YAKEEN NEET 2.0

2026

Newton's Laws of Motion

PHYSICS KPP 24

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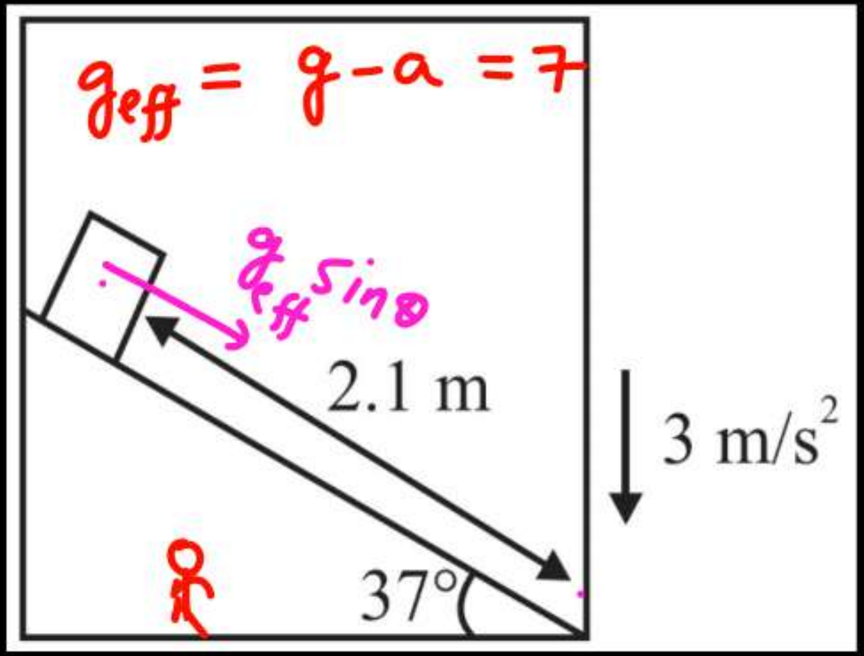
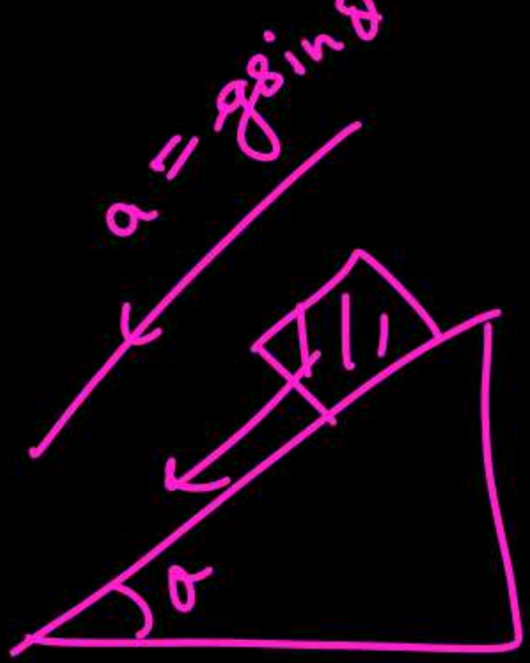
QUESTION - 01

A block of mass 1 kg is kept on the tilted floor of a lift moving down with 3 ms^{-2}. If the block is released from rest as shown, what will be the time taken by block to reach the bottom?





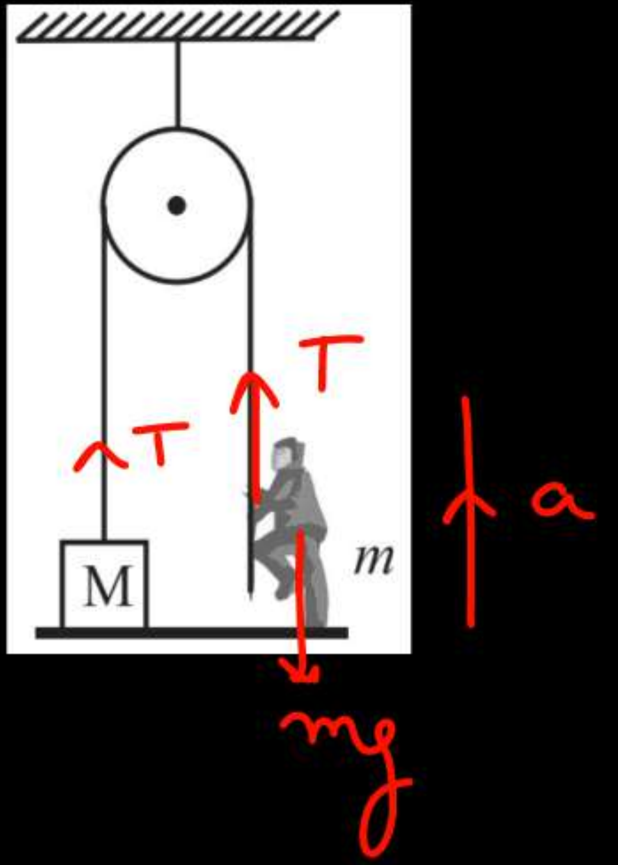
$$s = ut + \frac{1}{2}at^2$$

$$2.1 = 0 + \frac{1}{2} \times (7\sin 37)t^2$$

Ans: (1s)

QUESTION - 02

In the given figure, the block of mass M is at rest on the floor. At what acceleration with which should a boy of mass m climb along the rope of negligible mass so as to lift the block from the floor?



$T = Mg$

$T - mg = ma$

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

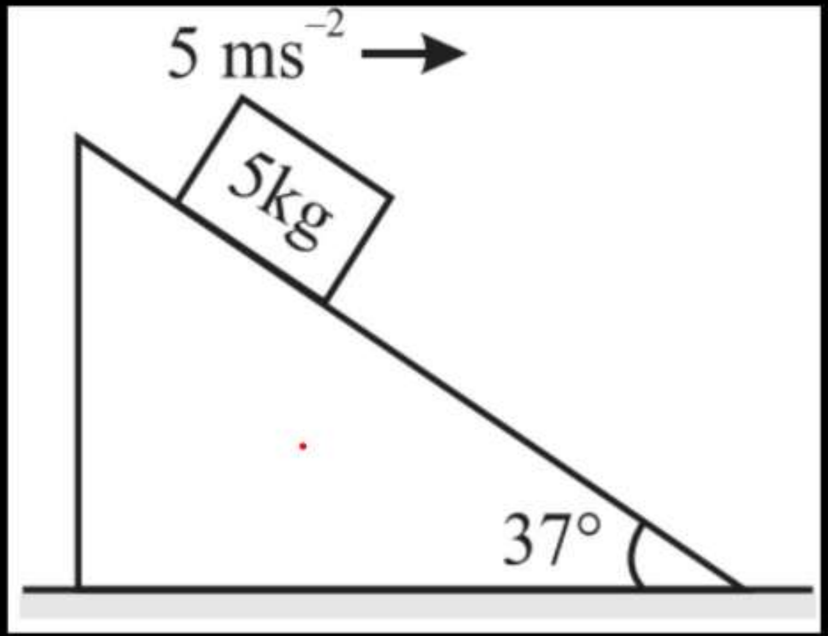
Ans $acc > a$

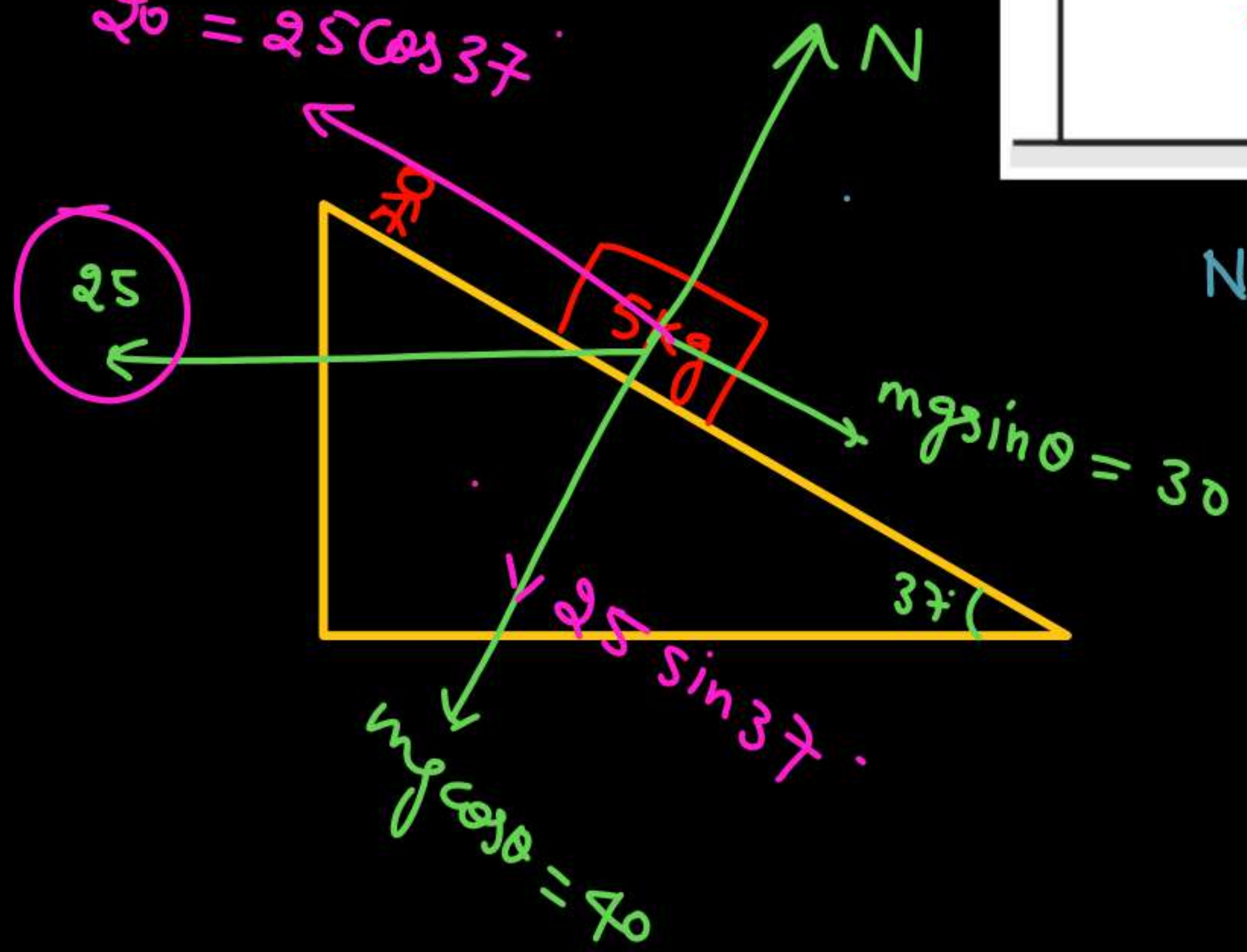
Ans: $a > \left(\frac{M}{m} - 1\right) g$

QUESTION - 03

$25 \times \frac{4}{5} = 20$

An inclined plane is moved toward right with an acceleration of 5 ms^{-2} as shown in figure. Find force in newton which block of mass 5 kg exerts on the incline plane. (All surfaces are smooth.)





$N = 40 + 25 \times \frac{3}{5} = 40 + 15$

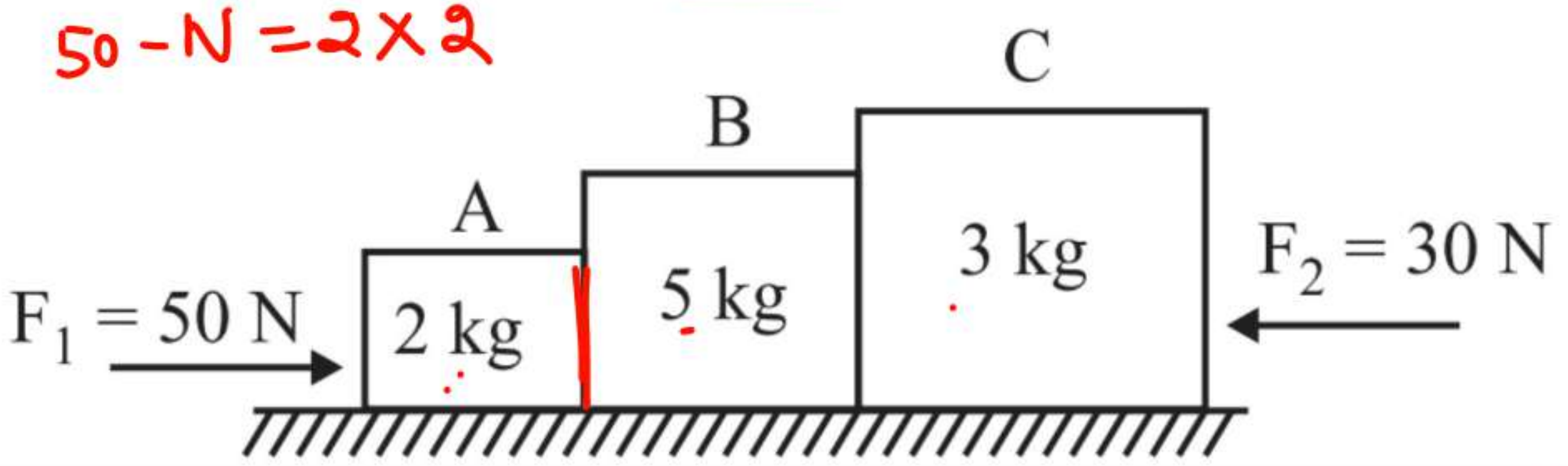
$= \underline{55}$

Ans: (55 N)

QUESTION - 04

Find the contact force between the blocks and acceleration of the blocks as shown in figure.

$50 - N = 2 \times 2$

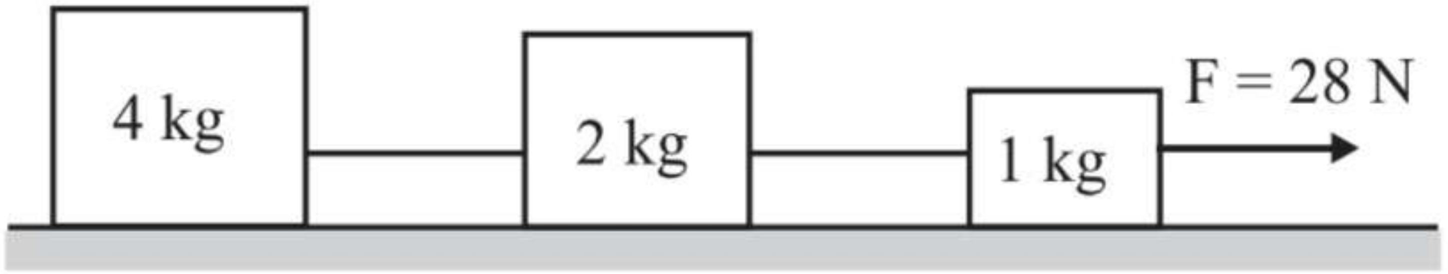


$a = 2$

Ans: ($N_1 = 36$ N; $N_2 = 46$ N)

QUESTION - 05

In the arrangement shown in figure, the strings are light and inextensible. The surface over which blocks are placed is smooth. Find:



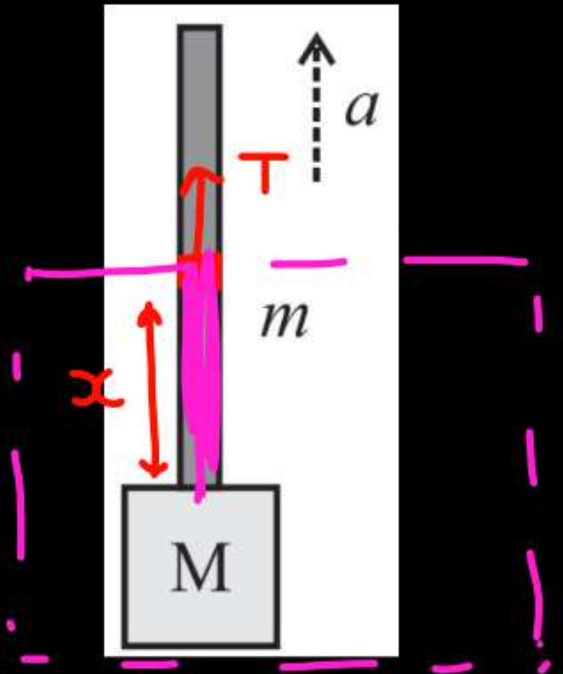
(a) the acceleration of each block

(b) the tension in each string

Ans: (a) $4\ ms^{-2}$; (b) $T_1 = 24$ N, $T_2 = 16$ N

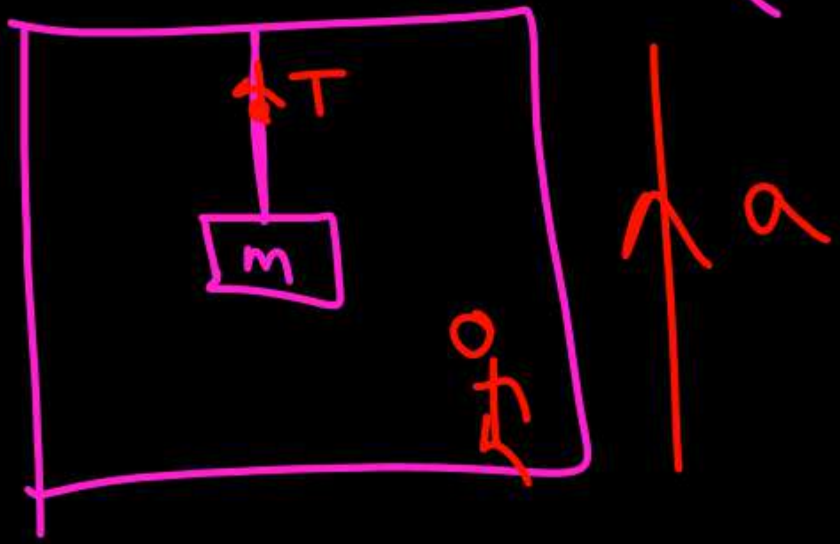
QUESTION - 06

A body of mass M is hanging by an inextensible string of mass m. If the free end of the string accelerates up with constant acceleration a, find the variation of tension in the string as a function of the distance measured from the mass M (bottom of the string).



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

$$T - \left(M + \frac{m}{L}x\right)g = \left(M + \frac{m}{L}x\right)a$$



$$T = \left(M + \frac{m}{L}x\right)(g + a)$$

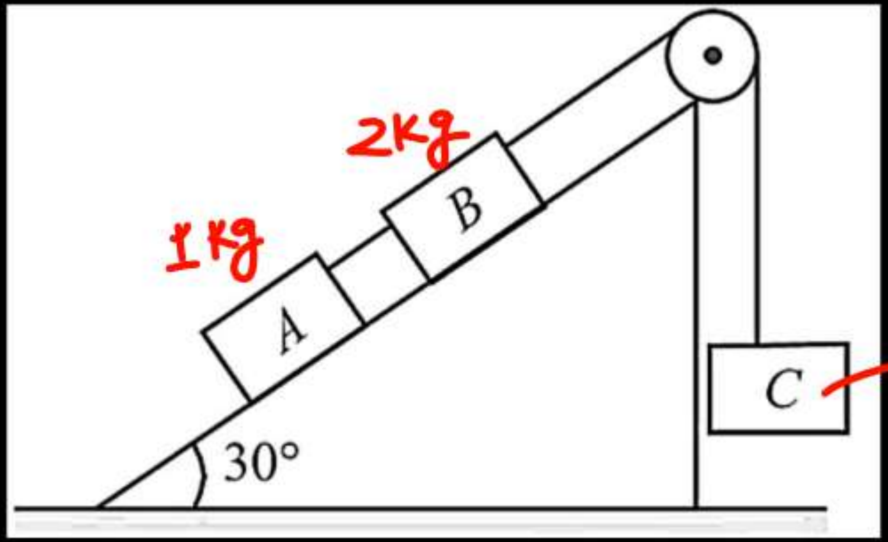
Ans: ~~(T = F)~~

QUESTION - 07

In the given figure, blocks A and B are connected together by a string and placed on a smooth inclined plane. B is connected to C (which is suspended vertically) by another string which passes over a smooth pulley fixed to the plane. The mass of A is $m_A = 1$ kg and mass of B is $m_B = 2$ kg.

(a) If the system is at rest, find the mass of C.

(b) If the mass of C is twice the mass calculated in (a), then find the acceleration of the system.



(b) 3kg

$$\frac{30 - 30\sin 30}{6} = \frac{15}{6}$$

(a) $30 \sin 30 = m_C \times g$

$m_C = 1.5$ kg.

Ans: (a) $m_C = 1.5$ kg; (b) $a = 2.5\ ms^{-2}$

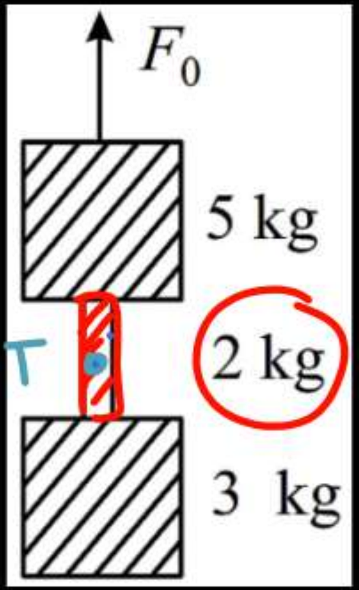
QUESTION - 08

A 5 kg block has a rope of mass 2 kg attached to its underside and a 3 kg block is suspended from the other end of the rope. The whole system is accelerated upward at an acceleration of 2 m/s^2 by an external force F_0. ($g = 10$ m/s^2).

(a) What is the value of F_0?

(b) What is the net force on the rope? $ma = 2 \times 2 = 4$

(c) What is the tension at middle point of the rope?



$F_0 - 100 = 10 \times 2$

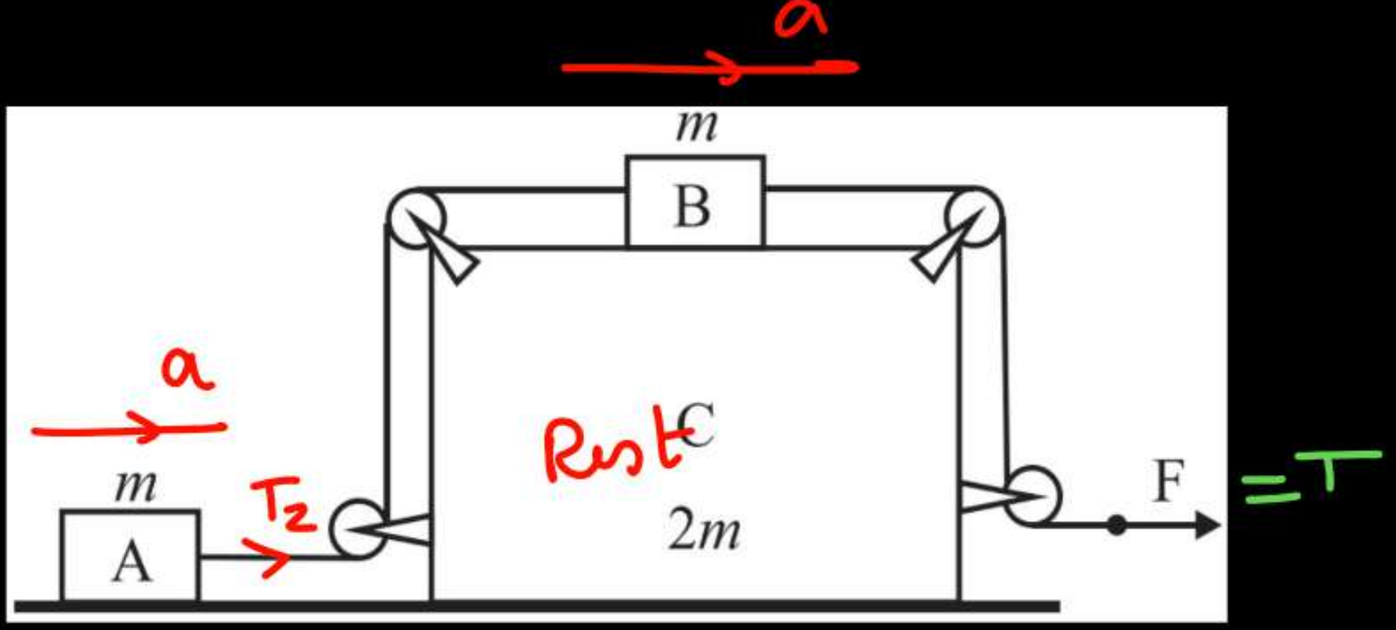
$T - 40 = 4 \times a$

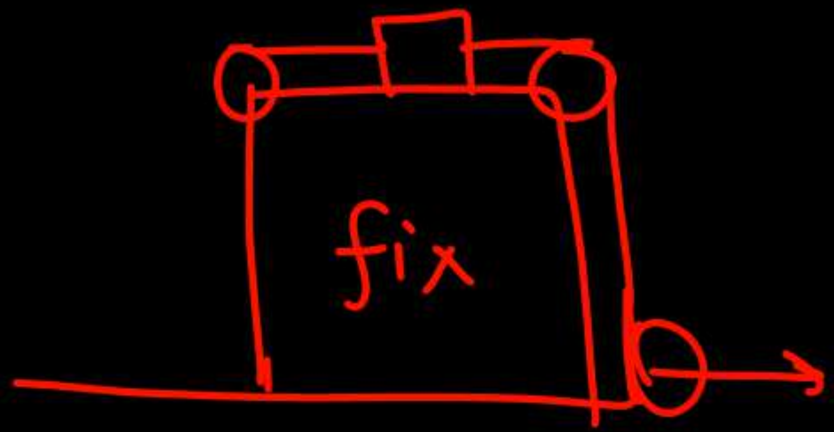
$T - 40 = 4 \times 2$

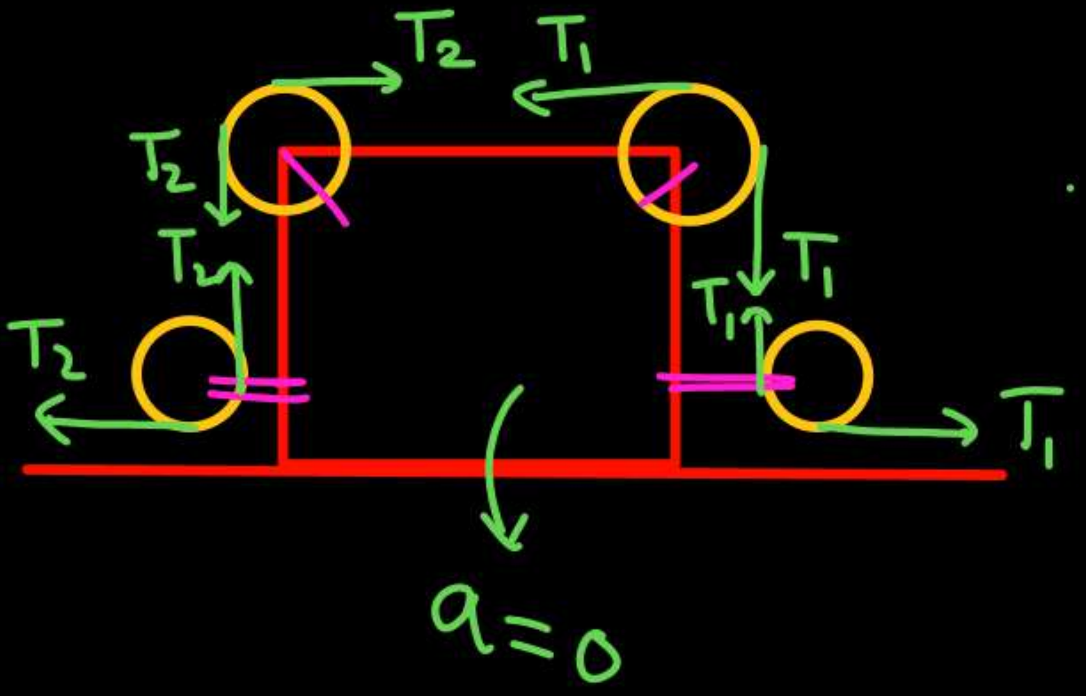
Ans: (a) F = 120 N; (b) F = 4 N; (c) 48 N

QUESTION - 09

In the system shown in the figure, all surfaces are smooth. Block A and B have mass m each and mass of block C is 2 m. All pulleys are massless and fixed to block C. Strings are light and the force F applied at the free end of the string is horizontal. Find the acceleration of all three blocks.







$$F - 0 = 2m\,a$$

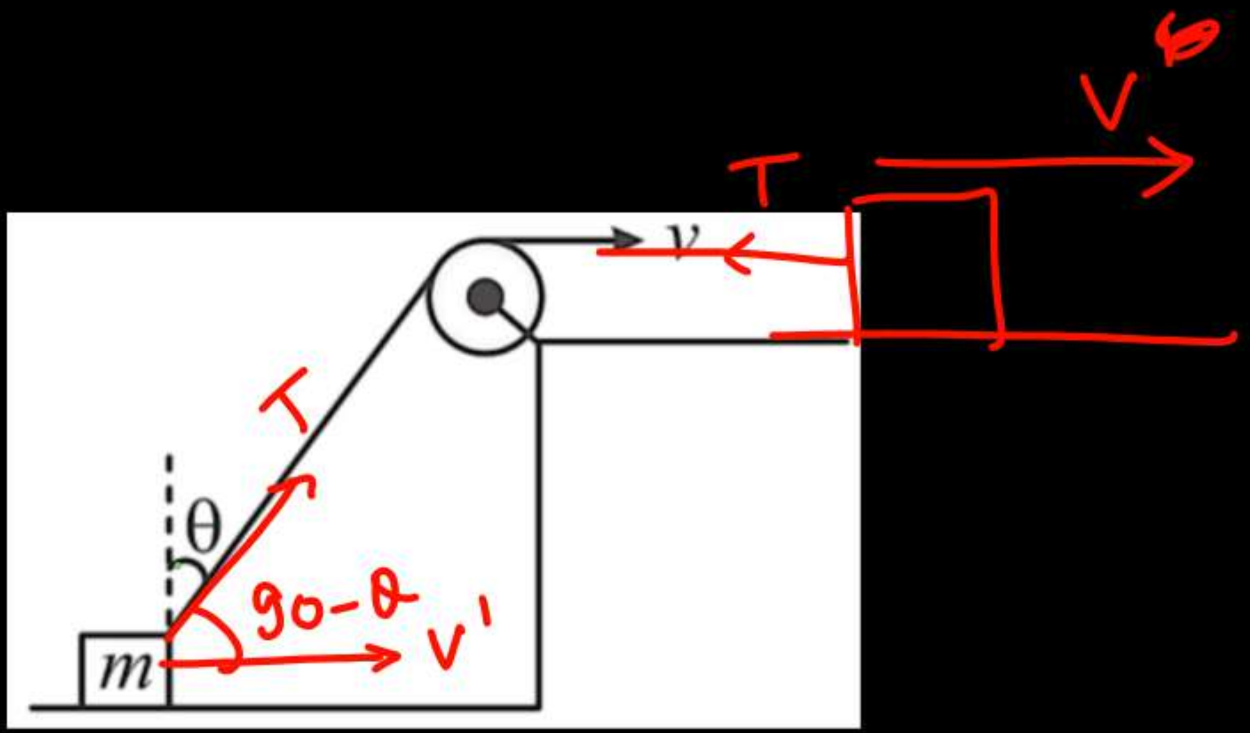
$$a = F/2m$$

Ans: $a = \dfrac{F}{2m}$

QUESTION - 10

A block is dragged on a smooth plane with the help of a rope which moves with velocity v. The horizontal velocity of the block is:

(1) v
(2) $\dfrac{v}{\sin\theta}$
(3) $v\sin\theta$
(4) $\dfrac{v}{\cos\theta}$



$v'\sin\theta = v$

$T v' \cos(90-\theta) + T v^{*} \cos 180 = 0$

$v' \sin\theta - v^{*} = 0$

$v' = \dfrac{v}{\sin\theta}$

Ans: (2)

QUESTION - 11

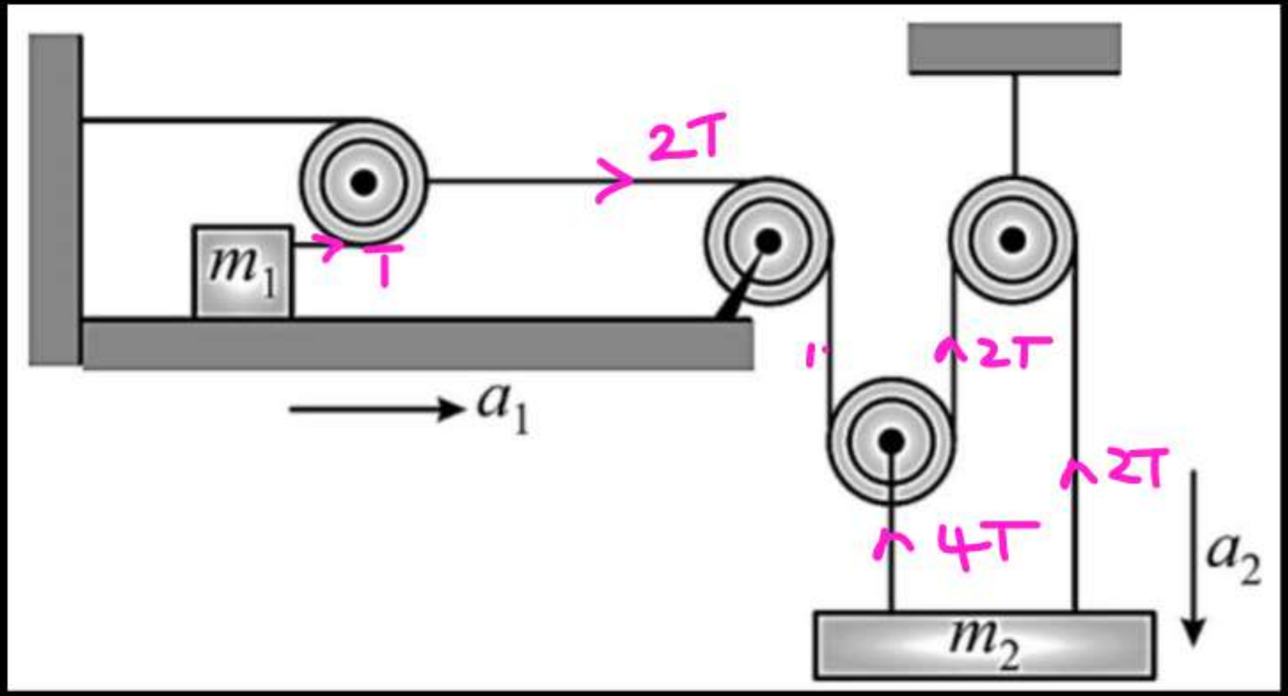
Two blocks are arranged as shown in the figure. The relation between acceleration a_1 and a_2 is:

(1) $a_1 = a_2$

(2) $a_1 = 6a_2$

(3) $a_1 = 3a_2$

(4) $a_1 = 4a_2$



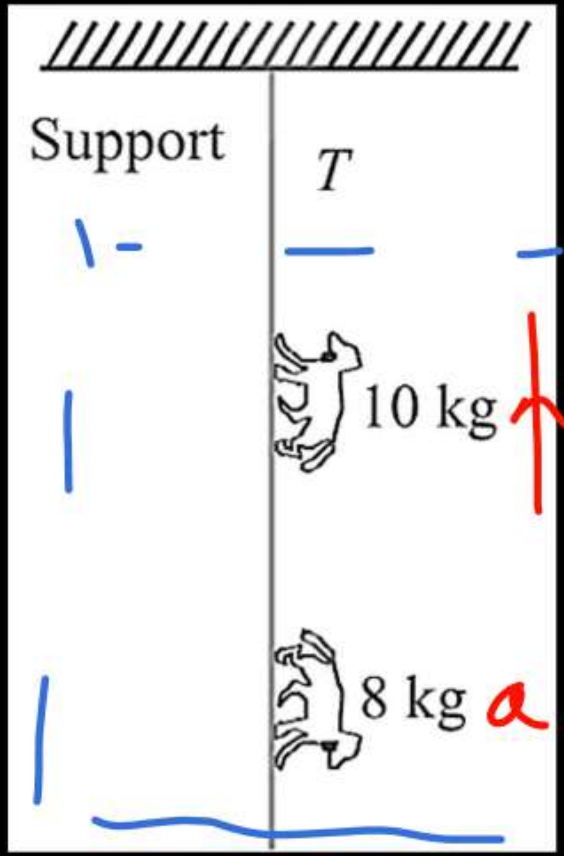
$Ta_1 - 6Ta_2 = 0$

$a_1 = 6a_2$

Ans: (2)

QUESTION - 12

Two monkeys of masses 10 kg and 8 kg are moving along a vertical rope as shown in figure. The former climbing up with an acceleration of 2 ms^{-2}, while the later coming down with a uniform velocity of 2 ms^{-1}. Find the tension in the rope at the fixed support.



$a = 2$

$a = 0$

$T - 180 = 10 \times 2 + 0$

$T = 200$

Ans: (200 N)

QUESTION - 13

If pulleys shown in the diagram are smooth and massless and a_1 and a_2 are acceleration of blocks of mass 4 kg and 5 kg respectively, then

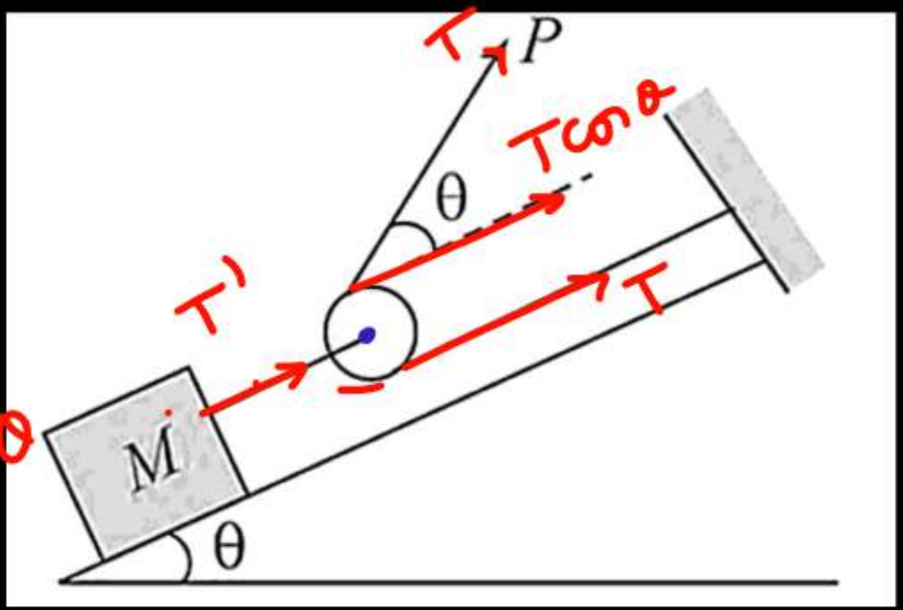
(1) $a_1 = a_2$ (2) $a_1 = 2a_2$

(3) $2a_1 = a_2$ (4) $a_1 = 4a_2$

Ans: (2)

QUESTION - 14

What should be the minimum force P to be applied to the string so that block of mass m just begins to move up the frictionless plane?



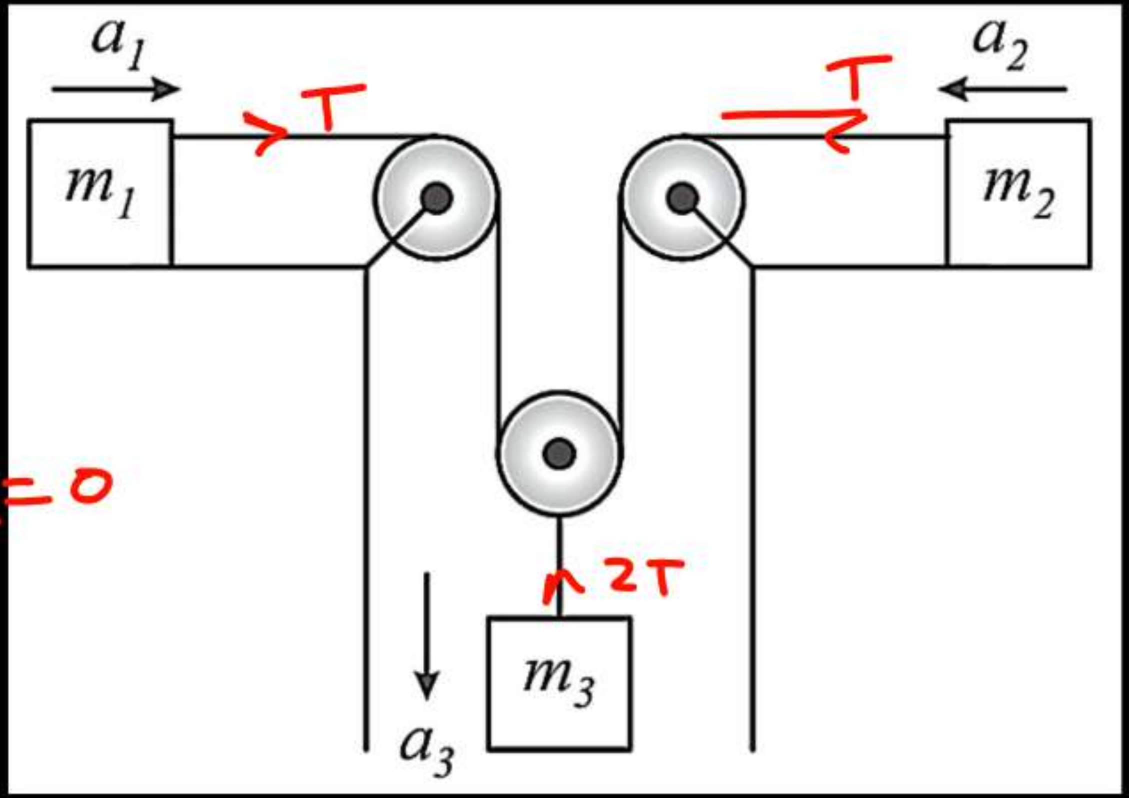
$$T' = T + T\cos\theta = mg\sin\theta$$

$$T = \frac{mg\sin\theta}{1+\cos\theta}$$

Ans: $\dfrac{mg\sin\theta}{1+\cos\theta}$

QUESTION - 15

In the arrangement of three blocks as shown in fig, the string is inextensible. If the directions of accelerations are as shown in the figure, then determine the constraint relation among a_1, a_2 and a_3.



$T a_1 - 2T a_3 + T a_2 = 0$

Ans: $(a_1 + a_2 = 2a_3)$

THANK
YOU