YAKEEN NEET 2.0

2026

Laws of Motion

Physics | Lecture - 5

By- Manish Raj (MR Sir)

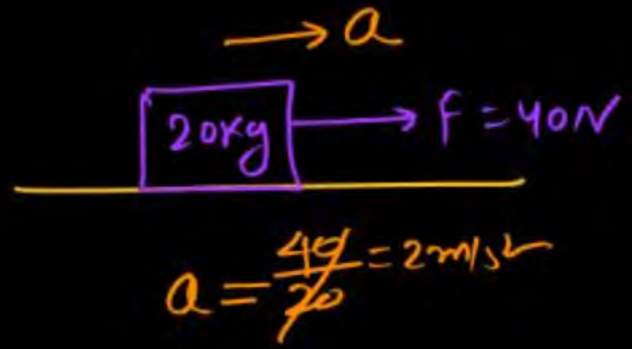
Topics to be covered

1. # Revision of last class.
2. Connected Body motion, Pully block Prob^{m} :
3.
4.

Kinte logo ko time maneg karne me Prob^{m} hai ??

(a) Yes

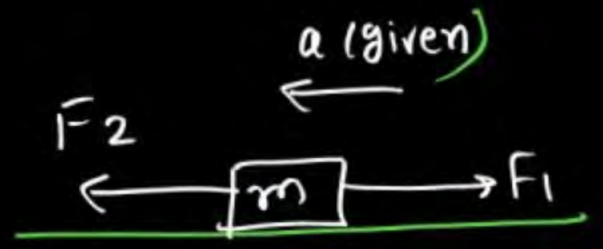
(b) NO

① 

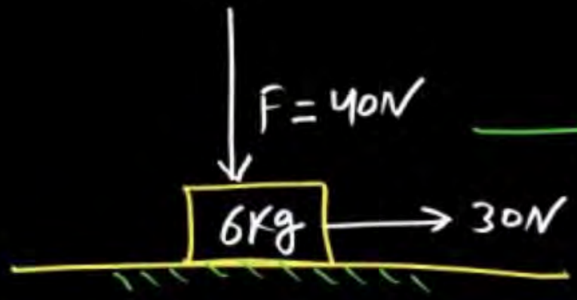
$a = \frac{40}{20} = 2 m/s^2$

② 

$$a = \frac{F_1 - F_2}{m}$$

③ 

$$a = \frac{F_2 - F_1}{m} \checkmark$$

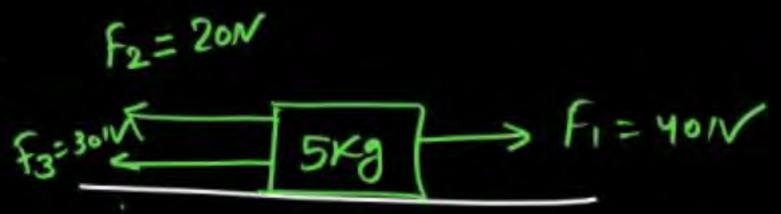
④ 

$a = \frac{30}{6} = 5 m/s^2.$

MR X BOX

Jabtak μk (coefficient of friction given Nahi hai surface ko smooth lena hai.

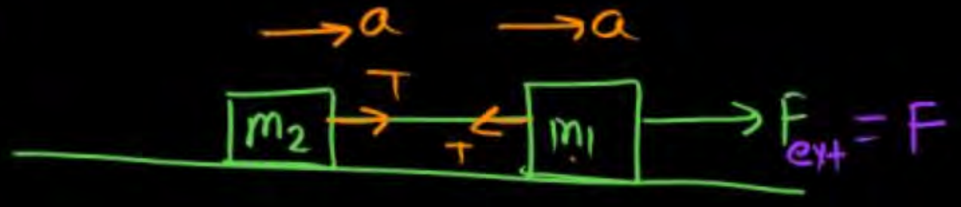
(5)



$$a = \frac{50-40}{5} = \frac{10}{5} = 2 m/s^2$$

$a =$ ← (Backward)

(6)



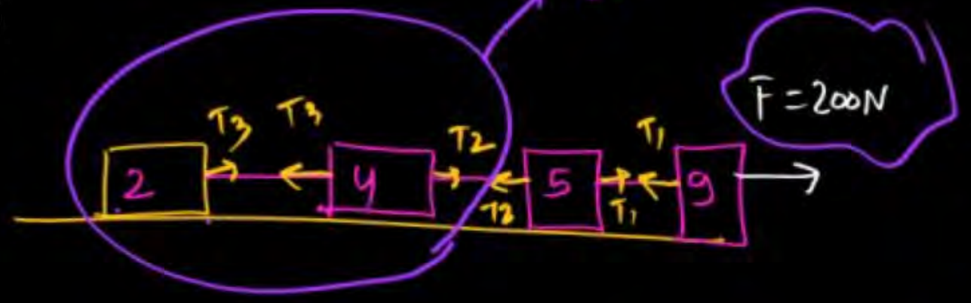
$$a = \frac{F}{m_1 + m_2} \checkmark$$

(7)

$$a = \frac{60}{10} = 6 m/s^2$$

$T = m_{Back} \times a$
$= 4 \times 6 = 24N$

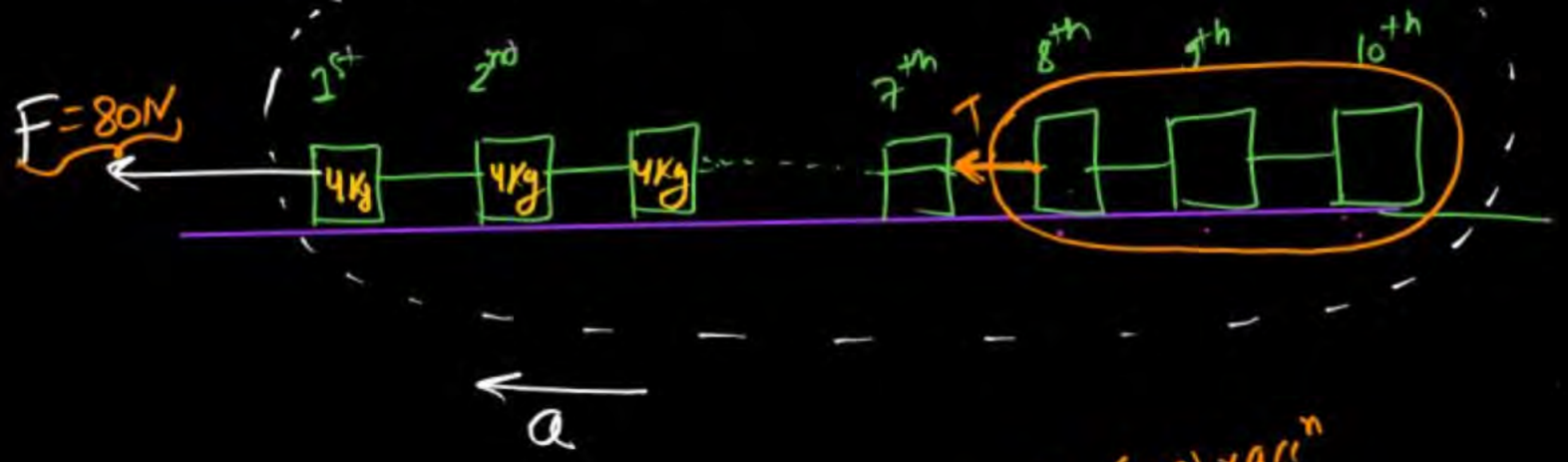
(8)



$$\begin{cases} T_3 = 20N \\ T_2 = 60N \\ T_1 = 110N \end{cases}$$

$$a = \frac{200}{2+4+5+9} = \frac{200}{20}$$

⑨ 10 object of equal mass 4 kg. Tension B/w 7th & 8th.



$$a = \frac{F}{10 \times 4} = \frac{80}{40}$$

$= 2 m/s^2$

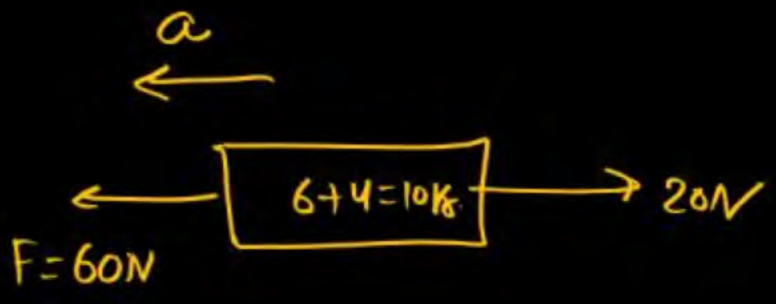
(common acc^n)

$T = (4 \times 3) \times$ acc^n

$T = 12 \times 2$

$T = 24N$

(10)



$$a = \frac{60-20}{10}$$

$$a = \frac{40}{10}$$

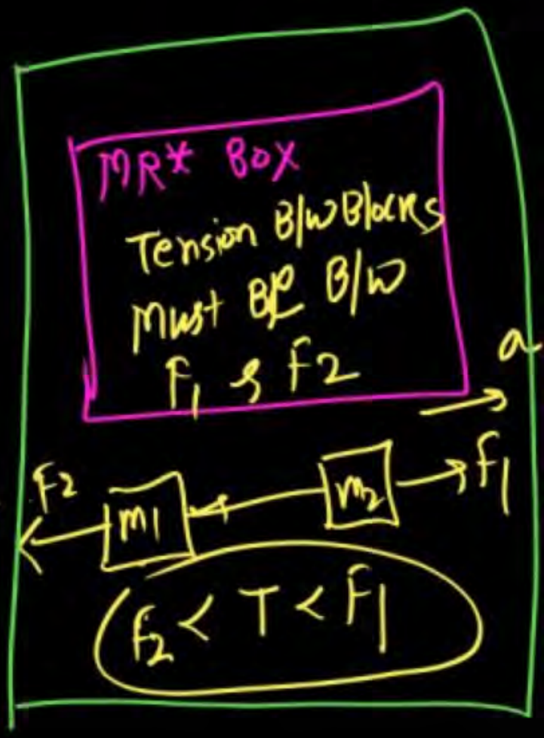
$a = 4 m/s^2$ ✓

$(60 - T) = ma$

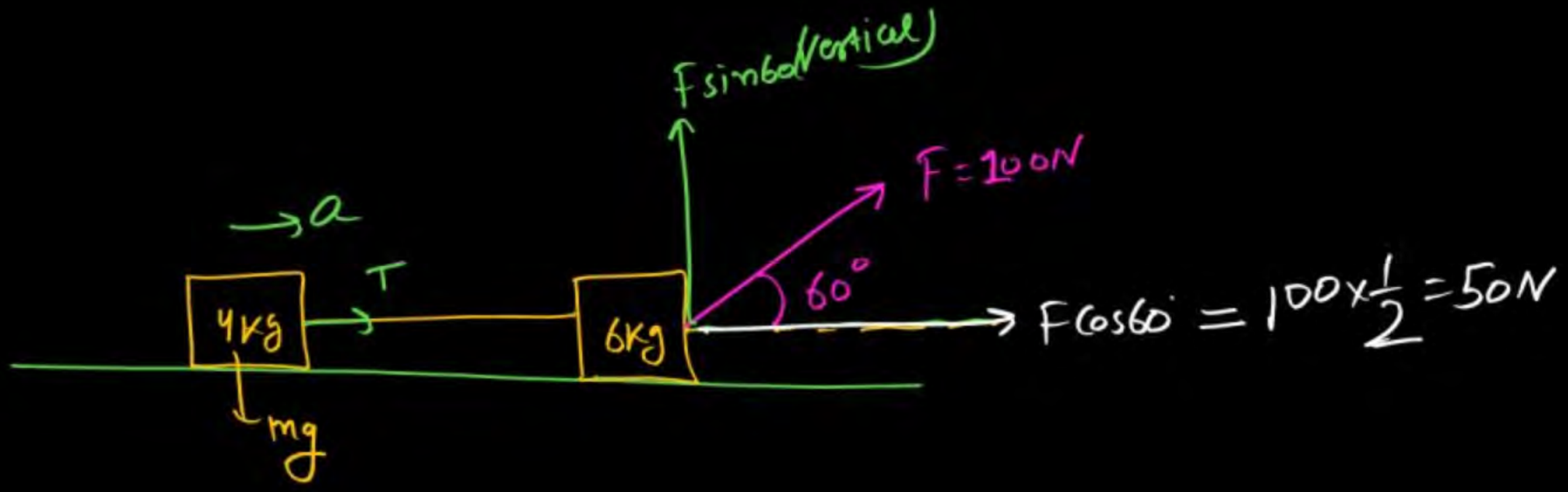
$60 - T = 6 \times 4$

$60 - T = 24$

$T = 60 - 24 = 36N$



11



$$a_{(common)} = \frac{50}{10} = 5 m/s^2$$

$$T = 4 \times a = 4 \times 5$$
$$= 20N$$

(12)

find acc^{n}

$$a = \frac{F}{m} = \frac{60}{5} = 12\,m/s^2$$

MR Scam ✗

$$a = \frac{60-50}{5}$$

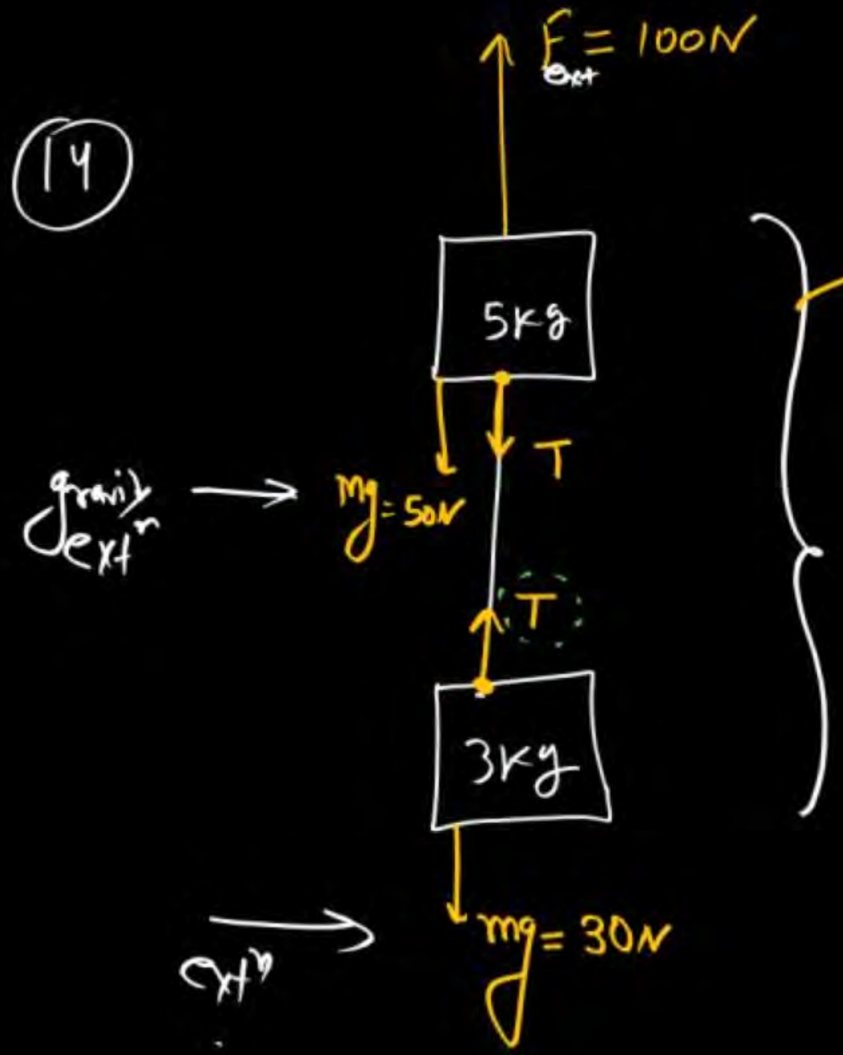
$$= \frac{10}{5} = 2\,m/s^2.$$

(13)

$$a = \frac{50-40}{5} = \frac{10}{5} = 2\,m/s^2$$ downwards

MR^{x} Box :–
Vertical dir^{n} me acceleration hai to mg consider kar ke Net Force dekho. ✓

(14)



FBD of system.

$$a = \frac{100-80}{8}$$

$$= \frac{20}{8} = 2.5 \text{ m/s}$$

for Tension :—

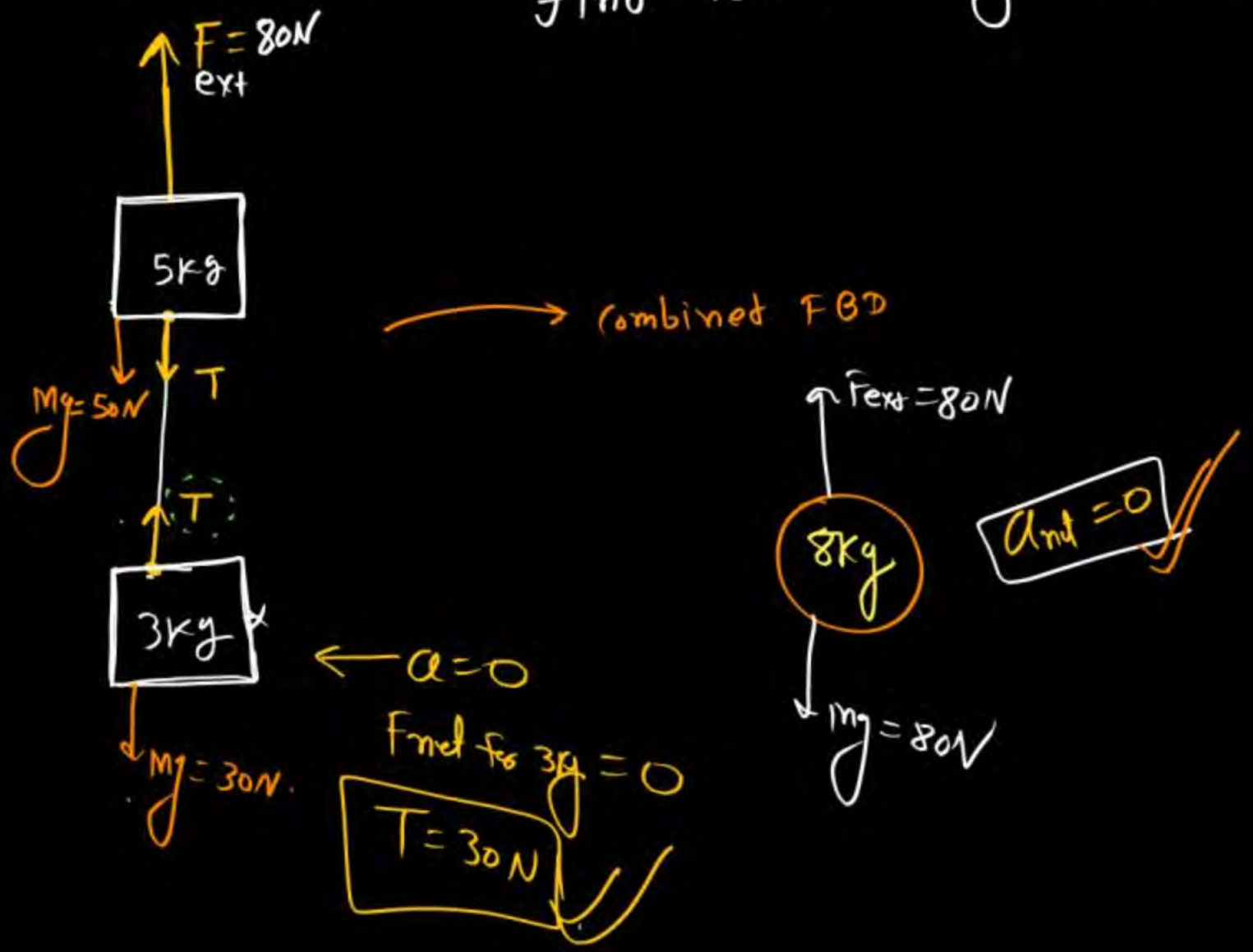
FBD of 3kg

$T - 30 = 3a$

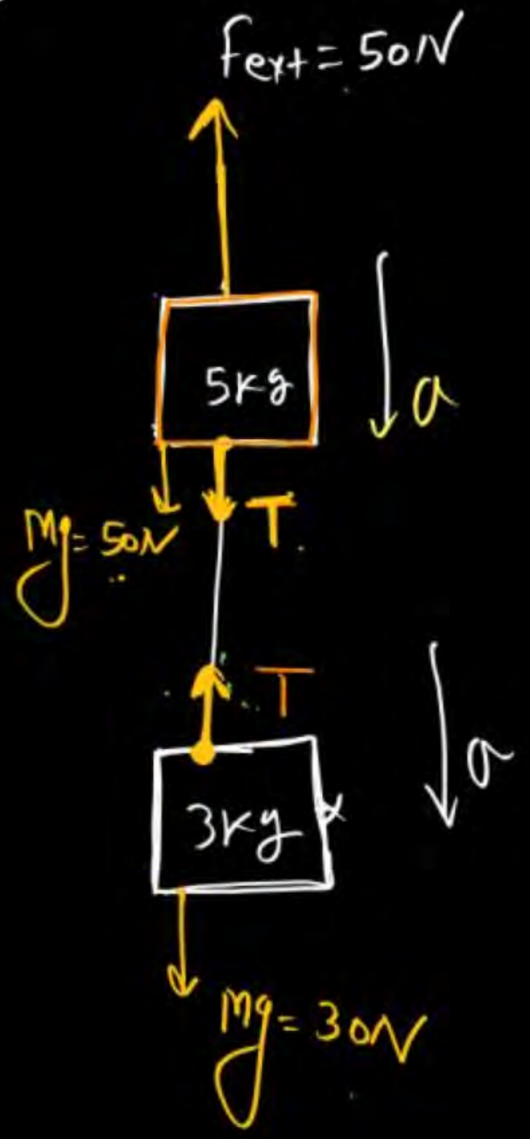
$T = 30 + 3 \times 2.5 = 37.5$ Newton

(15)

find Tension in string & acc^{n}.

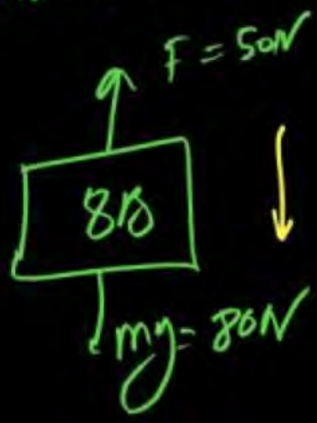


(17)



find Tension in string & acc^n.

Combine FBD



$a = \frac{80-50}{8} = \frac{30}{8}$ = $\frac{15}{4}$ m/s^2

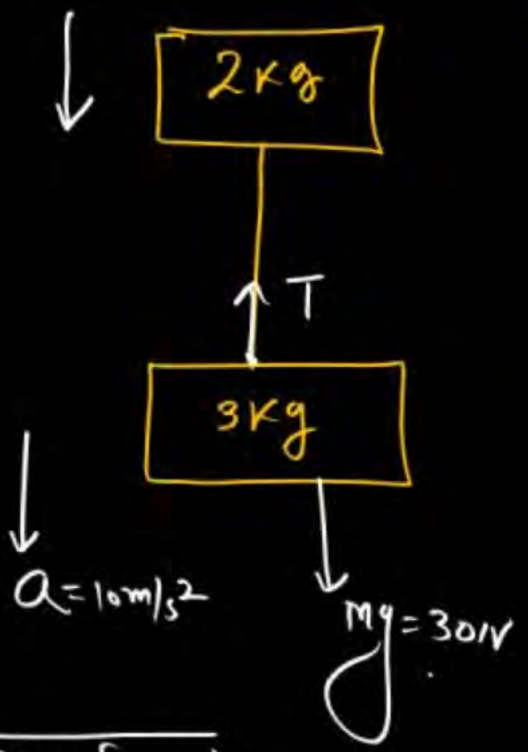
FBD of 3kg

$30 - T = 3a$

$T = 30 - 3 \times \frac{15}{4} = 30 - \frac{45}{4} = \frac{120-45}{4}$

$= \frac{75}{4}$ N

(18)



FBD of 3kg

$30 - T = 3 \times a$

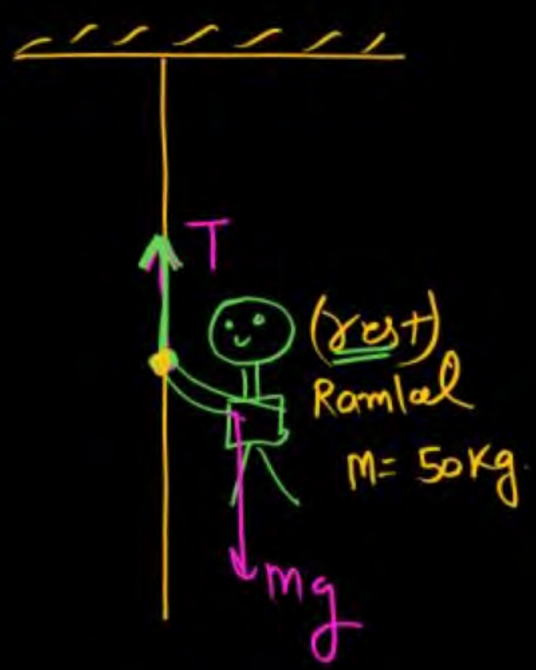
~~$30 - T = 3 \times 10$~~

In string → $T = 0$

Drop ??

Combined F.B.D

(19)

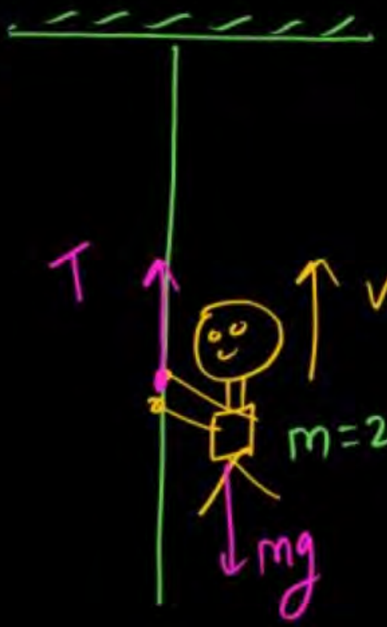


find Tension in string:-

$T = mg$

$T = 500$ Newth.

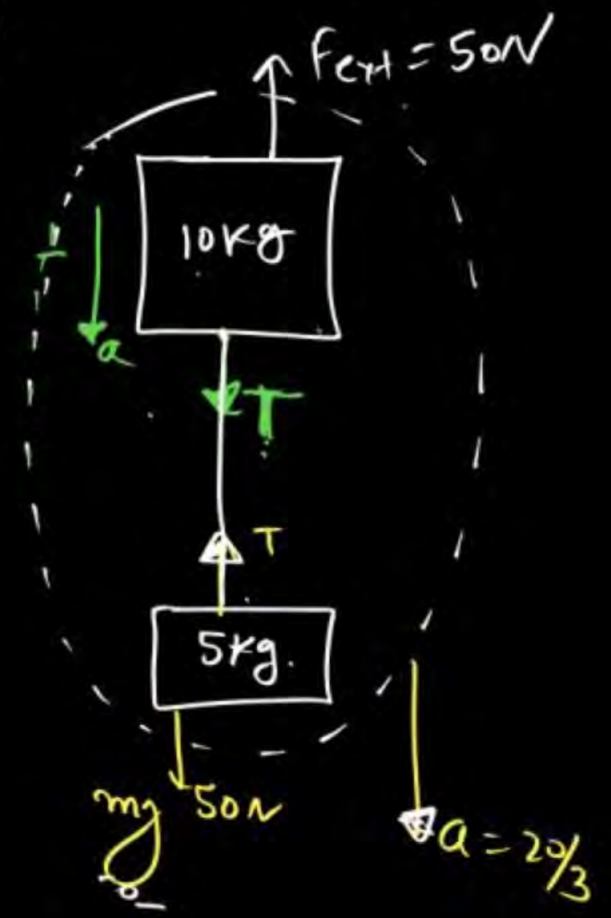
(20)



$T = mg$

$= 20 \times 10 = 200N$

(21)



Soln

find Tension B/w wire ??

$$a = \frac{150-50}{15} = \frac{100}{15}$$

$$= \frac{20}{3} m/s^2$$

FOD of 10kg

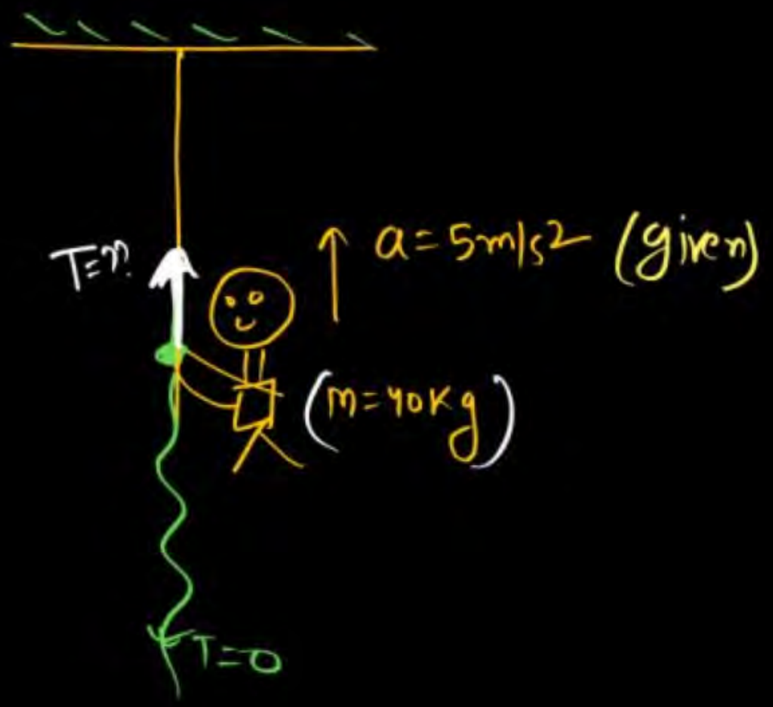
$100 + T - 50 = ma$

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

$T = \frac{200}{3} - 50$

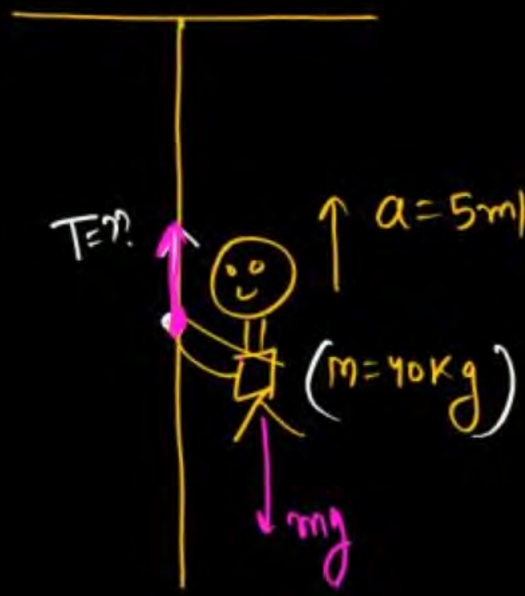
$= \frac{200-150}{3} = \frac{50}{3}$

(22)



find Tension in string?

T = ??



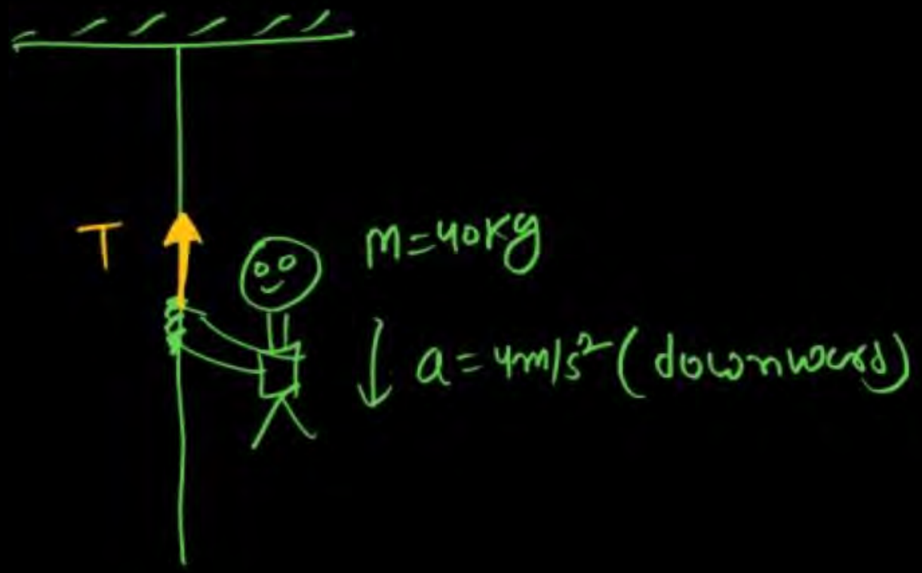
$T - mg = ma$

$T - 400 = 40 \times 5$

$T = 400 + 200 = 600\,N$

Newton

(23)



find Tension in string ??

"FBD of man"

400 − T = 40 × a

400 − T = 40 × 4

400 − 160 = T

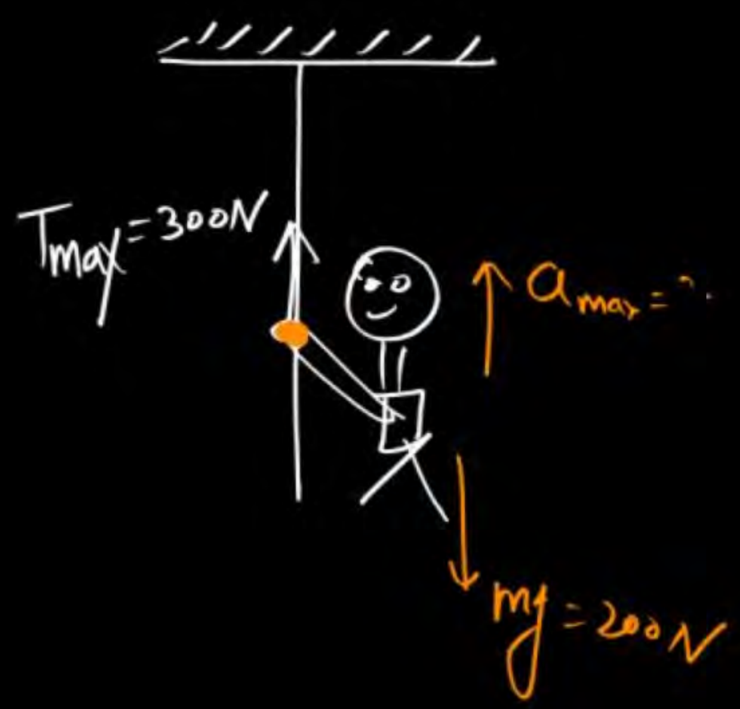
T = 240 N

R

Likna hai

24 (Breaking strength of string is $T = 300N$ then find max^m acc^n by which man of 20kg mass can climb up ??

max Tension.



$T_{max} - mg = m a_{max}$

$300 - 200 = 20 \times a$

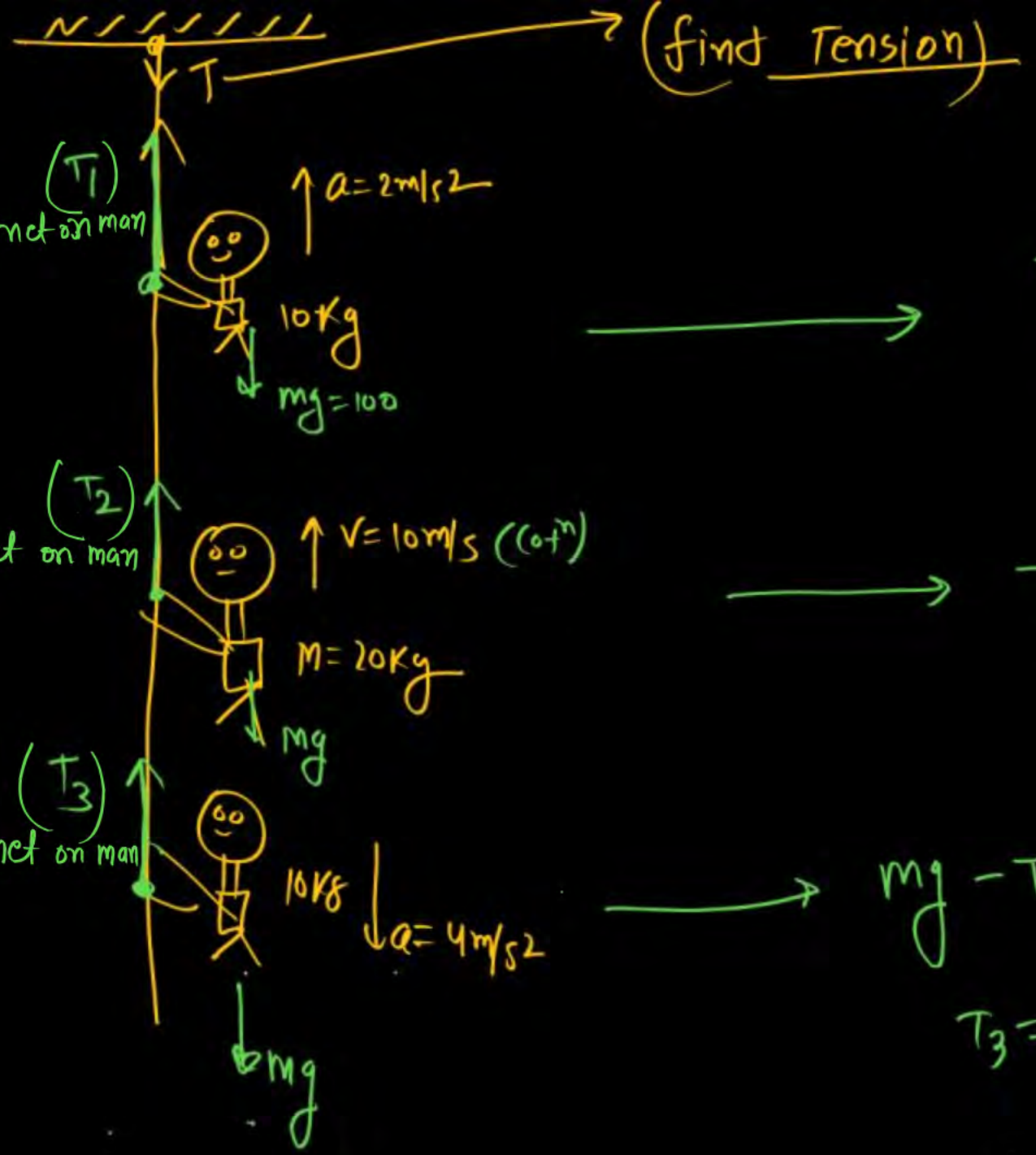
$100 = 20\,a$

$5\ m/s^2 = a$

AB

HCV

25



Separate F.B.D
यहाँ (T) net लिया है।

$T_1 - 100 = 10 \times 2$

$T_1 = 100 + 20 = 120N$

$T_2 = 200N$ — (ii)

$T_{rope} = 120 + 200 + 60$

380 N

Ans

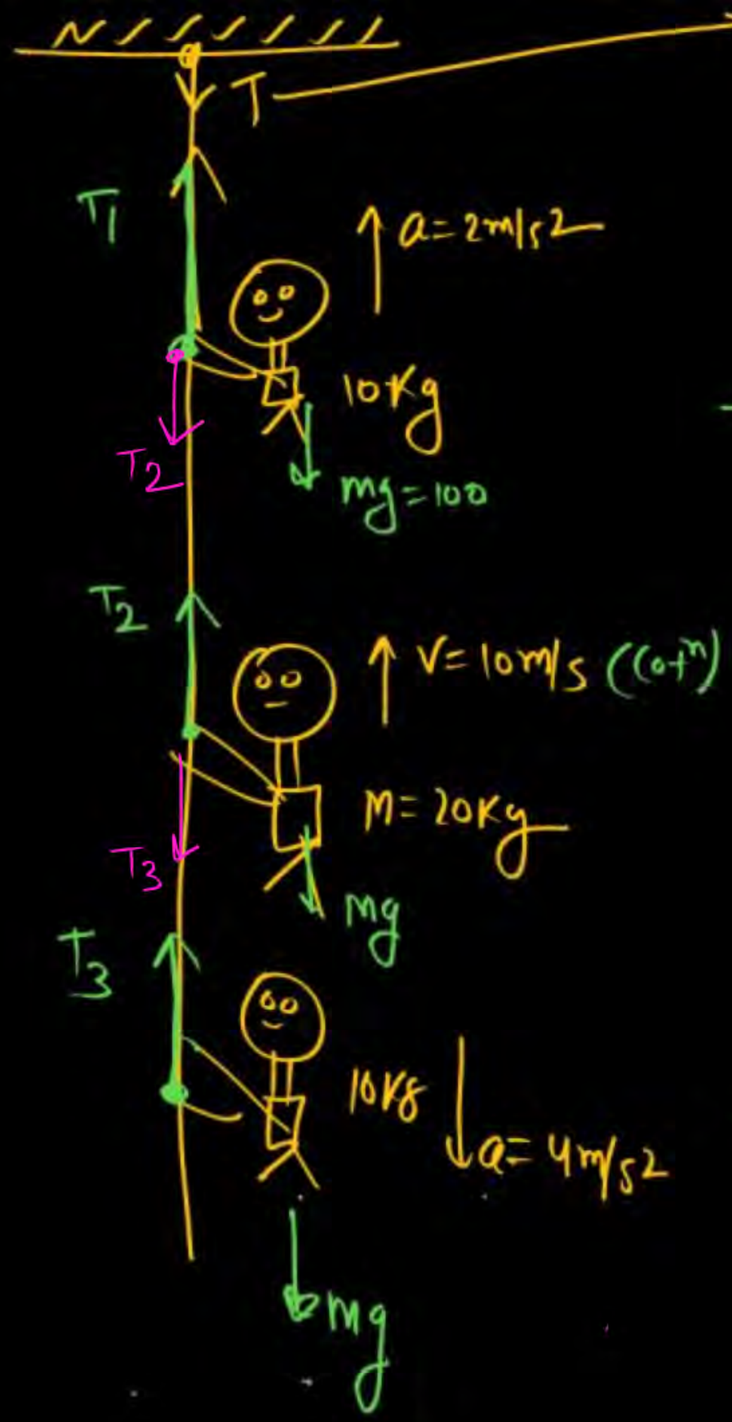
$mg - T_3 = ma$

$T_3 = mg - ma = 10 \times 10 - 10 \times 4$

$= 100 - 40 = 60N$

HCV

25



(find Tension)

(2nd method)

$T_1 - T_2 - mg = ma$

$T_1 - 260 - 10\times10 = 10\times2$

$T_1 = 20 + 360$

$\boxed{T_1 = 360}$

final Tension

$T_2 - T_3 - mg = ma$ ($a \to 0$)

$T_2 = T_3 + mg$

$= 60 + 20\times10$

$= 260$

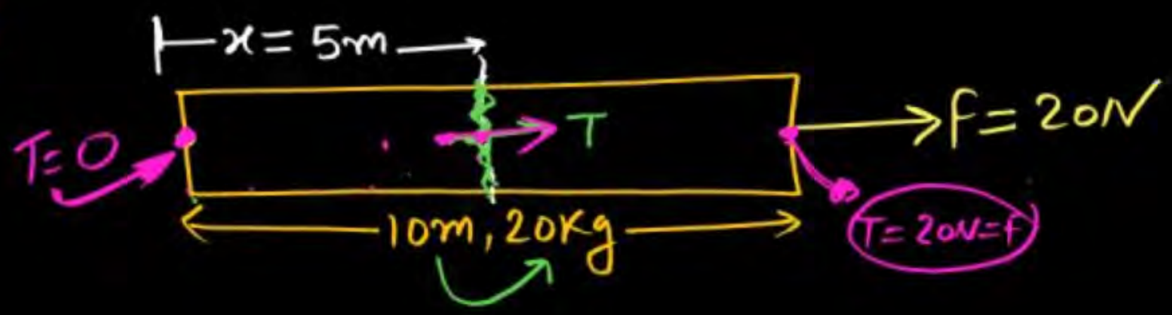
$mg - T_3 = ma$

$100 - T_3 = 10\times4$

$T_3 = 100 - 40 = 60$

Massive string

(26)



Yaha mg Nahi lenge.

$$a = \frac{20}{20} = \frac{F}{m}$$

$$a = 1\ m/s^2 \leftarrow$$

10kg → $T = ma$

$= 10 \times 1$

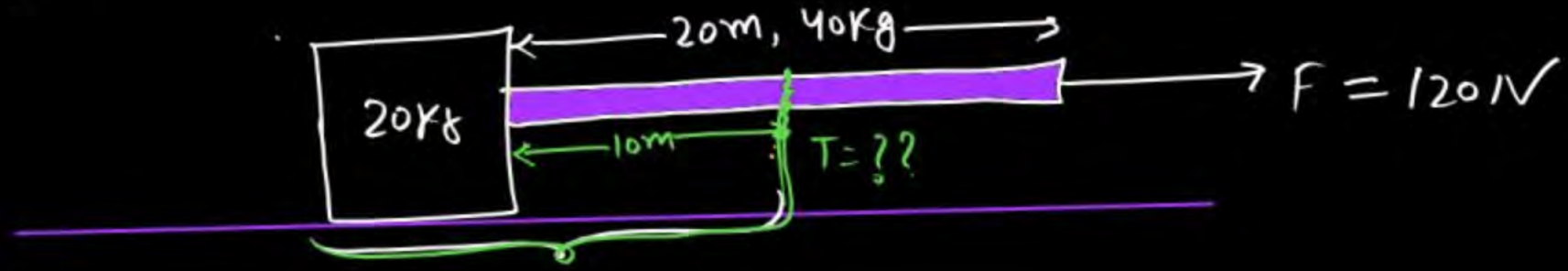
$= 10N$

MR* Box

Massive string ko Block hi maano.

Jis Point Pe Tension nikalna hai wha Pe usko 2-Part me man lo, & FBD Bana o.

(27)



20m ⟶ 40kg
10m ⟶ 20kg.

(Combine FBD)

$a = \frac{120}{20+40} = \frac{120}{60} = 2 m/s^2$.

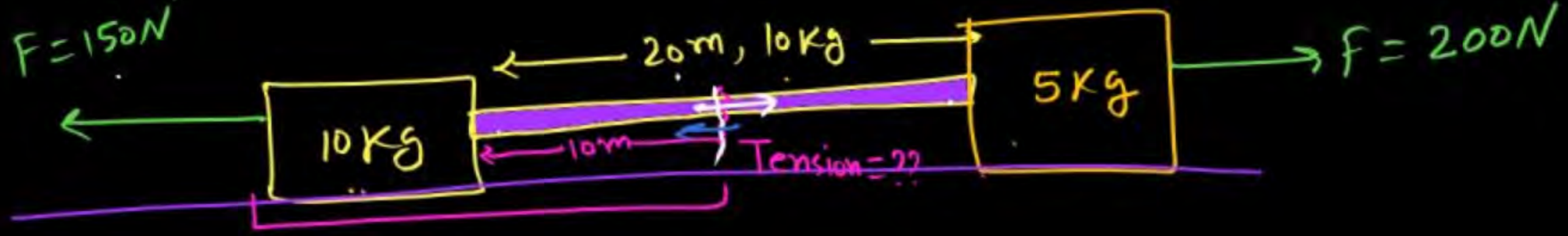
(Common System)

FBD of (Block + half string)

20+20 ⟶

$T = ma = 40 \times 2 = 80$ Newton.

(28)



find T in given diagram.

Sol^n

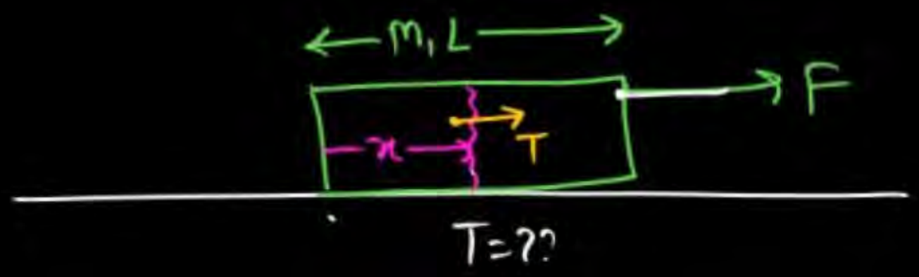
$$a_{system} = \frac{(200-150)}{(10+10+5)} = \frac{50}{25} = 2\ m/s^2$$

FBD of 10kg + half string (5kg)

$T - 150 = 15 \times a$

$T = 150 + 15 \times 2 = 150 + 30 = 180N$

(29)



$L \longrightarrow m$

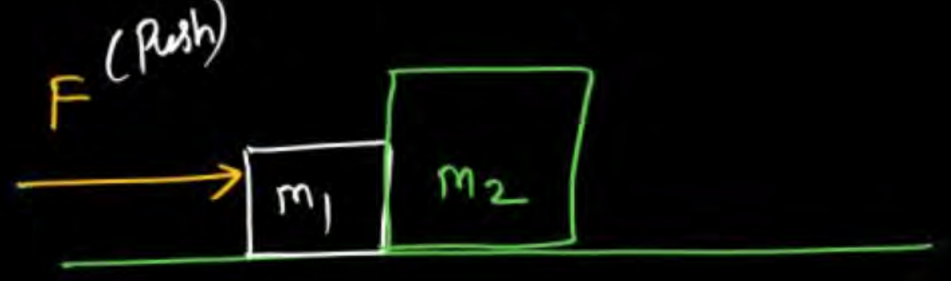
$1 \longrightarrow \frac{m}{L}$

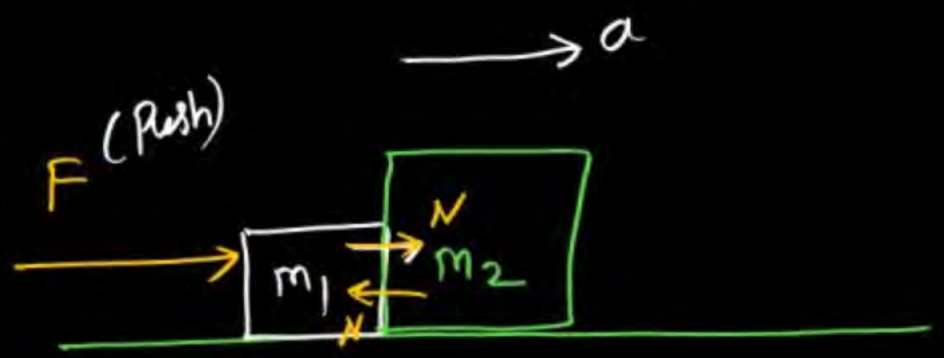
$x \longrightarrow \frac{m}{L}x$

$a = \frac{F}{m}$ (System/Block/Strip)

$T = m'a = \frac{m}{L} x \frac{F}{m} = \frac{Fx}{L}$

(30)



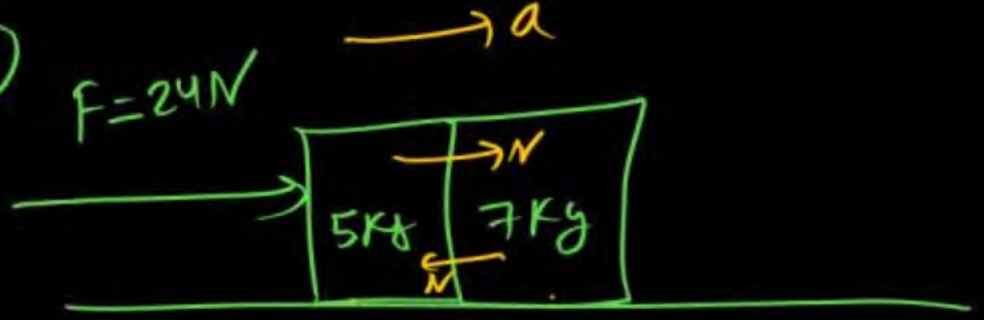


$$a_{sys} = \frac{f}{m_1 + m_2} \quad \text{(combine FBD)}$$

FBD of m_2

$$N = m_2 a = m_2 \left[\frac{f}{m_1 + m_2}\right] \text{ Ans}$$

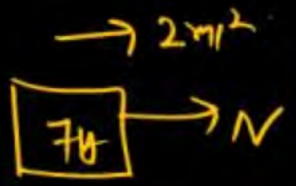
(31)



Normal b/w them.

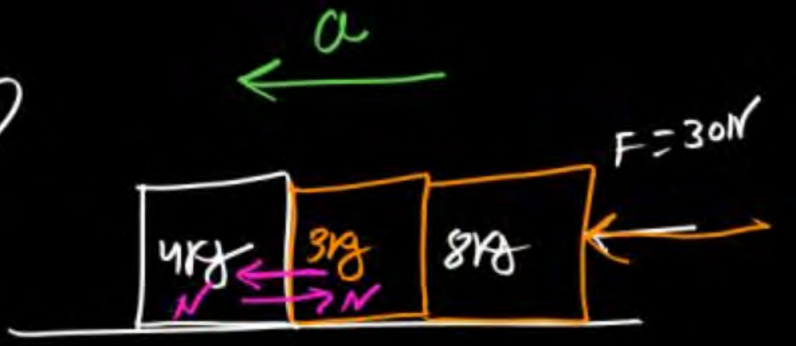
$$a_{common} = \frac{24}{7+5} = \frac{24}{12} = 2 m/s^2$$

7 Kg Ka FBD



$N = ma = 7 \times 2 = \underline{14N}$ Ans.

(32)



Contact force b/w 4Kg & 3Kg.

$$\vec{a} = \frac{30}{15} = 2 m/s^2 \leftarrow$$

FBD of 4Kg.

$N = ma = 4 \times 2 = \underline{8N}$

Question

(33) ext Patient

Three blocks A, B and C of masses 4 kg, 2 kg and 1 kg respectively, are in contact on a friction less surface, as shown. If a force of 14 N is applied on the 4 kg block, then the contact force between A and B is: **[2015]**

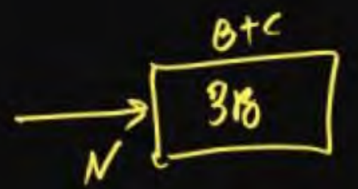
1. 6 N
2. 8 N
3. 18 N
4. 2 N

$a = \frac{14}{7} = 2 m/s^2$

$14 - N = ma$

$14 - N = 4 \times 2$

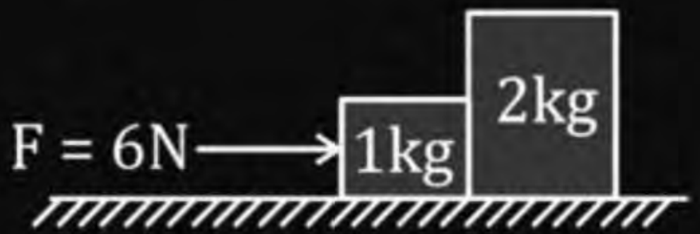
$N = 14 - 8 = 6N$



$N = m \times a = 3 \times 2 = 6N$

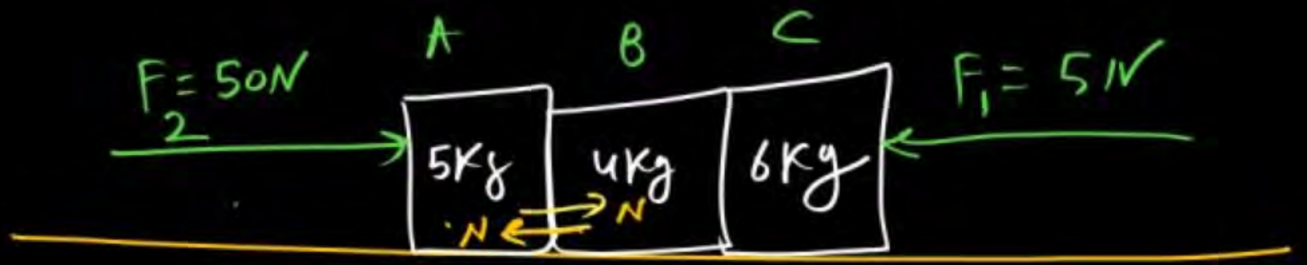
Question 34

Arrangement of two block system is as shown. The net force acting on 1 kg and 2 kg blocks are (assuming the surface to the frictionless) respectively



1. 4 N, 8 N
2. 1 N, 2 N
3. 2 N, 4 n
4. 3 N, 6 N

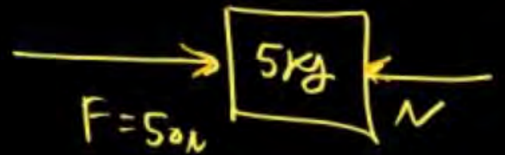
(35)



Contact force b/w A & B

$$a_{common} = \frac{45}{9} = 3\,m/s^2$$

$\rightarrow a = 3\,m/s^2$



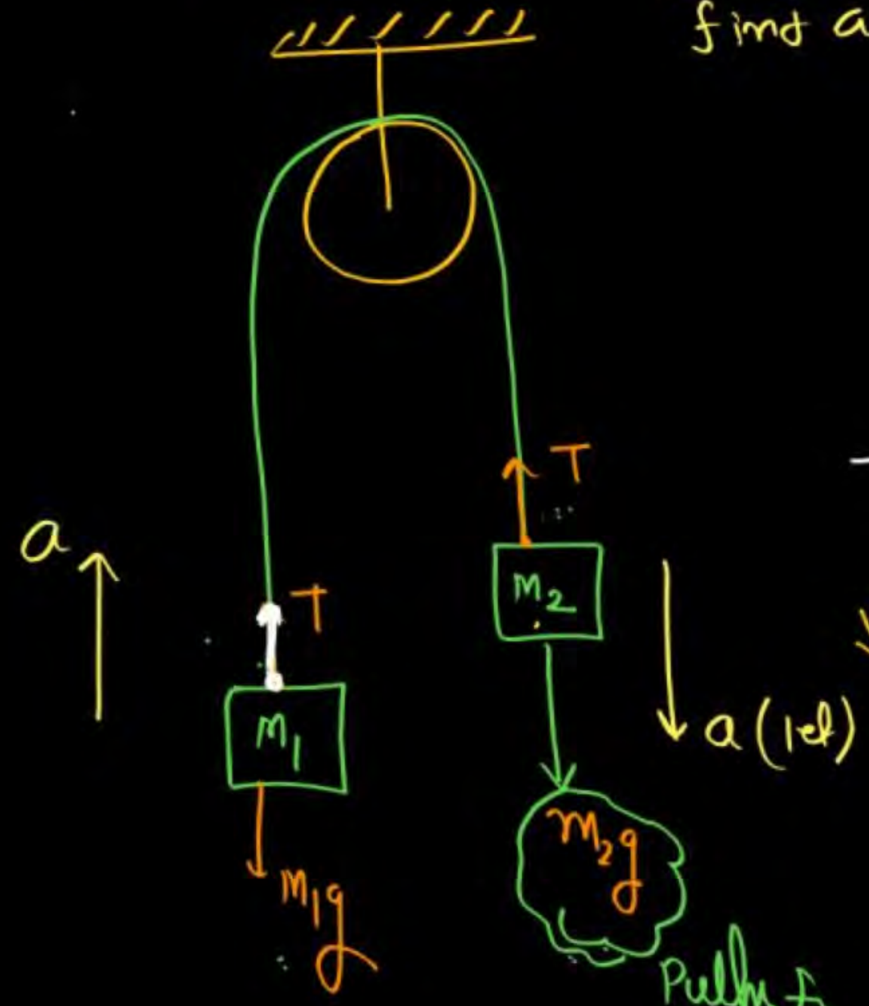
$50 - N = 5 \times 3$

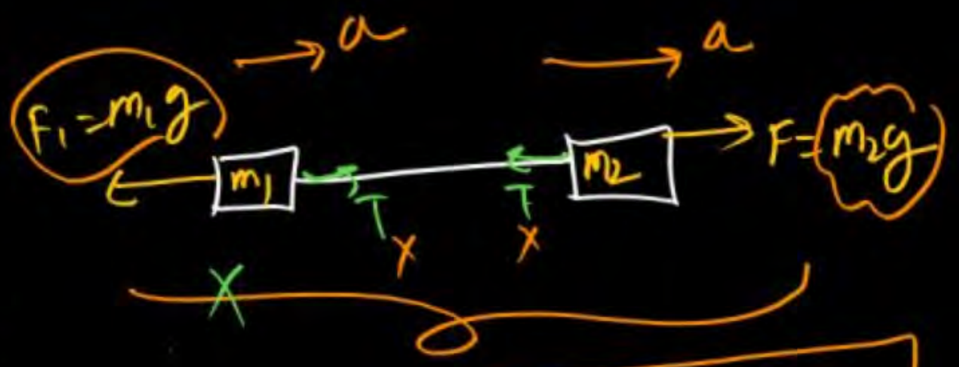
$N = 50 - 15 = 35$ New.

Pulley Block Problem

If $(m_2 > m_1)$

find acc^n





$$m_2 g - T = m_2 a \quad -(i)$$

$$T - m_1 g = m_1 a \quad -(ii)$$

$$m_2 g - m_1 g = (m_1 + m_2)\, a$$

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

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

$$a = \left(\frac{m_1 + m_2}{m_1 - m_2}\right) g$$

MR^* if $m_1 = m_2$

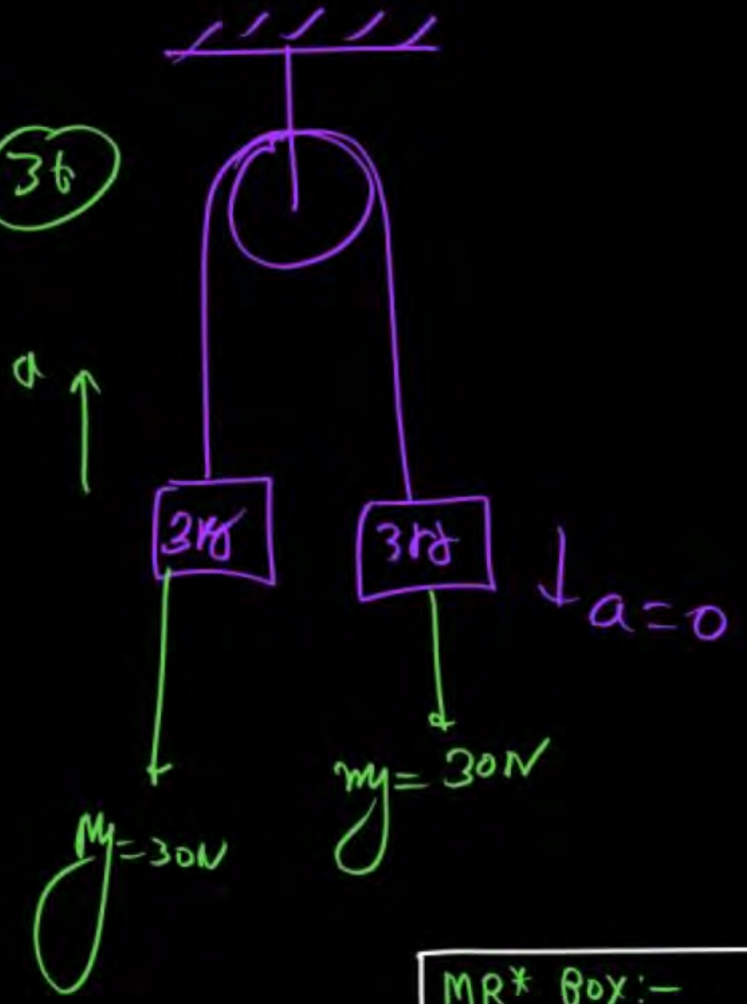
$a = 0$

$$a = \frac{2 m_1 m_2}{m_1 + m_2} g$$

dimension

dim^n wrong

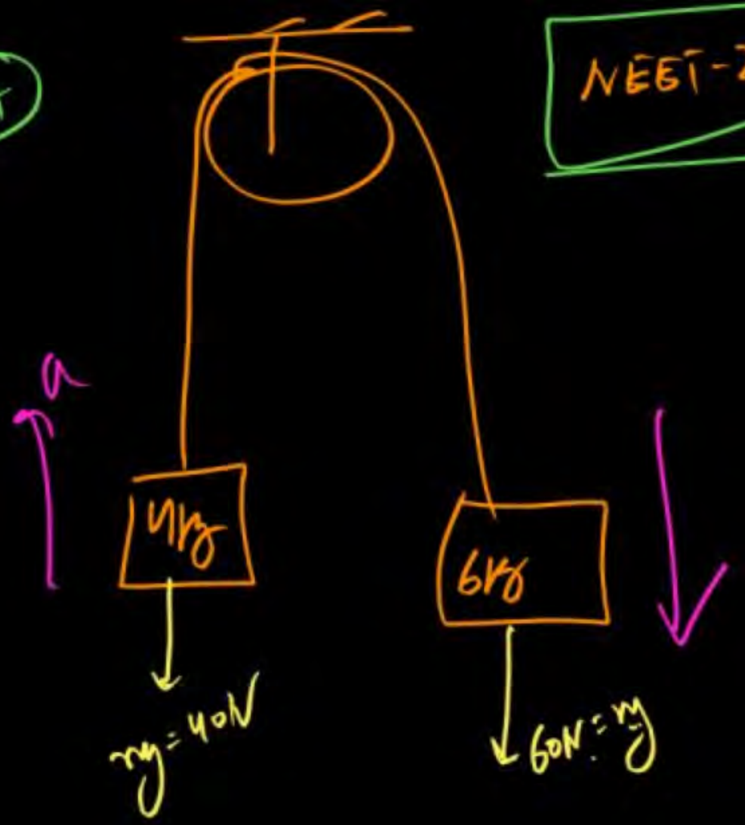
36



MR* Box:-
Tension ke liye
kisi ek object
ka FBD banao.

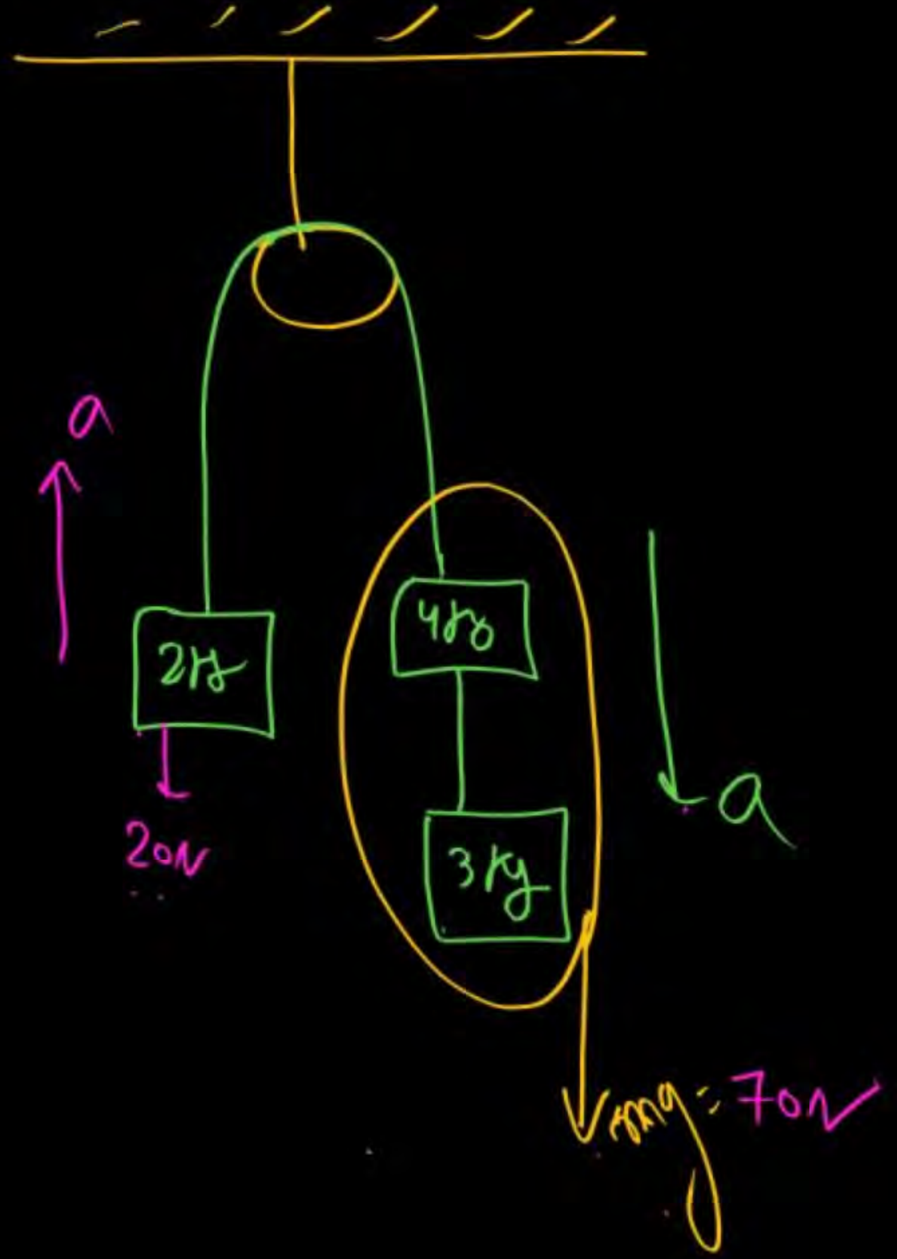
37

NEET-2020



$$a = \frac{60-40}{10} = \frac{20}{10} = 2\,m/s^2$$

(38)



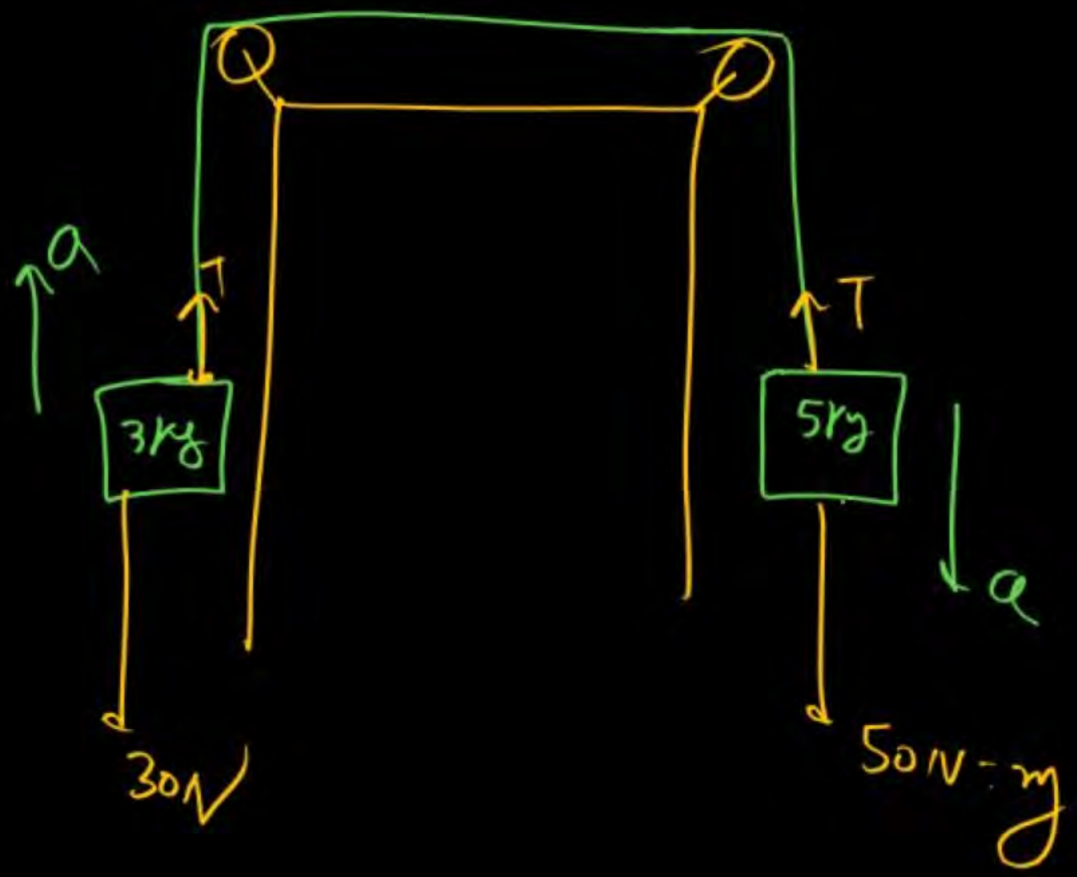
$$a = \frac{(70-20)}{g} = \frac{50}{g}\ m/s^2$$

MR* Box:—

Acceleration ke diretion me JO force hai usko tve lo, usi ke dir^n me net force hoga

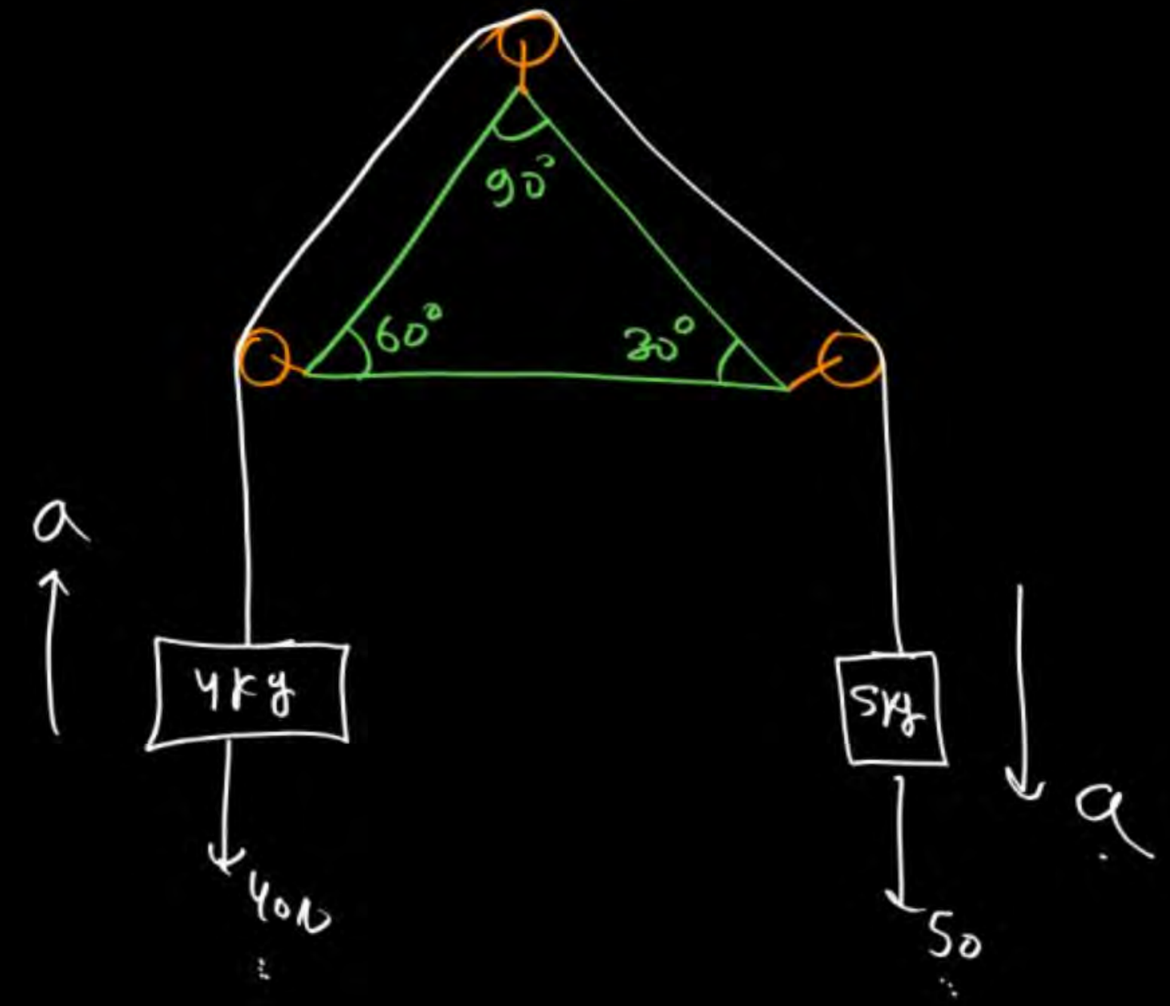
$$\vec{a} = \frac{(F_{net})\ Pulley}{Mass\ total.}$$

39



$$a = \frac{50 - 30}{8} = \frac{20}{8}\ m/s^2$$

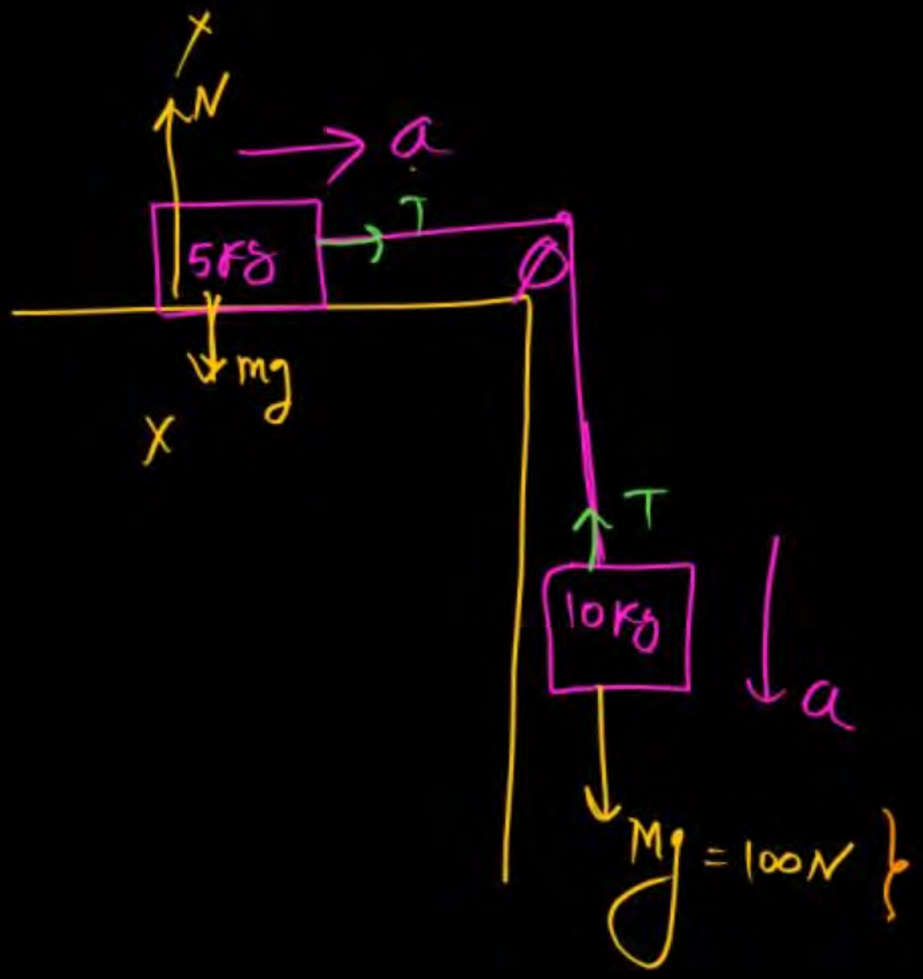
(40)



$$a = \frac{50-40}{g}$$

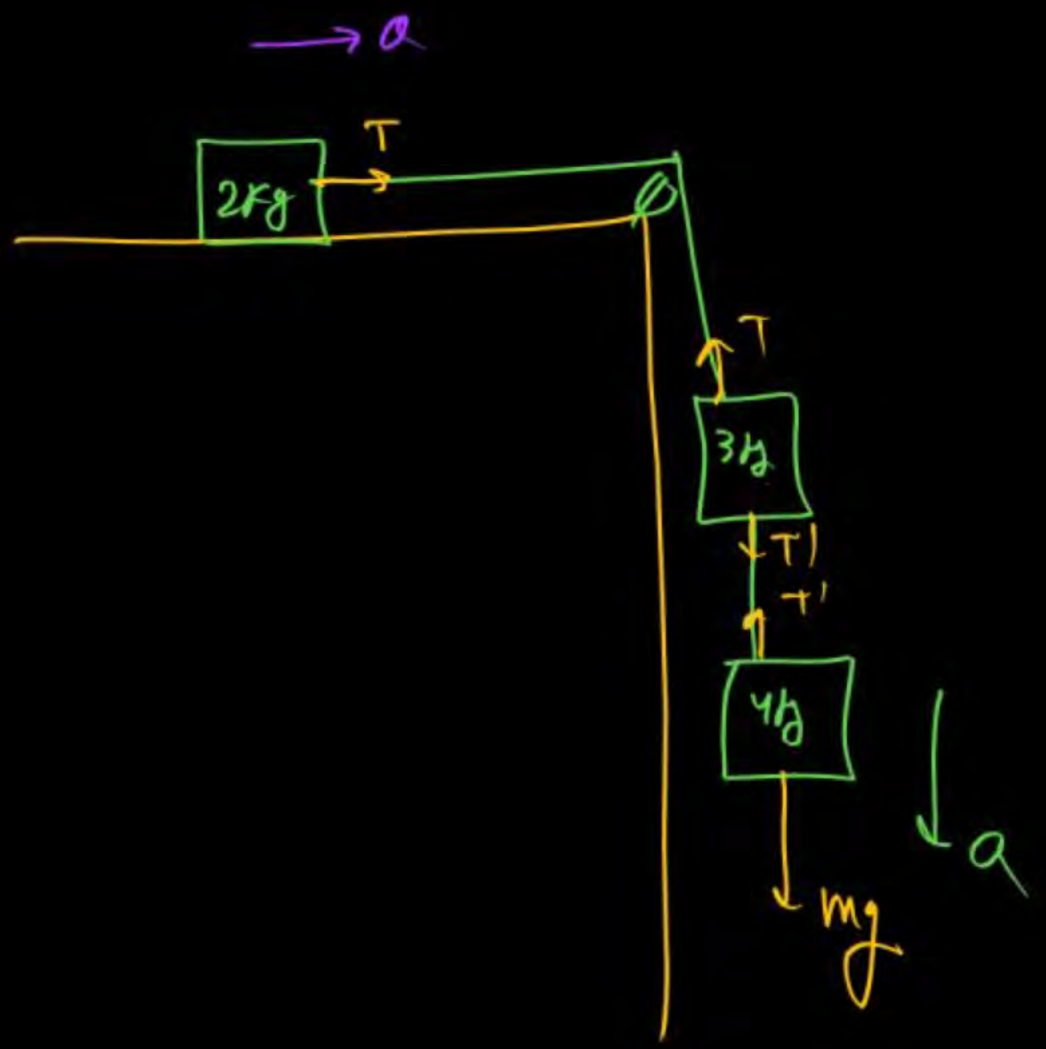
$$= \frac{10}{g}\ m/s^2$$

(41)



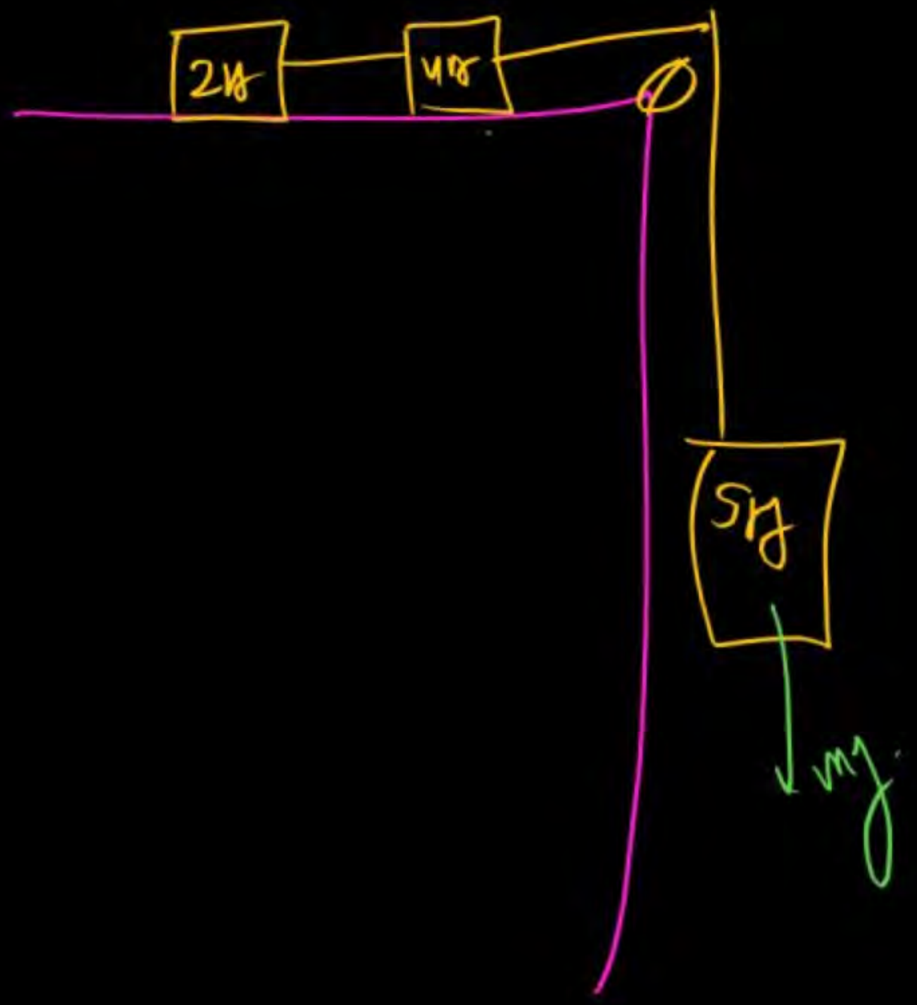
$$a = \frac{100}{15} \quad m/s^2$$

(42)



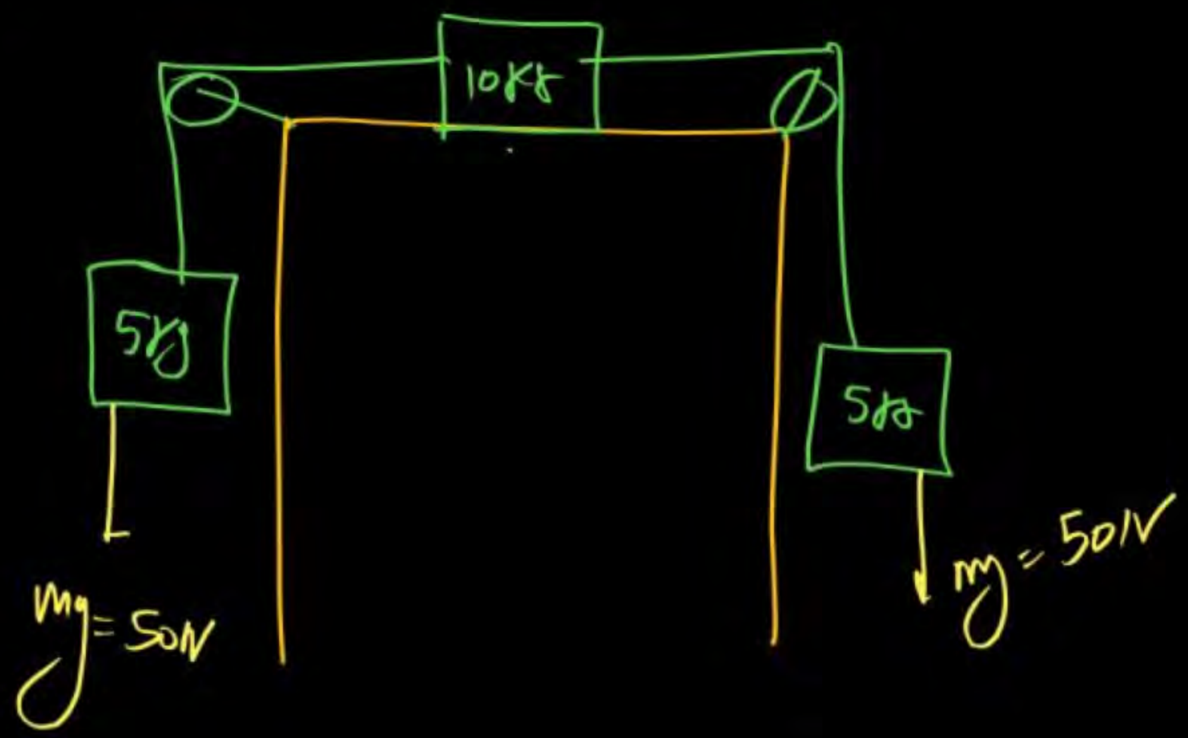
$$a = \frac{70}{g}\ m/s^2 = \frac{F_{net}}{m_{net}}$$

Q3



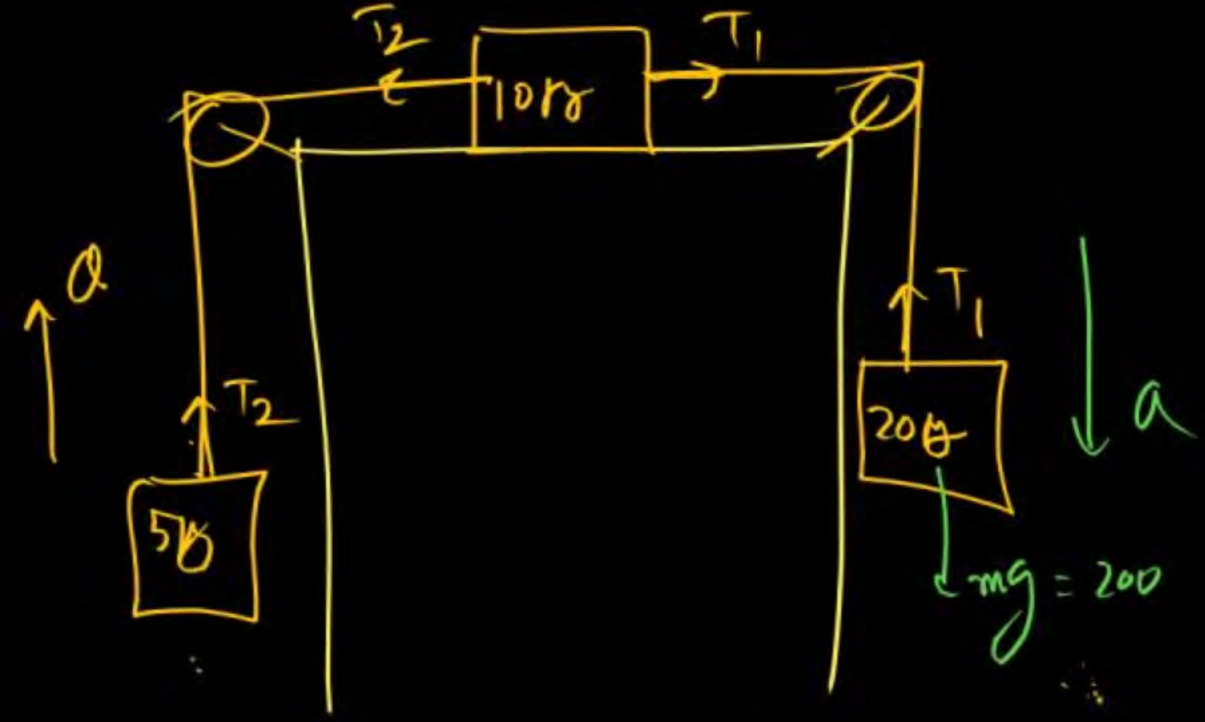
$$a = \frac{50}{11} = \frac{50}{11}\ m/s^2$$

44



$a = 0$ ✓

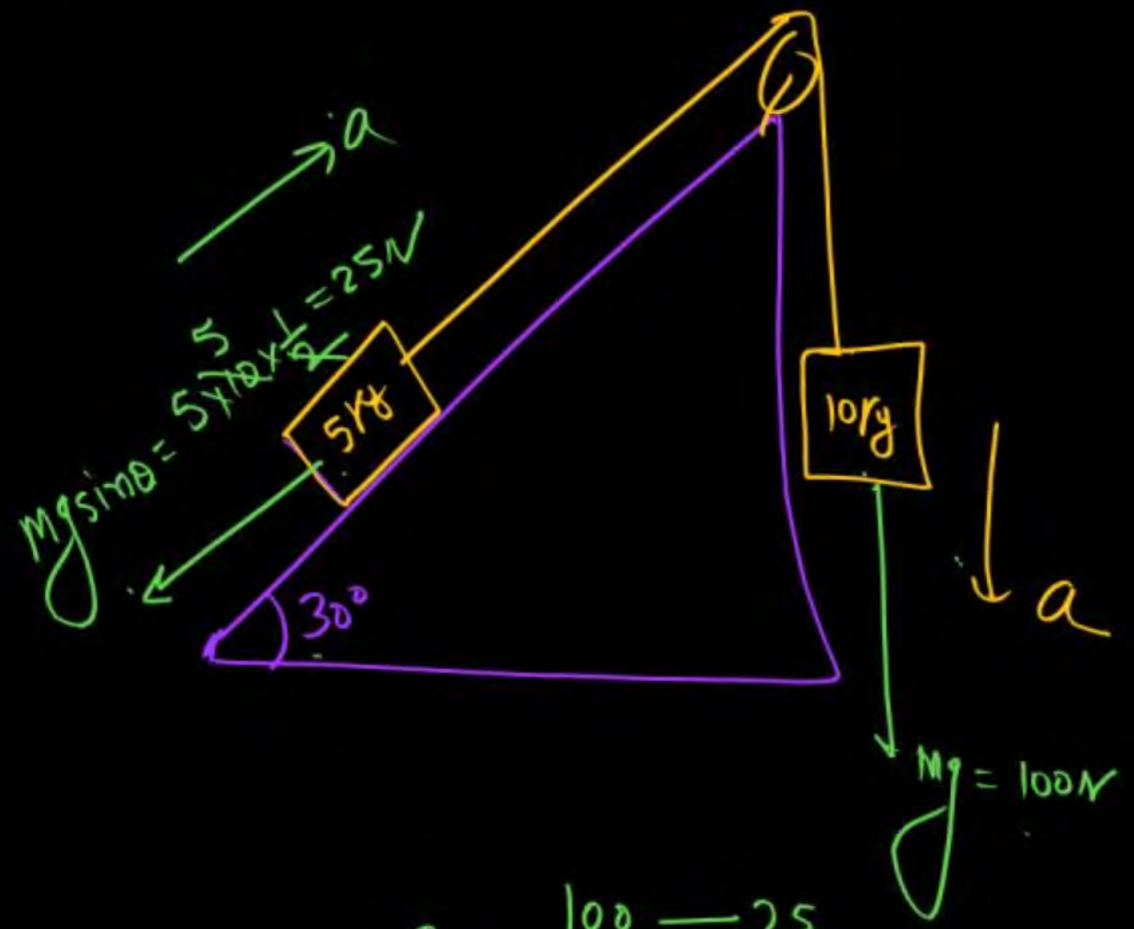
(45)



$$a = \frac{200 - 50}{35}$$

$$a = \frac{150}{35}\ m/s^2$$

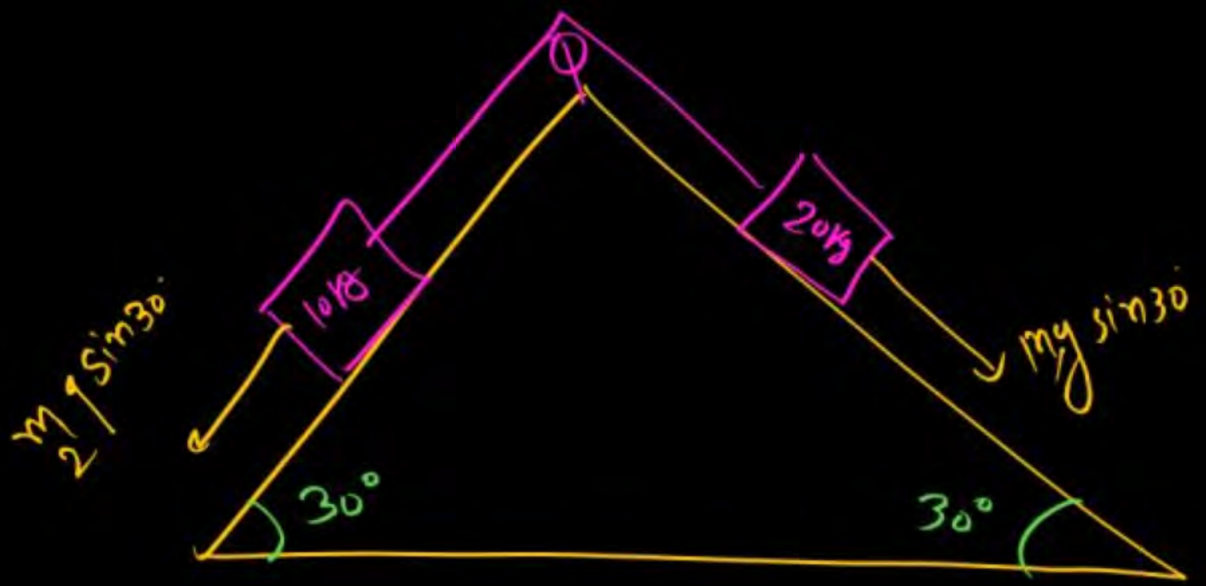
(46)



$$a = \frac{100 - 25}{15}$$

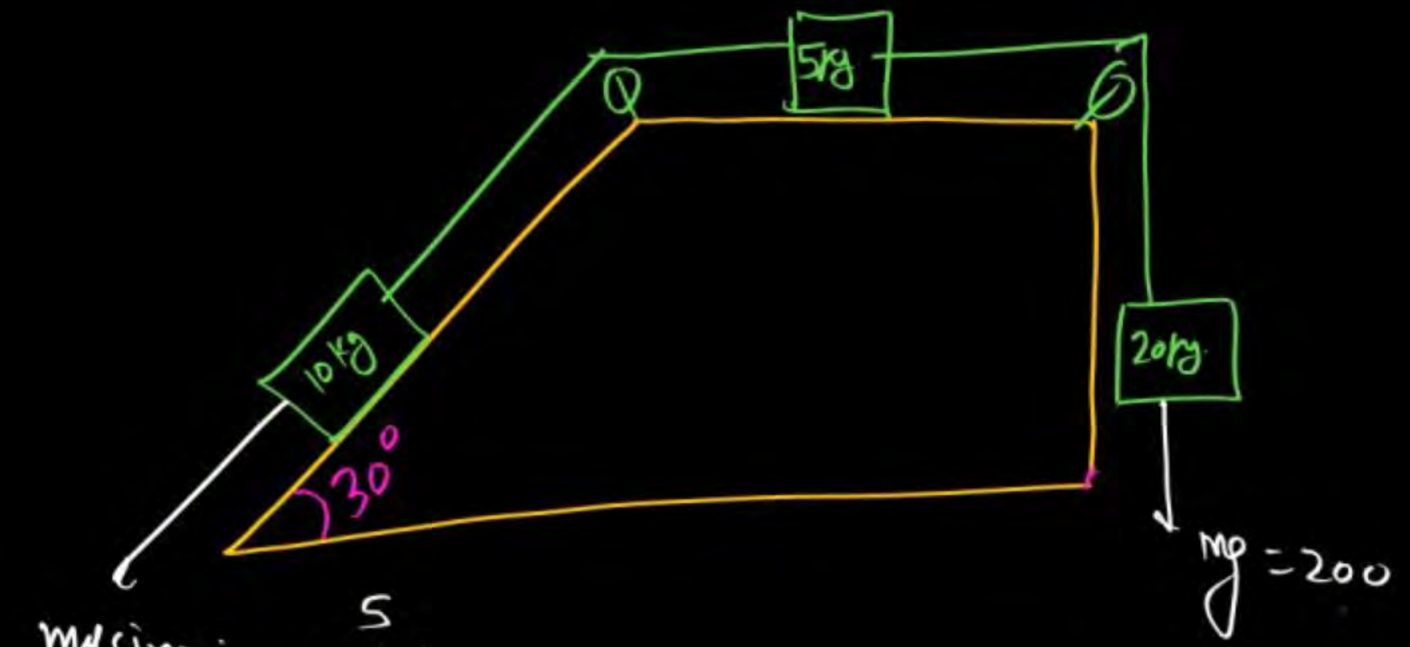
$$a = \frac{75}{15} = 5 m/s^2$$

47



$$a = \frac{F_{net}}{M_{total}}$$

(48)

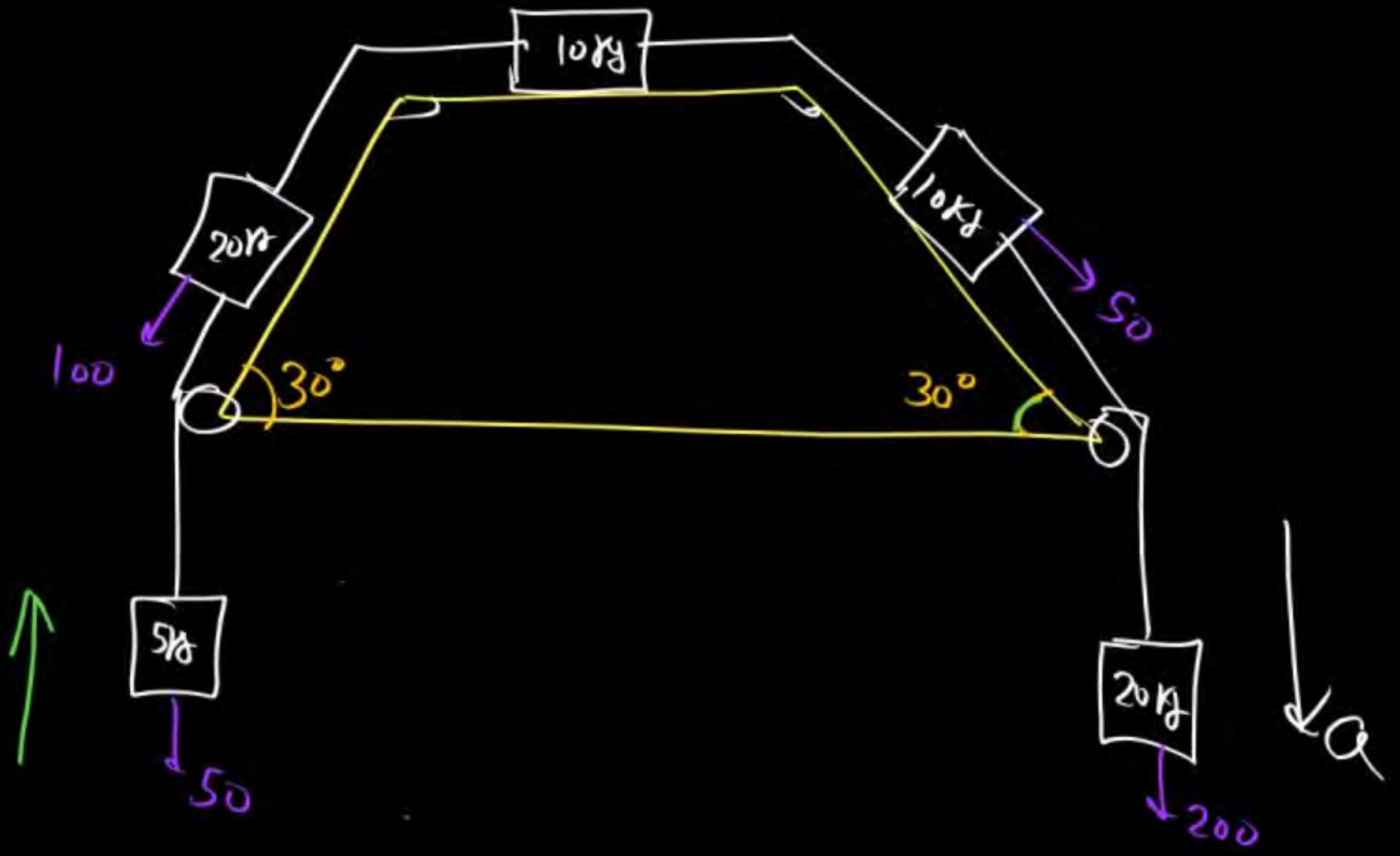


$mg\sin 30 = 10 \times 10 \times \frac{1}{2}$ (5)

$= 50N$

$$a = \frac{150}{35}\ m/s^2$$

49



$$acc^n = \frac{250 - 150}{65}$$

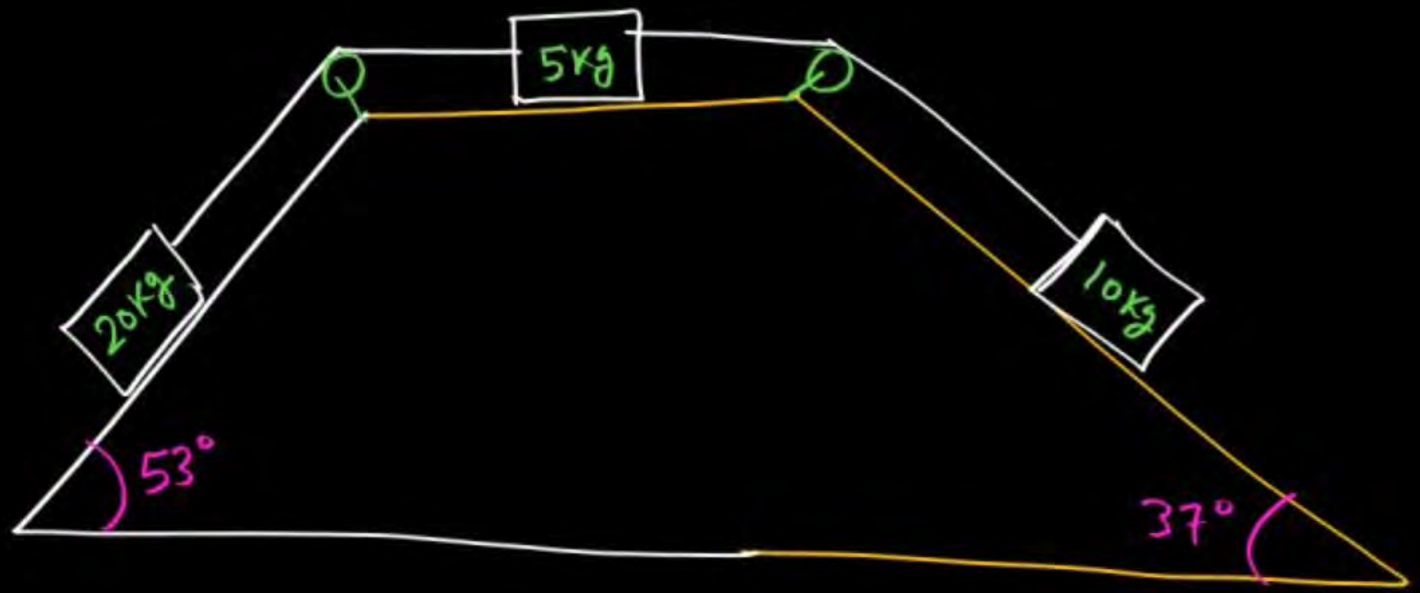
$$= \frac{100}{65}\ m/s^2$$

find acc^{n}.

(50)

$\sin 37^\circ = \frac{3}{5}$

$\sin 53^\circ = \frac{4}{5}$



H/W

Question

Notes में नहीं लिखना

(1)

A person of mass 60 kg is inside a lift of mass 940 kg and presses the button on control panel. The lift starts moving upwards with an acceleration 1.0 m/s^2. If $g = 10\ ms^{-2}$, the tension in the supporting cable is **[2011 Pre]**

1. 8600 N
2. 9680 N
3. 11000 N
4. 1200 N

Question

(2)

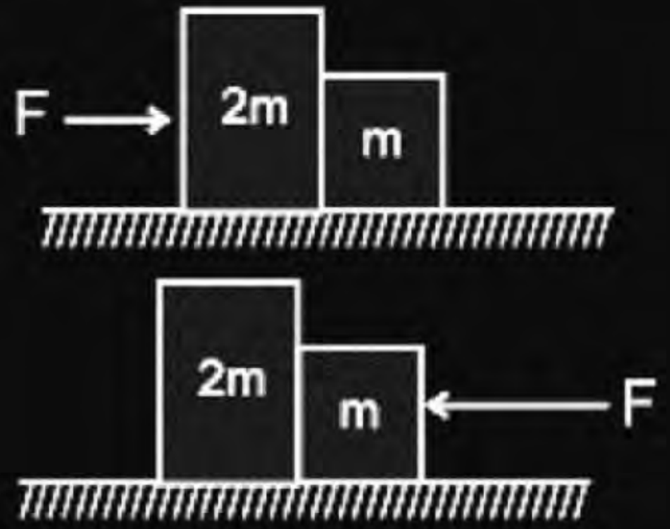
The mass of a lift is 2000 kg. When the tension in the supporting cable is 28000 N, then its acceleration is: [2019]

1. $4\ ms^{-2}$ upwards
2. $4\ ms^{-2}$ downwards
3. $14\ ms^{-2}$ upwards
4. $30\ ms^{-2}$ downwards

Question 3

Two blocks are in contact on a frictionless table. One has mass *m* and the other 2m. A force F is applied on 2m as shown in the figure. Now the same force F is applied from the right on m. In the two cases respectively, the ratio of force of contact between the two blocks will be:

1. Same
2. 1 : 2
3. 2 : 1
4. 1 : 3



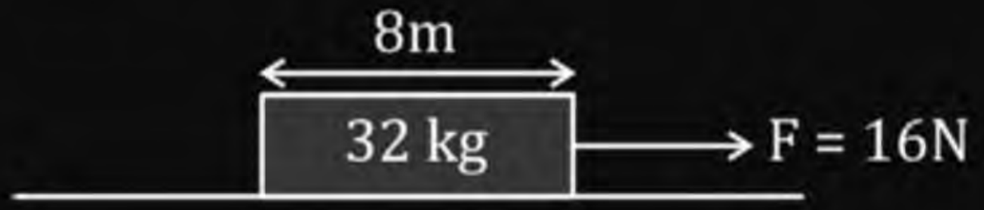
Question 4

Figure shows a uniform rod of length 30 cm having a mass 3.0 kg. The rod is pulled by constant forces of 20 N and 32 N as shown. Find the force exerted by 20 cm part of the rod on the 10 cm part (all surfaces are smooth) is:

1. 36 N
2. 12 N
3. 64 N
4. 24 N

Question 5

A massive string of length 8 m and mass 32 kg, then find tension of a point 3 m away from a end where force is applied.



Question

6

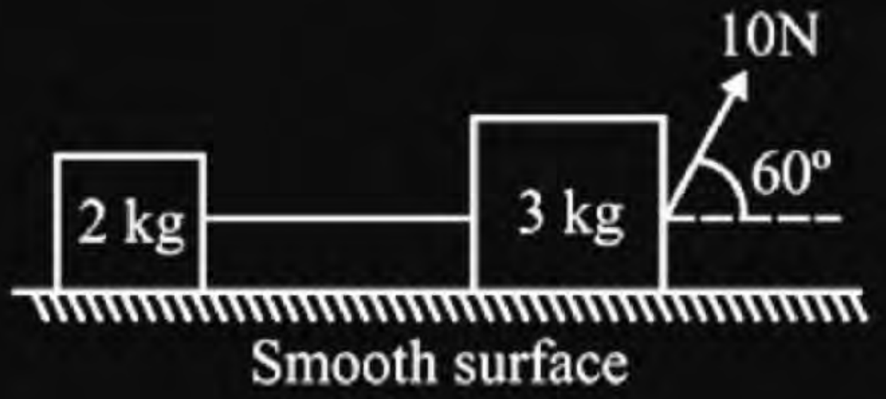
A lift of mass 1000 kg is moving with acceleration of 1 m/s^2 in upward direction, then the tension developed in string which is connected to lift is

1. 9800 N
2. 10,800 N
3. 11,000 N
4. 10,000 N

Question 7

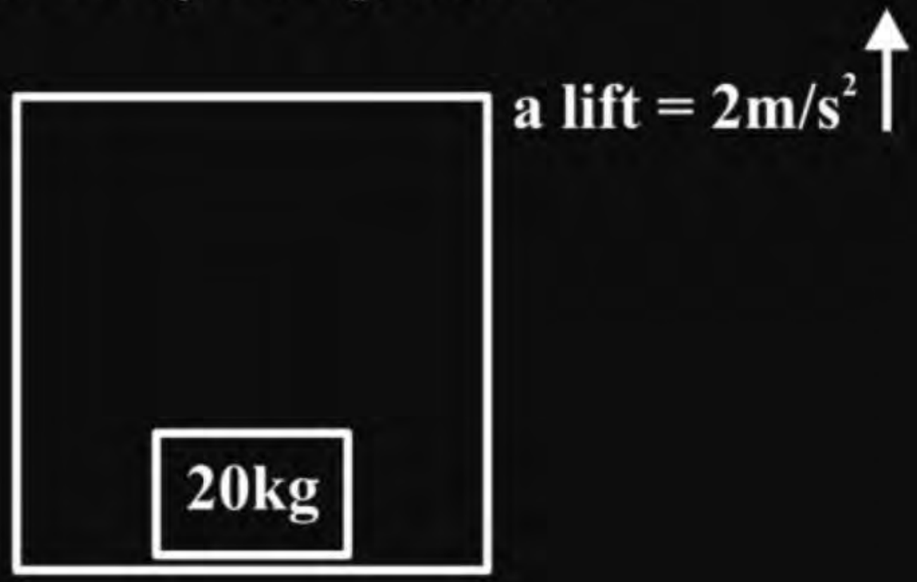
Figure shows two blocks connected by a light inextensible string as shown in figure. A force of 10 N is applied on the bigger block at 60° with horizontal, then the tension in the string connecting the two masses is

1. 5 N
2. 2 N
3. 1 N
4. 3 N



Question 8

Find force applied on base of lift by 20 kg block.



Think about vertical force on 20kg block.

Question 9

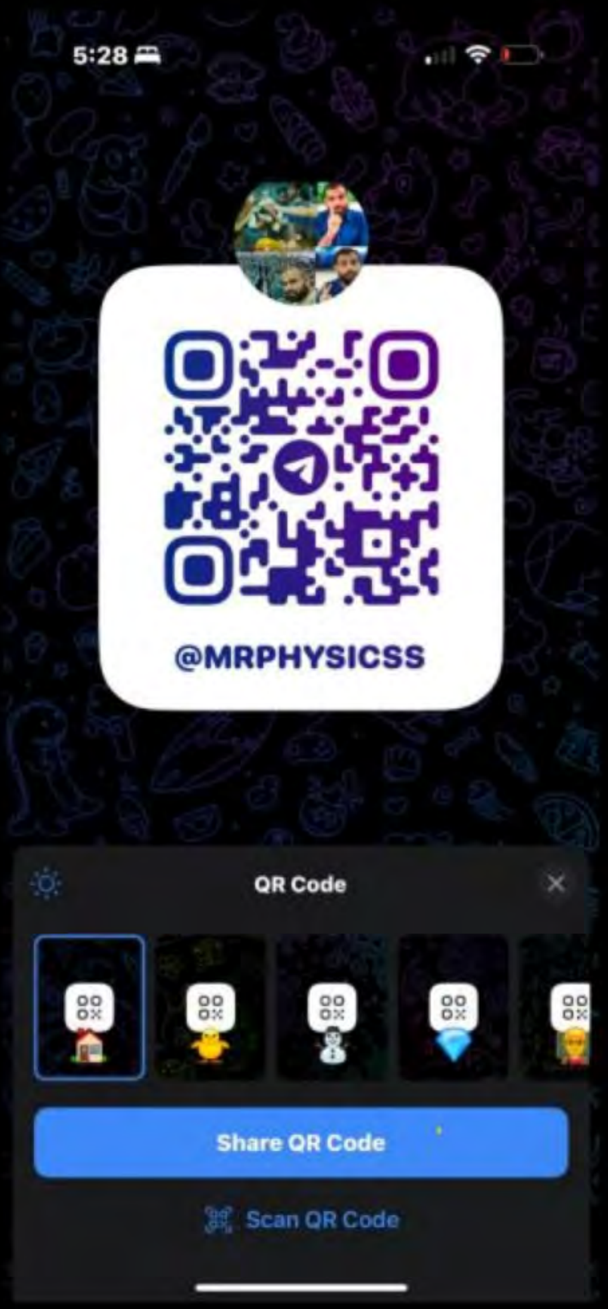
A mass of 1 kg is suspended by a thread. It is (i) lifted up with an acceleration 4.9 m/s^2, (ii) lowered with an acceleration 4.9 m/s^2. The ratio of the tensions is

1. 1 : 3
2. 1 : 2
3. 3 : 1
4. 2 : 1

Question 10

Tension in the rope at the rigid support is ($g = 10\ m/s^2$)

1. 760 N
2. 1360 N
3. 1580 N
4. 1620 N



Rapid Test

THANK YOU