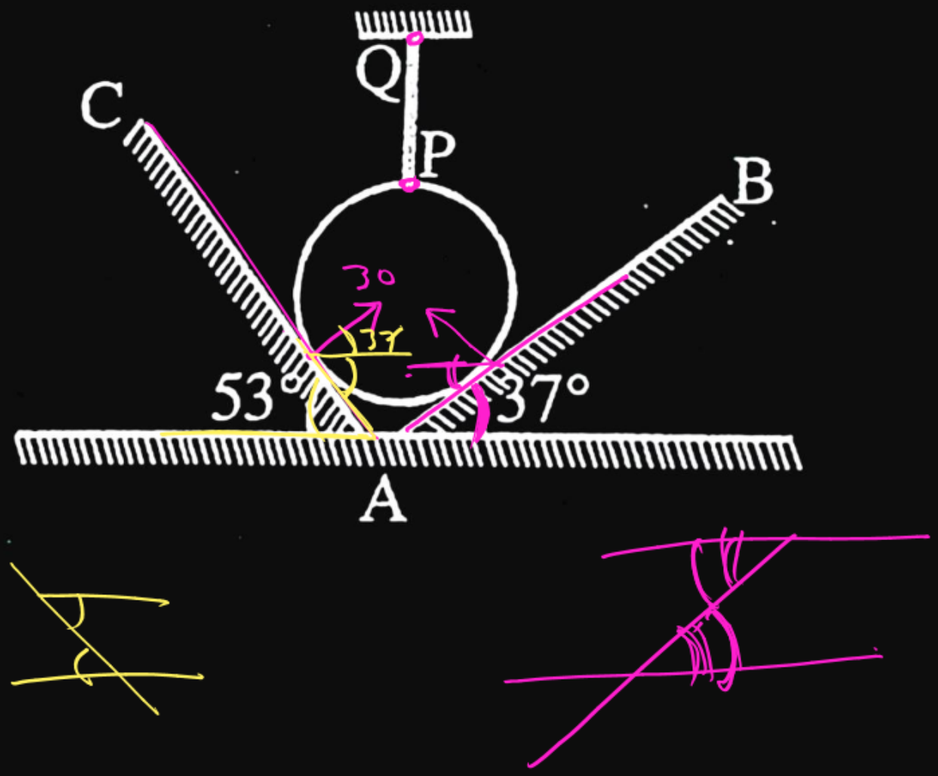
$T = \frac{W}{2\sin\theta} = \frac{W}{2}\operatorname{cosec}\theta$

Question

(10) A cylinder of mass 10 kg is resting between two frictionless inclined surfaces AB and AC, and it is attached to a vertical string PQ whose other end Q is fixed to the ceiling, as shown in the figure. If the forces applied by cylinder to surfaces AC and AB are 30 N and 40 N, respectively, the tension in the string is (in N) [$g = 10\ m/s^2$]

1. 20
2. 50
3. 30
4. 40





Question

(11)

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 Tin the string is:
(Given $g = 10\ ms^2$)

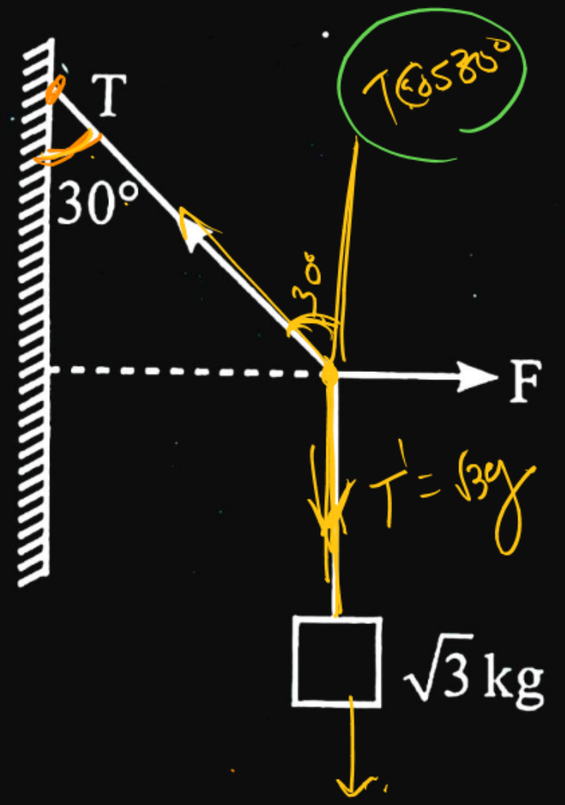
[JEE Main 2023]

1. 20 N
2. 25 N
3. 10 N
4. 15 N

$T\cos 30° = \sqrt{3}g$

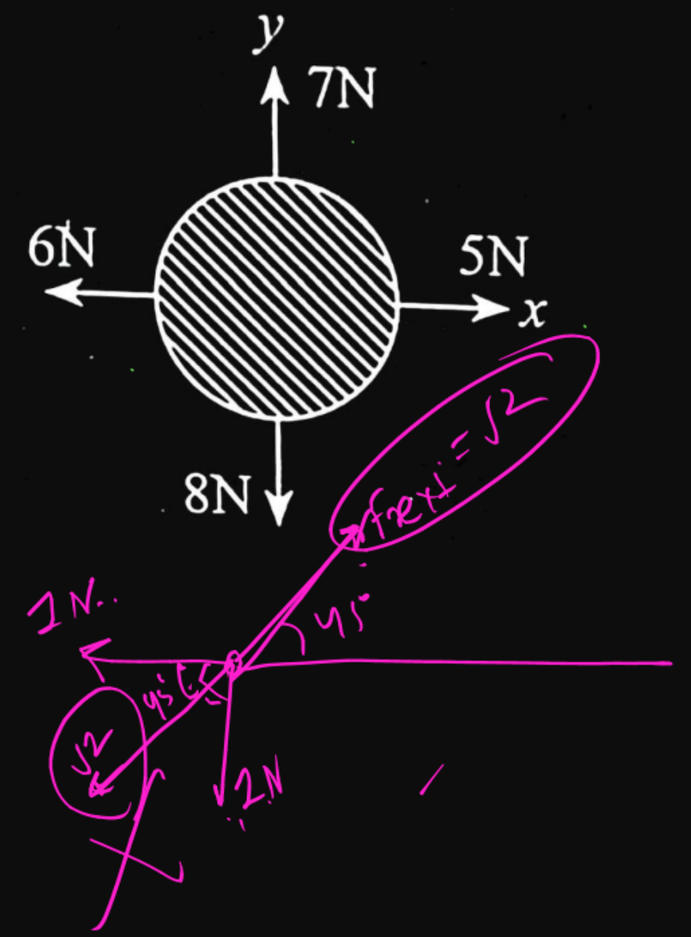
$T\frac{\sqrt{3}}{2} = \sqrt{3}g$

$T = 2g$



Question

12 For a free body diagram shown in the figure, the four forces are applied in the 'x' and 'y' directions. What additional force must be applied and at what angle with positive x-axis so that the net acceleration of body is zero? **[JEE Main 2022]**

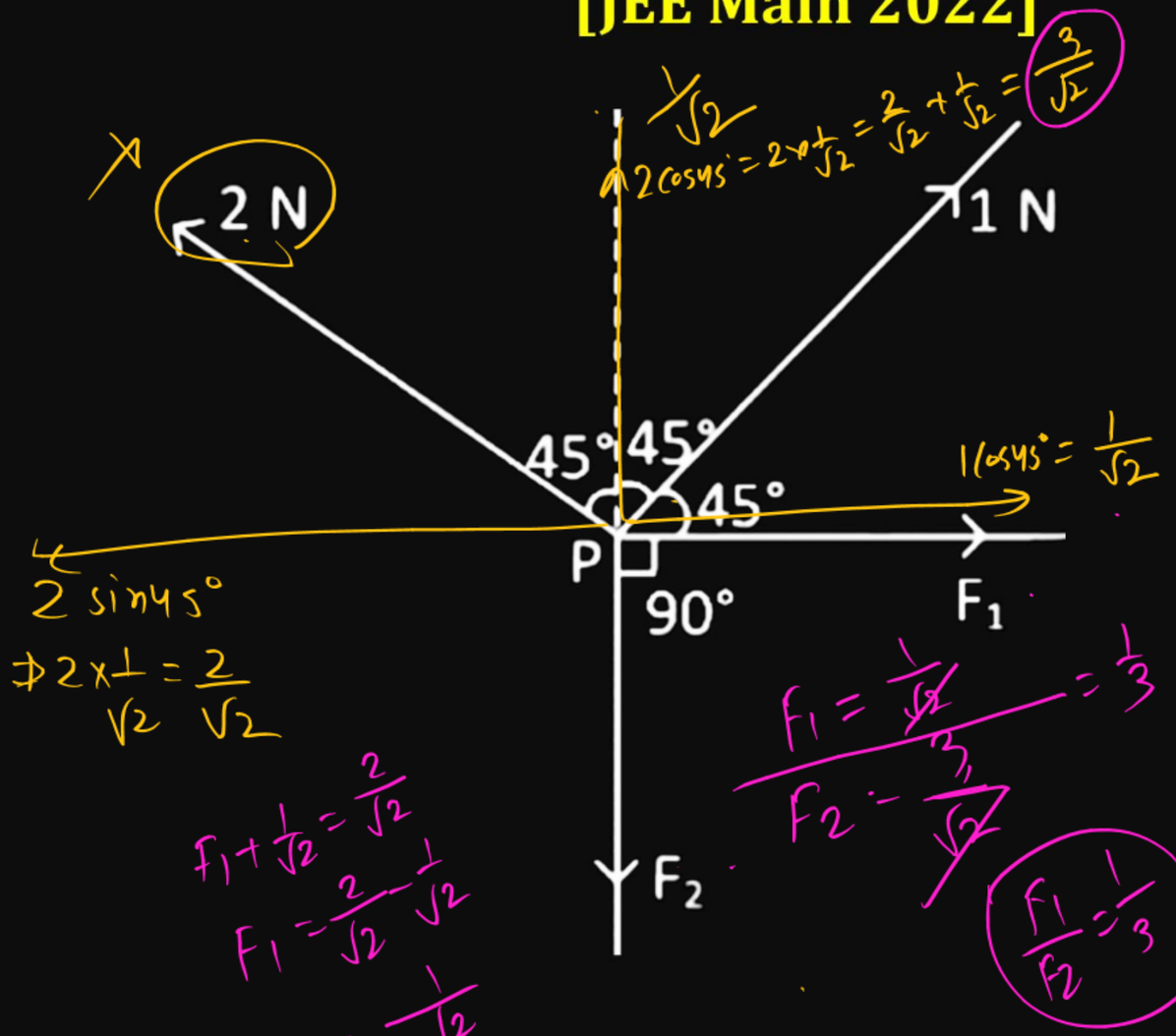


1. $\sqrt{2}$ N, 45°
2. $\sqrt{2}$ N, 135°
3. $\frac{2}{\sqrt{3}}$ N, 30°
4. 2 N, 45°

Question

13 Four forces are acting at a point P in equilibrium as shown in figure. The ratio of force F_1 to F_2 is 1 : x where, x = ____3____. **[JEE Main 2022]**

$\frac{F_1}{F_2} = \frac{1}{3} = \frac{1}{x}$



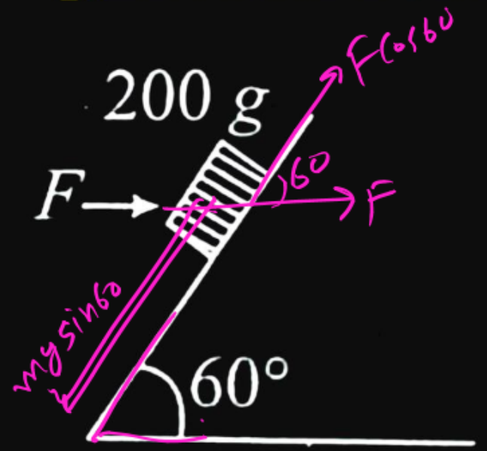
Question

14

A block of mass 200 g is kept stationary on a smooth inclined plane by applying a minimum horizontal force F = $\sqrt{x}$N as shown in figure. The value of x = _____.

12

[JEE Main 2022]



$F\cos 60^\circ = mg\sin 60^\circ$

$F \times \frac{1}{2} = \frac{200}{1000} \times 10 \times \frac{\sqrt{3}}{2}$

$F = 2\sqrt{3} = \sqrt{x}$

$2\sqrt{3} = \sqrt{x}$

$4 \times 3 = x$

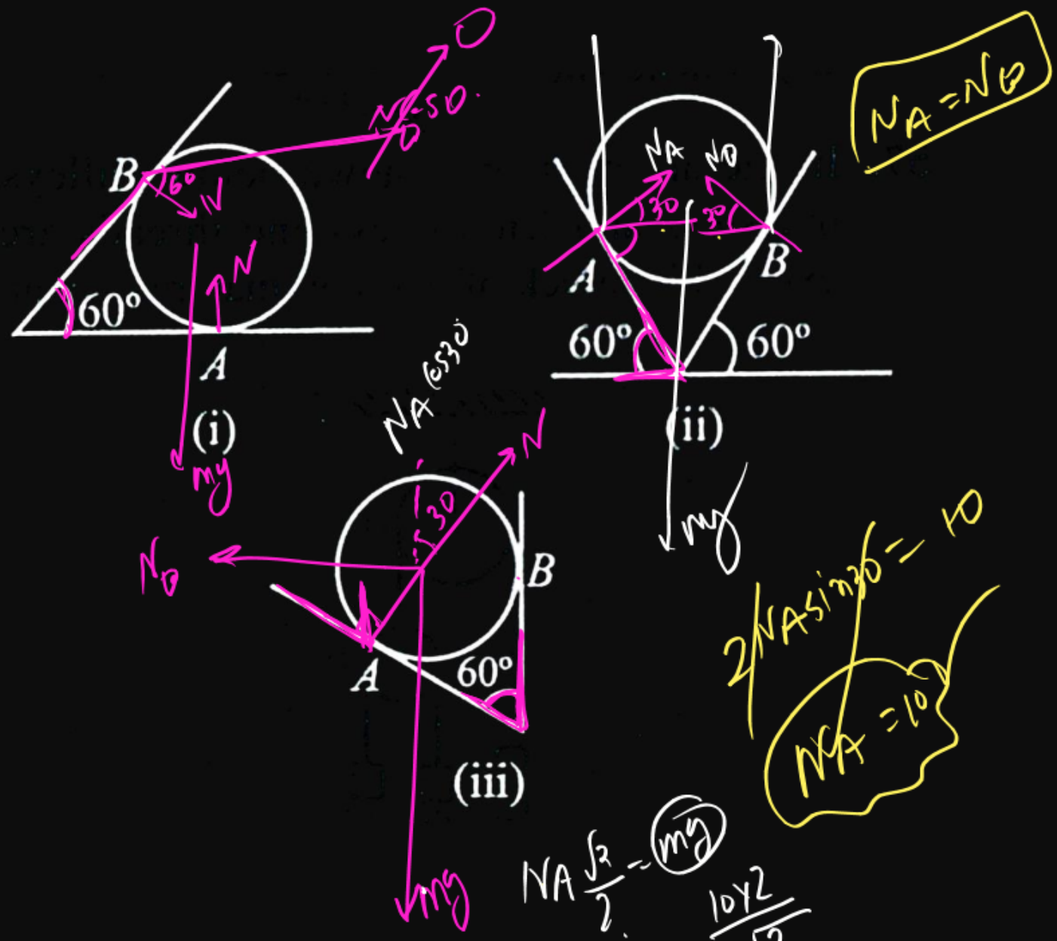
Question

15

An iron sphere weighing 10 N rests in a V shaped smooth trough whose sides form an angle of 60° as shown in the figure. Then the reaction forces are:
($g = 10\ m/s^2$)

1. $R_A = 10$ N and $R_B = 0$ in case (i)
2. $R_A = 10$ N and $R_B = 0$ in case (ii)
3. $R_A = \frac{20}{\sqrt{3}}$ N and $R_B = \frac{10}{\sqrt{3}}$ in case (iii)
4. $R_A = 10$ N and $R_B = 10$ N in all the three cases

Ans → (1) (3)

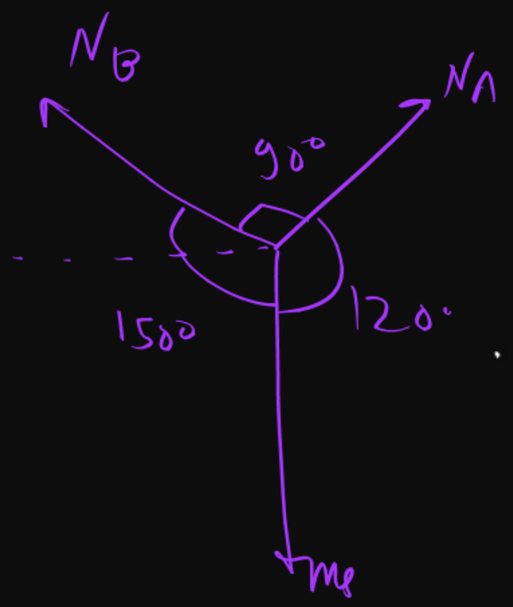


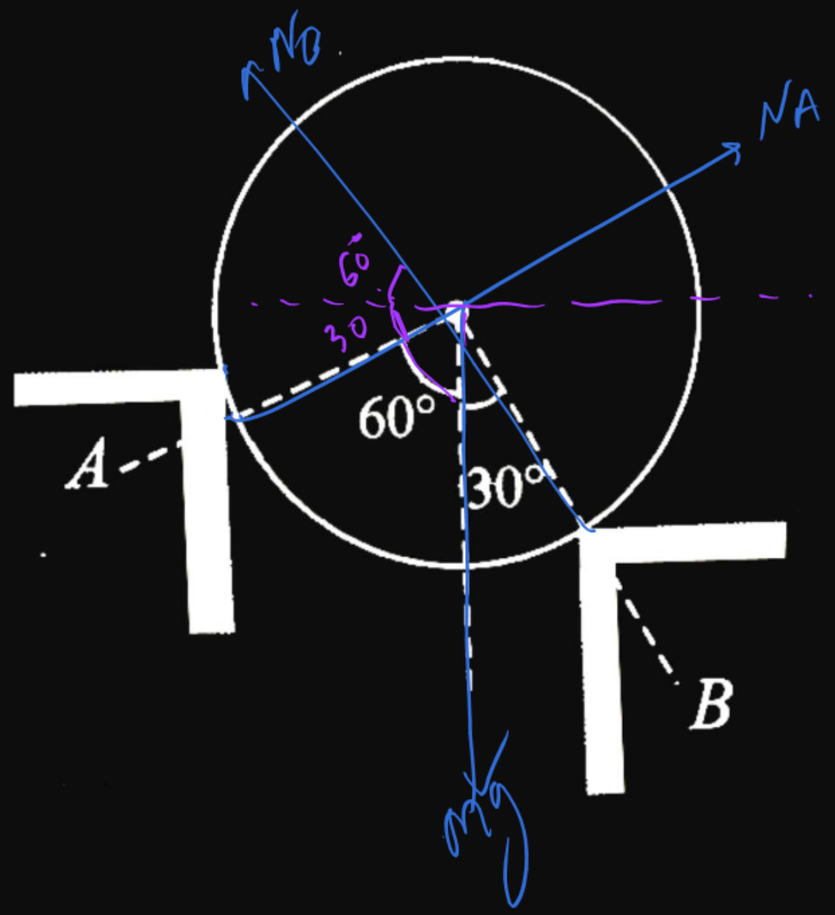
Question

16

A cylinder of mass M and radius R is resting on two corner edges A and B as shown in figure. The normal reaction at the edges A and B are: (Neglect friction):

1. $N_A = \sqrt{2}N_B$
2. $N_B = \sqrt{3}N_A$
3. $N_A = \frac{Mg}{2}$
4. $N_B = \frac{2\sqrt{3}Mg}{5}$

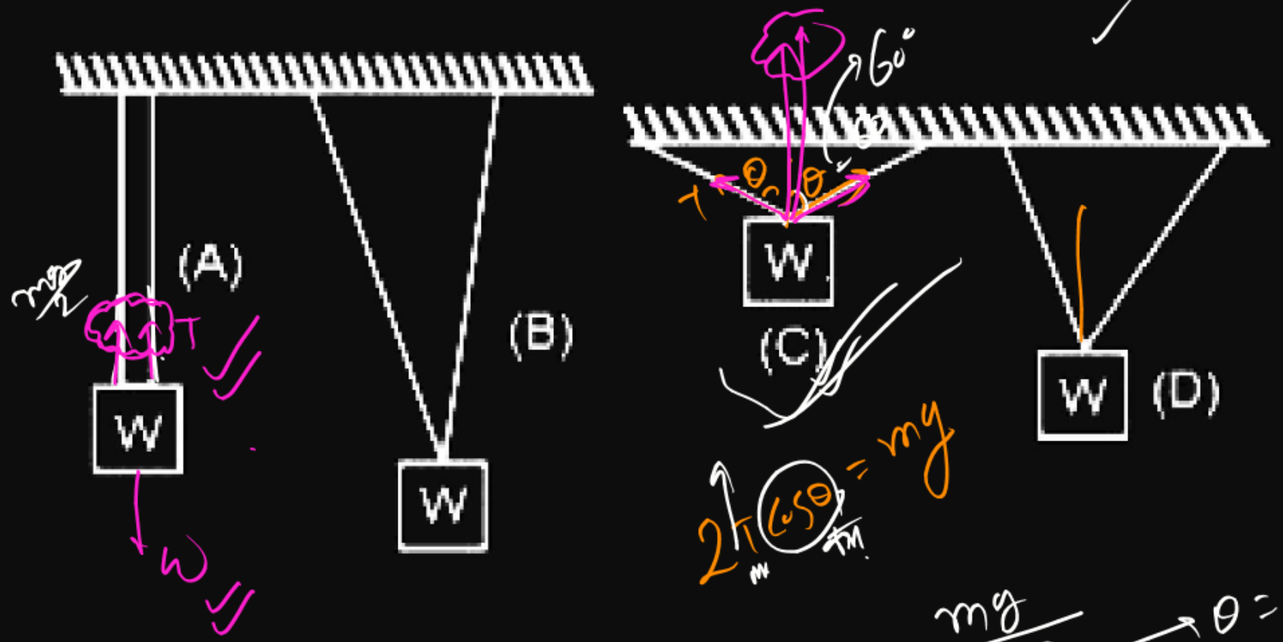




Question

A weight can be hung in any of following four ways by using same string. In which case is the string more likely is break

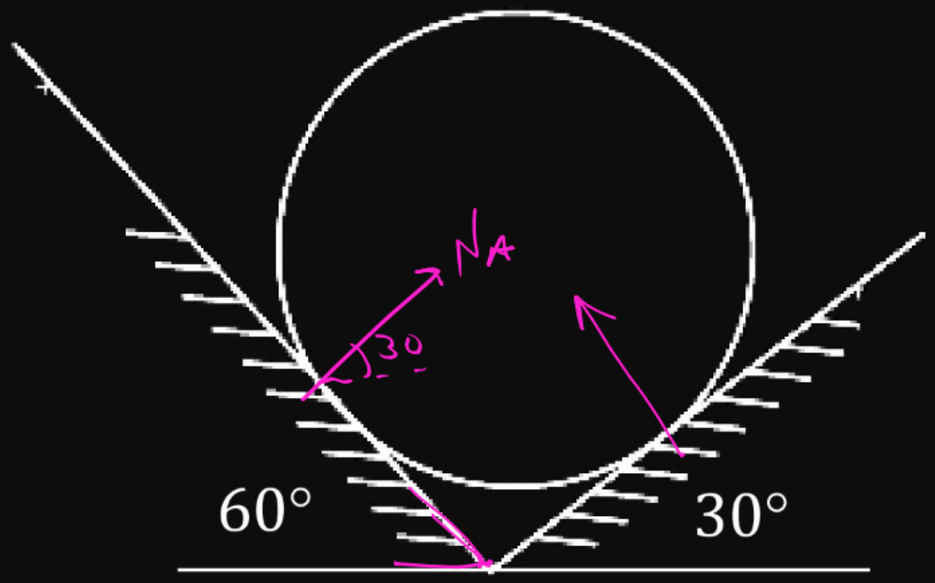
1. A
2. B
3. C
4. D



Question

18

A cylinder of mass $1/\sqrt{3}$ kg is placed on the corner of two inclined planes as shown in the figure. Find the normal reaction at contact point of cylinder with the slope of inclination 30°.



1. 15 N
2. 10 N
3. 7 N
4. 5 N

Question

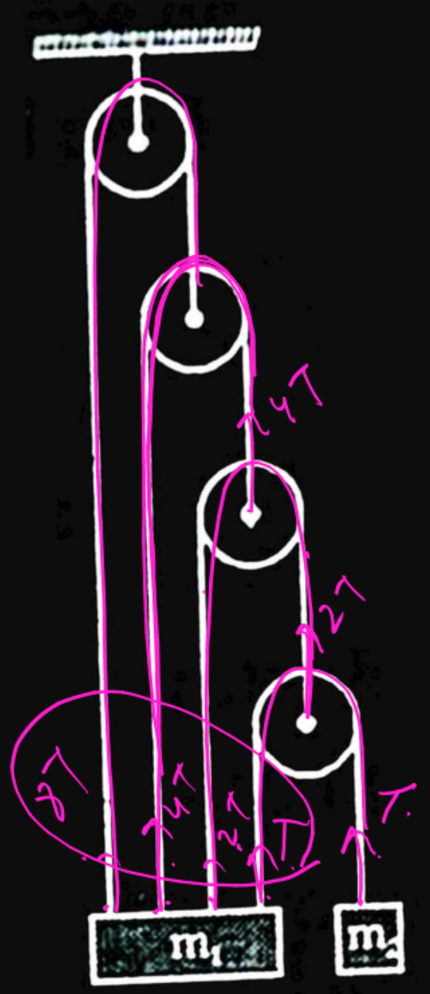
19 If system is in equilibrium, then find relation between m_1 and m_2.

1. $\frac{m_1}{m_2} = \frac{1}{2}$
2. $\frac{m_1}{m_2} = \frac{1}{15}$ $\left(\frac{15}{1}\right)$
3. $\frac{m_1}{m_2} = \frac{1}{10}$
4. $\frac{m_1}{m_2} = 1$

$15T = m_1 g$

$15(m_2 g) = m_1 g$

$15 = \frac{m_1}{m_2}$



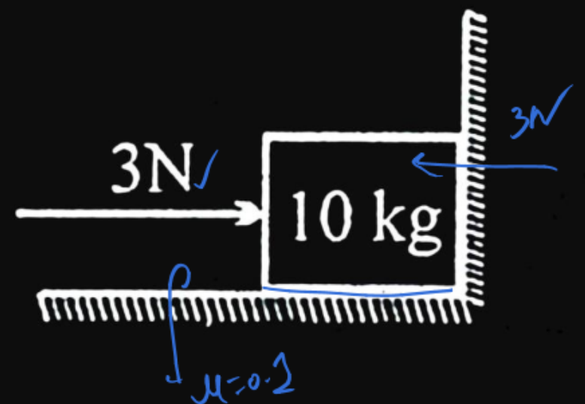
$T = m_2 g$

Question

20

A block is kept at the corner of two walls and force 3N is applied on block. If $\mu = 0.1$, between block and walls then frictional force acting on block equal to:

1. 3 N
2. 10 N
3. 0
4. cannot be determined



Question

21 Four forces act on a particle as shown in the figure such that net force is zero. Then consider following statements:

(A) Magnitude of $\vec{f}_1$ is 10 N

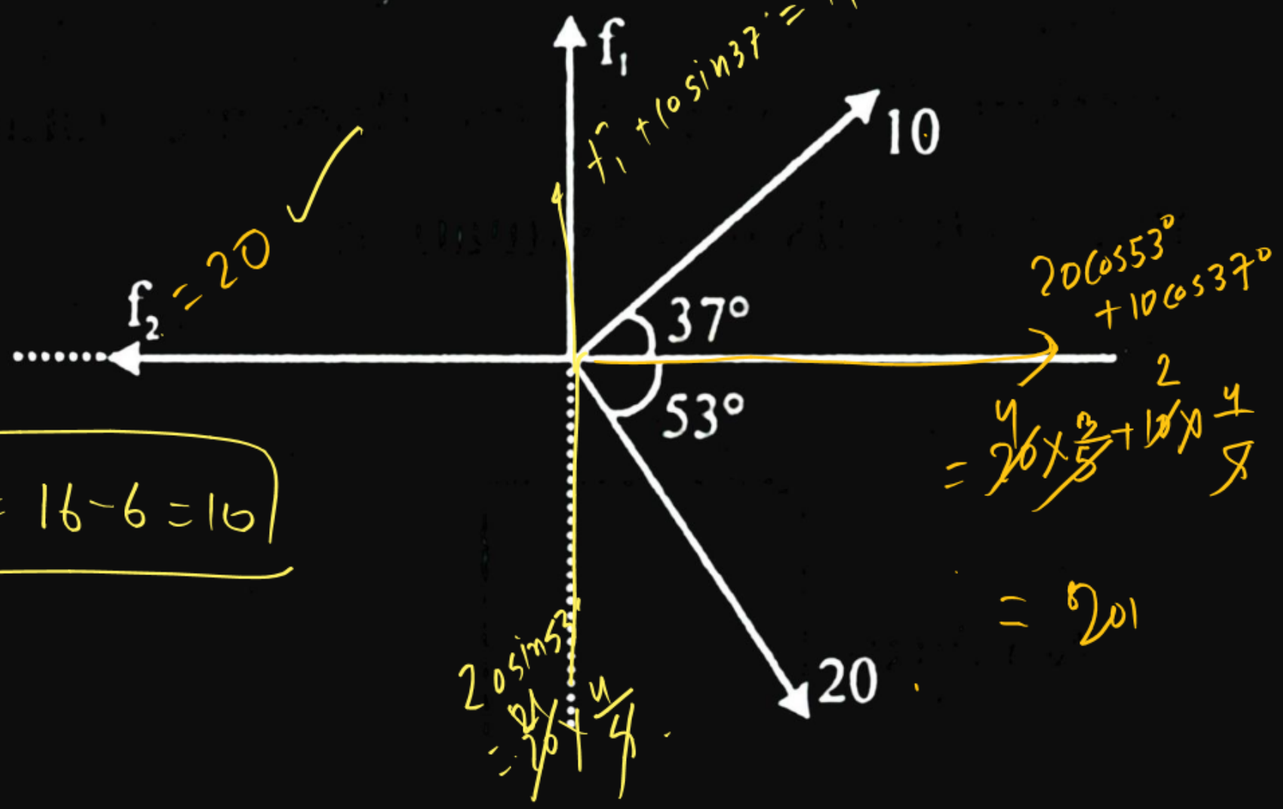
(B) Magnitude of $\vec{f}_1$ is 20 N

(C) Magnitude of $\vec{f}_2$ is 10 N

(D) Magnitude of $\vec{f}_2$ is 20 N

Select correct alternative

1. Only A
2. Only C
3. Only D
4. Only A and D

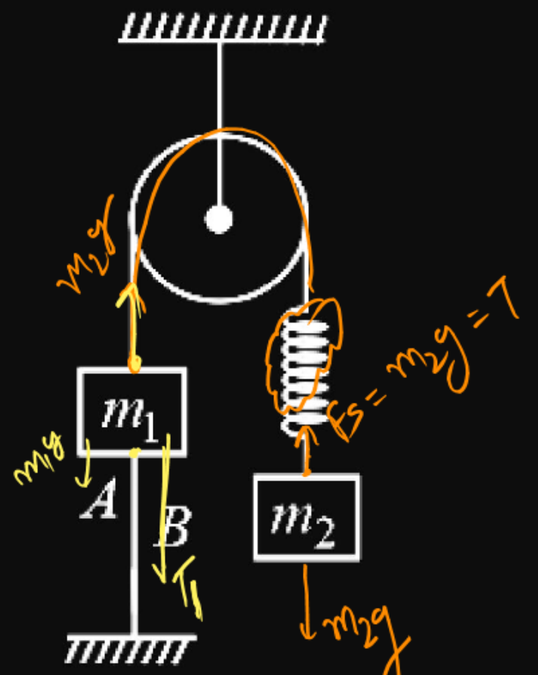


Question

22

In a given figure, two masses m_1 and m_2 ($m_2 > m_1$) are at rest in equilibrium position. Find the tension in string AB

1. $m_1 g$
2. $m_2 g$
3. $(m_1 + m_2)g$
4. $(m_2 - m_1)g$



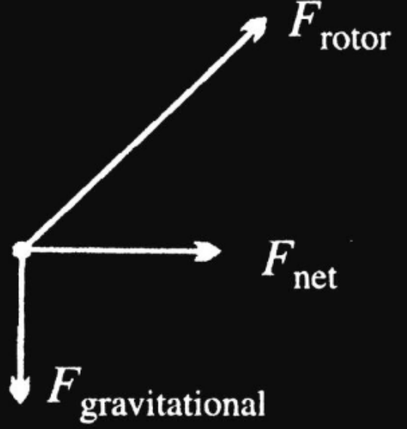
$m_1g + T_1 = m_2g$

$T_1 = m_2g - m_1g$

Question

23 A helicopter is moving to the right in horizontal plane. It experiences three forces $\vec{F}_{\text{gravitational}}$, $\vec{F}_{\text{drag}}$ and upthurst force on it caused by rotor $\vec{F}_{\text{rotor}}$ and its net acceleration being 'a'. Which of the following diagrams can be correct free body diagram w.r.t. to a stationary observer on ground?

1



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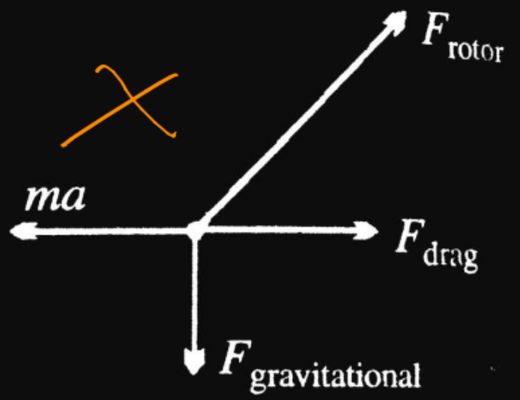

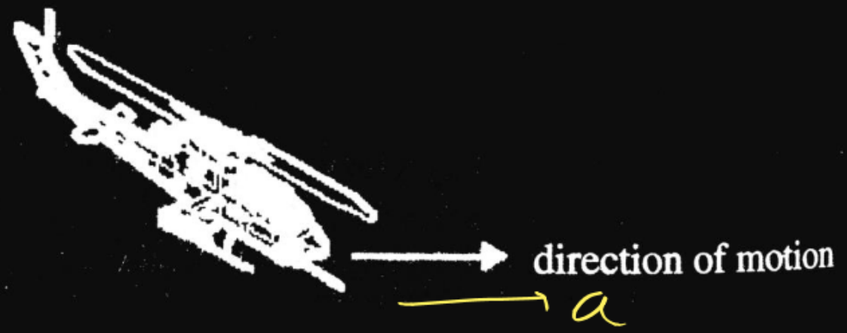

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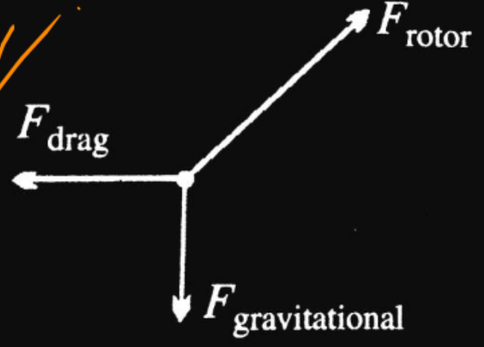

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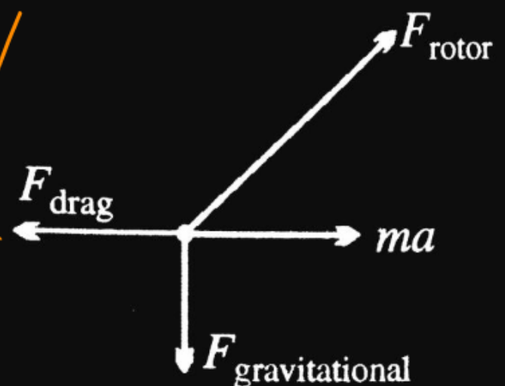
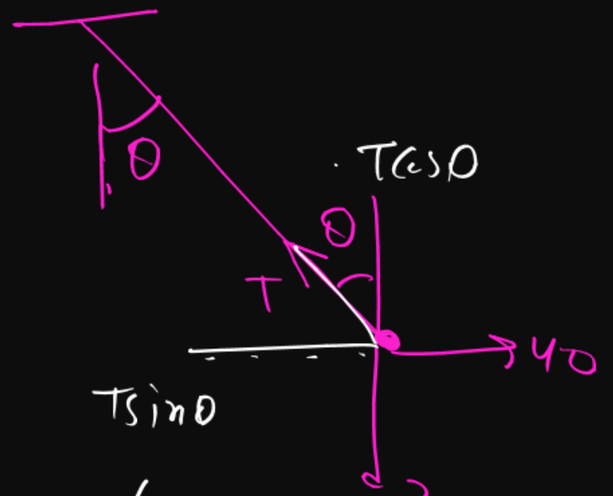


Question

24

In shown system, each of the block is at rest. The value of θ is

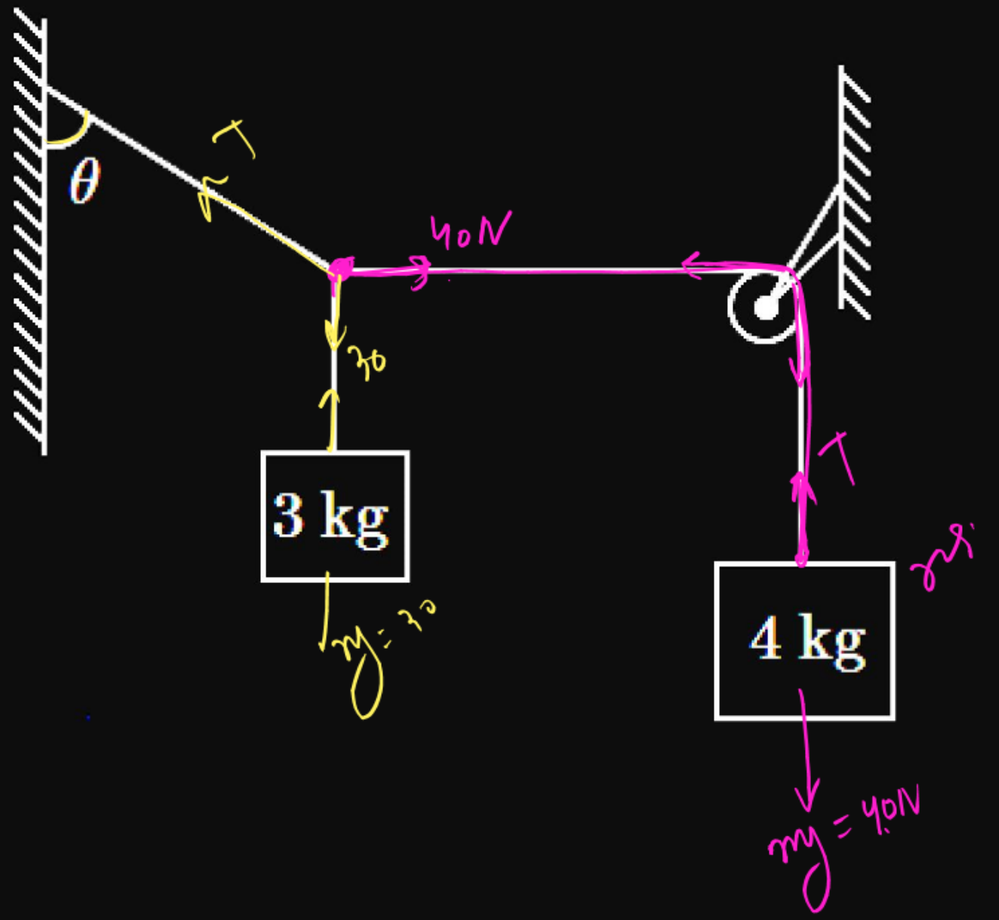
1. $\tan^{-1}(1)$
2. $\tan^{-1}\left(\frac{3}{4}\right)$
3. $\tan^{-1}\left(\frac{4}{3}\right)$
4. $\tan^{-1}\left(\frac{3}{5}\right)$



$T\sin\theta = 40$

$T\cos\theta = 30$

$\tan\theta = \frac{4}{3}$



THANK YOU