YAKEEN NEET 2.0

2026

Laws of Motion

PHYSICS | Lecture 07

By - Saleem Ahmed Sir

Todays Goal.

- Question Practice on NLM
- Spring force.

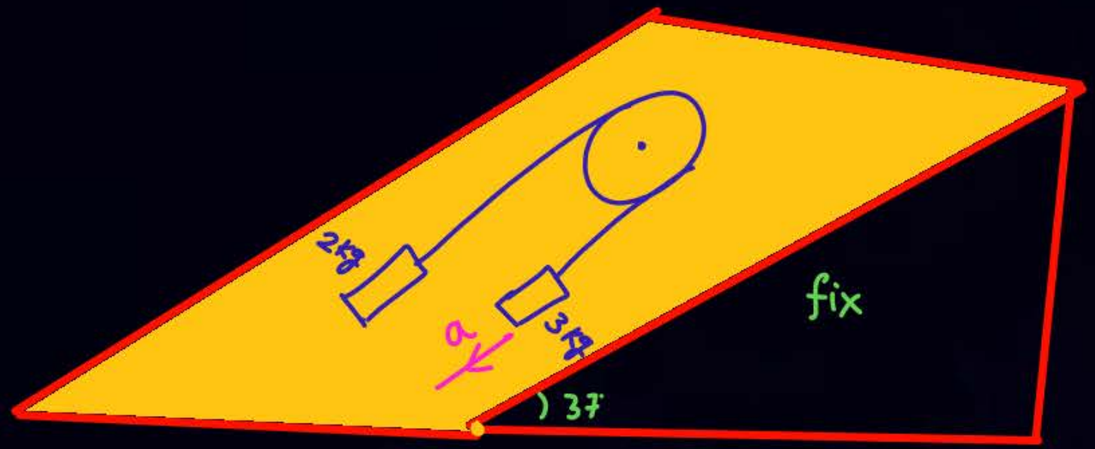
Breakfast

Q

$$a = \frac{3g\sin 37^\circ - 2g\sin 37^\circ}{2+3}$$

$$a = \frac{g\sin 37}{5} = \frac{10 \times 3}{5 \times 5} = \frac{6}{5}$$

$$= 1.2\ m/s^2$$



$g \Rightarrow g\sin 37$

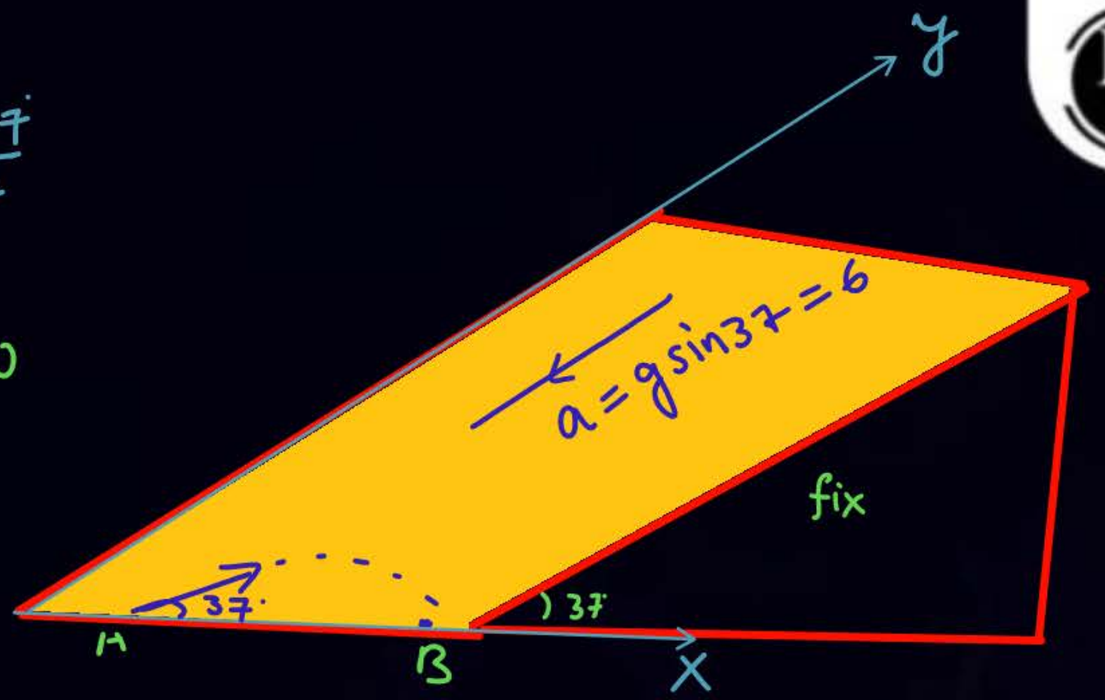
$a = 1.2$

Breakfast

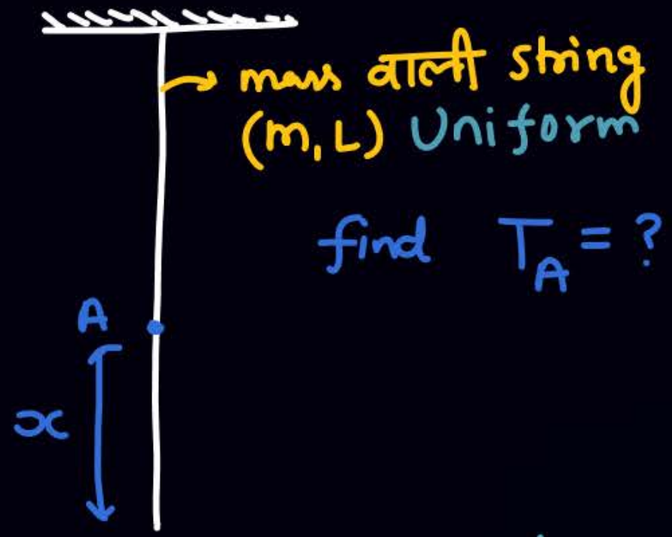
Q

$$t_{A\to B} = \frac{2u_y}{a_y} = \frac{2 \times 100 \cdot \sin 37^\circ}{g \sin 37}$$

$$= \frac{200}{10} = 20$$



Q



Sol^n

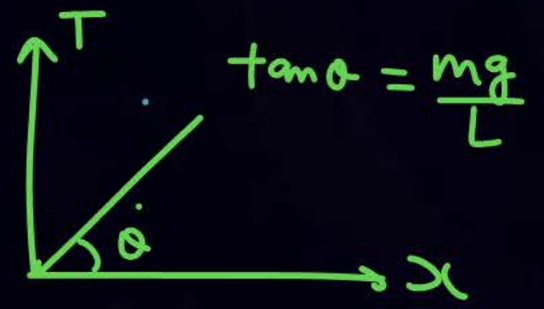
$T_A = m'g$

$T_A = \frac{mx}{L} g$.

$L \longrightarrow m$

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

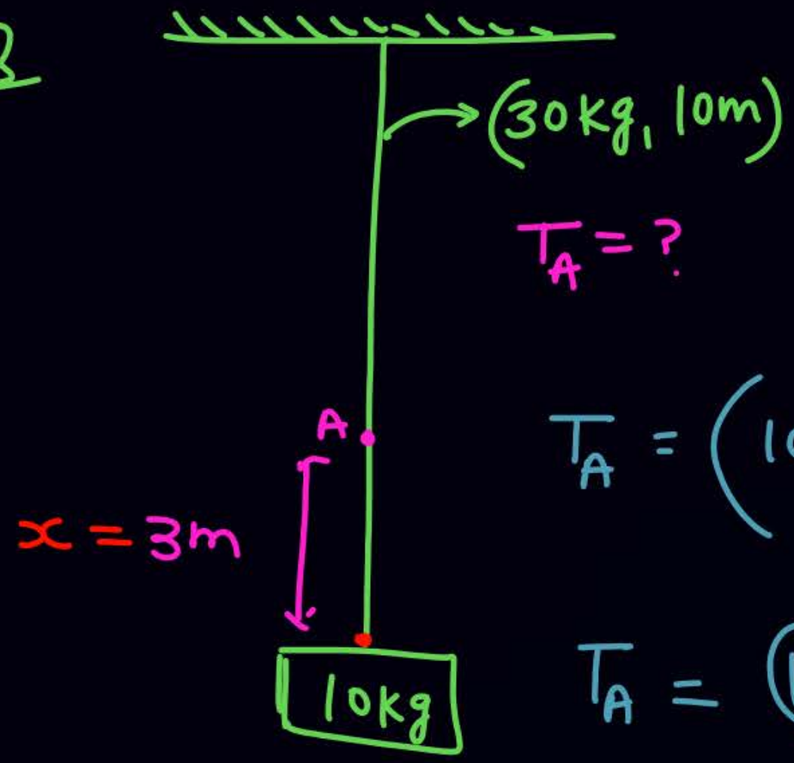
$x \longrightarrow \frac{m}{L} x = m'$



$\tan\theta = \frac{mg}{L}$

$(\text{stress})_A = \frac{T}{\text{Area}} = \checkmark$

Q



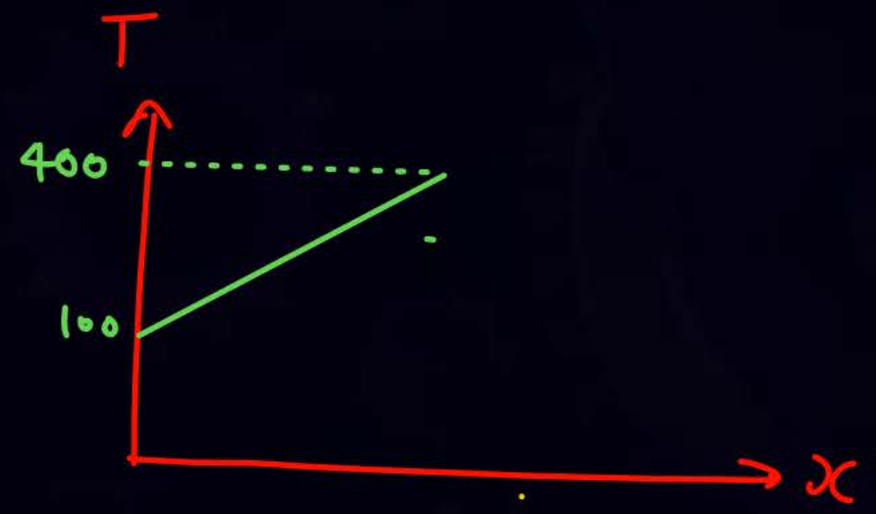
$$T_A = \left(10 + m_{\text{नीचे वाली रस्सी}}\right) g$$

$$T_A = (10 + 9) \times 10 = \underline{\underline{190}}$$

10m ⟶ 30kg

1m ⟶ $\frac{30}{10}$ kg

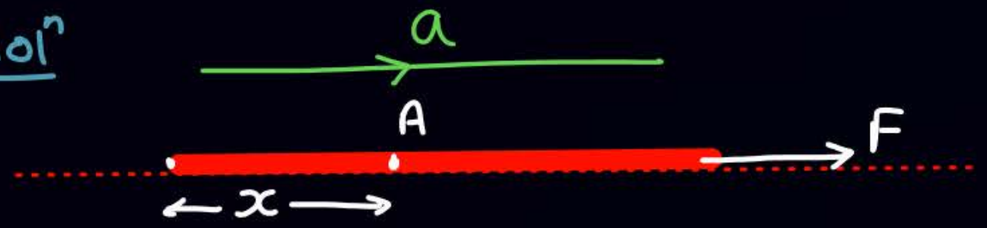
3m ⟶ $\frac{30}{10} \times 3 = 9$ kg



Q

find Tension at A.

Soln



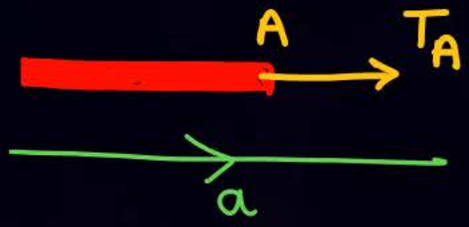
$F = ma$

$a = F/m$

$L \longrightarrow m$

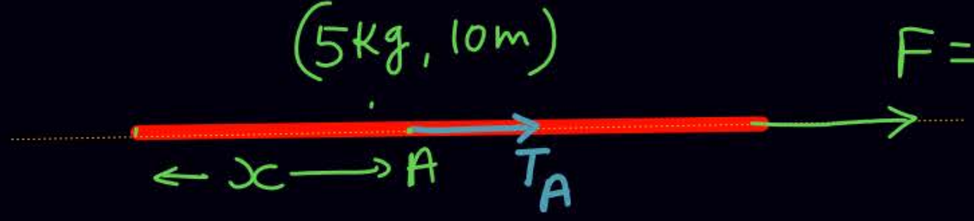
$1 \longrightarrow \frac{m}{L}$

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



$T_A = m_x a = \frac{m}{L} x \cdot \frac{F}{m} = \frac{Fx}{L}$

Q



① $T_A = ?$

$$a = \frac{100}{5} = 20$$

$$T_A = m_x \cdot a = \frac{M}{L} x \cdot 20$$

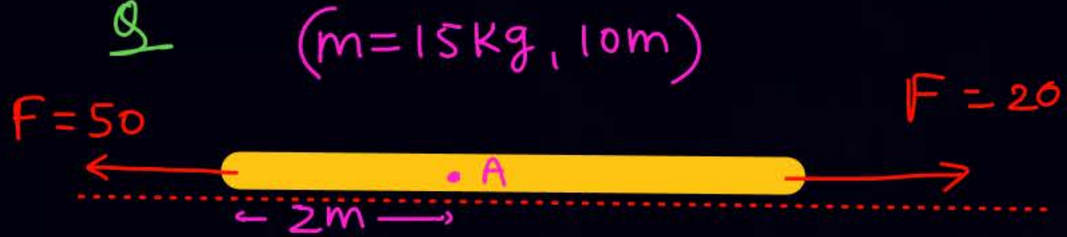
$L \longrightarrow M$

$$= \frac{5}{10} x \times 20$$

$$= 10x$$

$200 - T_A = 12 \times 10$

Q



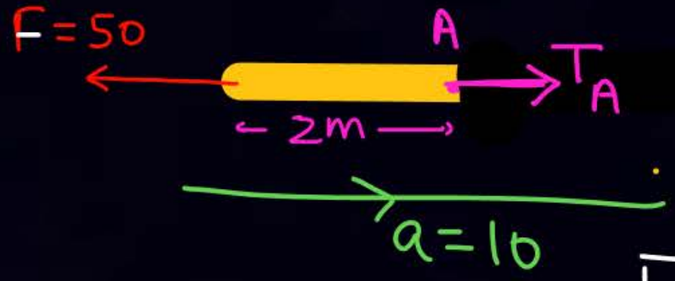
$T_A = ?$

10m ⟶ 15kg

1m ⟶ $\frac{15}{10}$ kg

2m ⟶ $\frac{30}{10}$ kg = 3kg

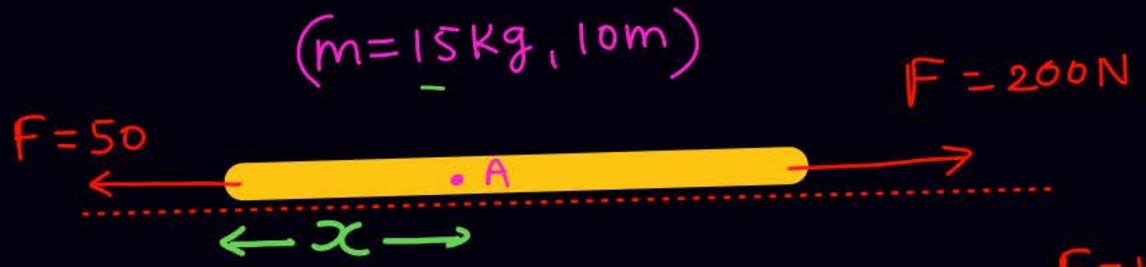
Sol^n $$a = \frac{200 - 50}{15} = 10$$



$T_A - 50 = 3 \times 10$

$\boxed{T_A = 80N}$

Q



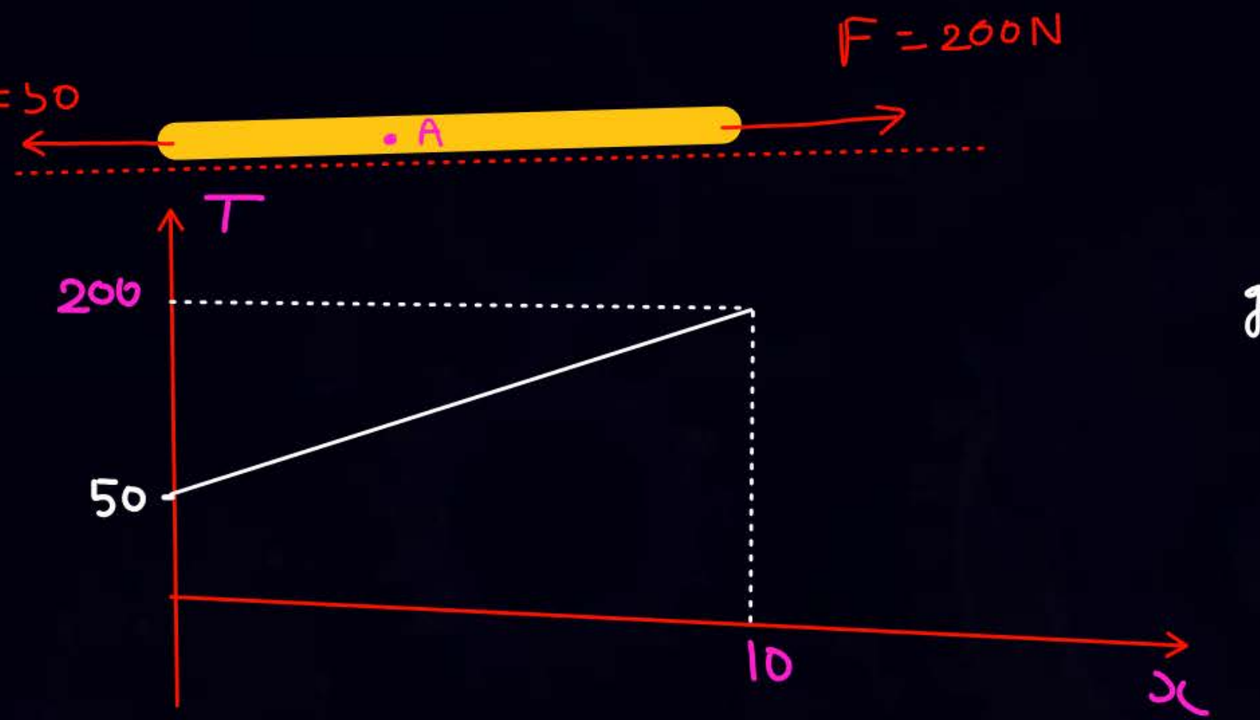
$$a = \frac{200-50}{15} = 10$$

$$T_A - 50 = m_x \cdot a$$

$$T_A - 50 = \frac{m}{L} x \cdot a$$

$$T_A - 50 = \frac{15}{10} x \cdot 10$$

$$\boxed{T_A = 15x + 50}$$



Q

$F_1 > F_2$

$T_A = ?$

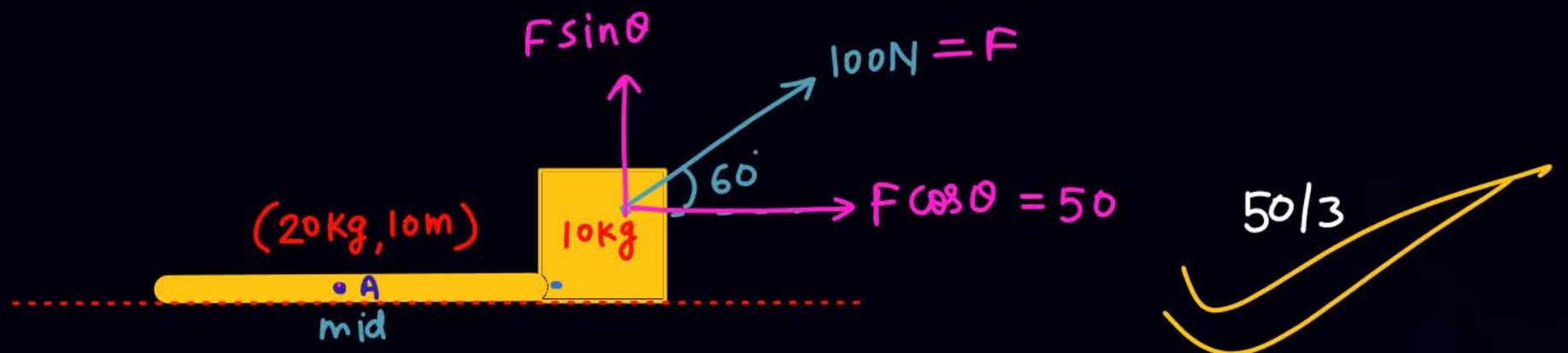
$$a = \frac{F_1 - F_2}{m}$$

$$T_A - F_2 = \frac{m}{L} x \cdot a$$

$$T_A = F_2 + \frac{m}{L} x \cdot \frac{F_1 - F_2}{m}$$

$$T_A = F_2 + \left(\frac{F_1 - F_2}{L}\right) x$$

Q

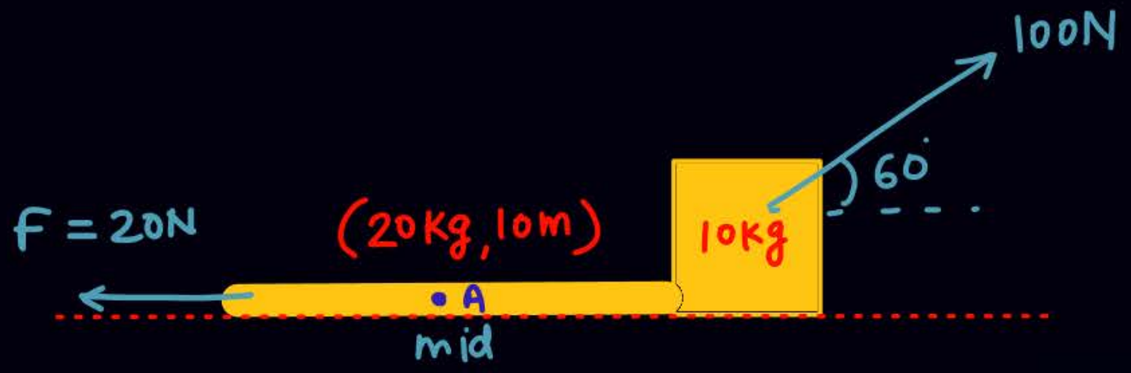


find $T_A = ?$

$$a = \frac{F\cos\theta}{m_{total}} = \frac{50}{30} = \frac{5}{3}$$

$$T_A = 10 \times \frac{5}{3} = \frac{50}{3}$$

Q



find $T_A = ?$

Sol^n

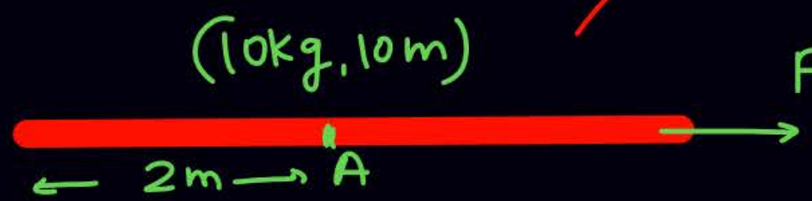
$$T_A - 20 = 10 \times \left(\frac{50-20}{30}\right)$$

$$T_A = 20 + 10 = 30\,N$$

$-\ 110/3$

$-\ 36.67$

Q



$T_A = ?$

Soln $a = \frac{100}{10} = 10$

$T_A = 2 \times a = 2 \times 10$

$= 20$

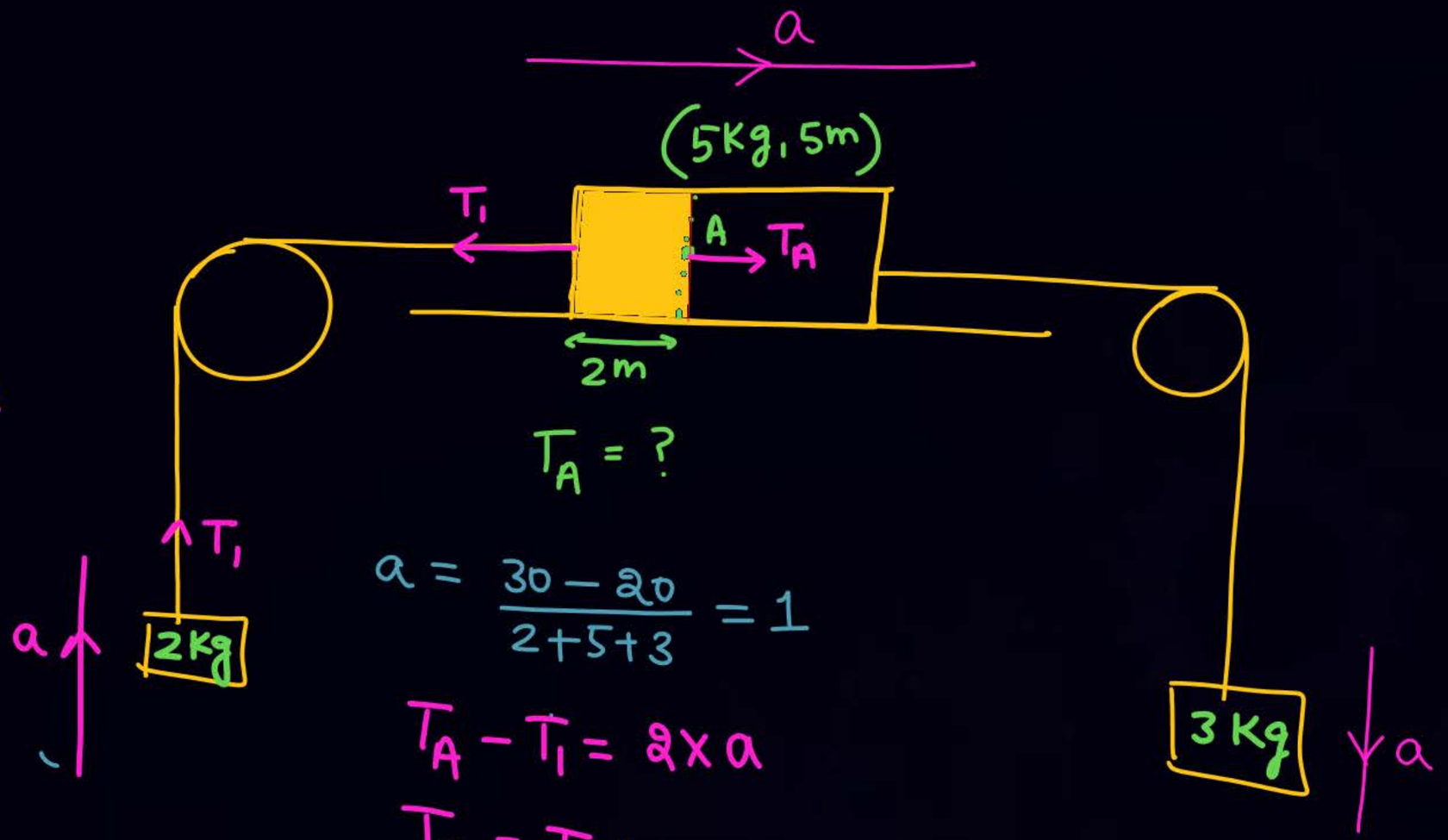
Same

$a = \frac{100-0}{10} = 10$

$T = 2 \times 10 = 20$

M-2.

Q



$T_1 - 20 = 2a$

$T_1 - 20 = 2 \times 1$

$T_1 = 22$

$$a = \frac{30 - 20}{2+5+3} = 1$$

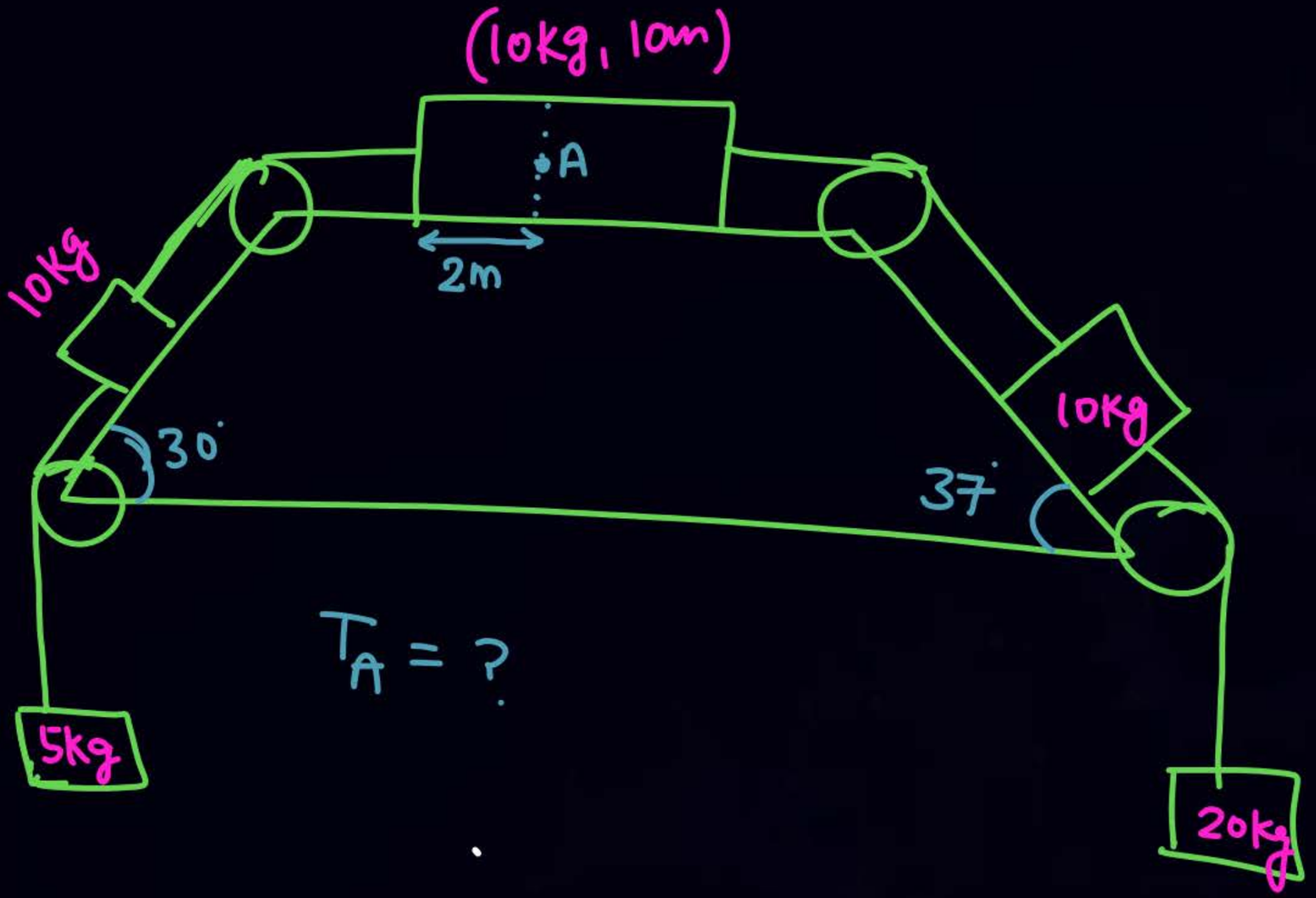
$T_A - T_1 = 2 \times a$

$T_A = T_1 + 2$

$T_A = 22 + 2 = \underline{24}$

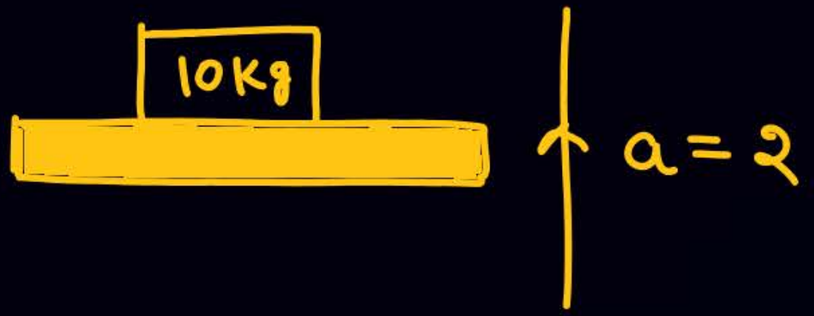
SSSQ

H/W



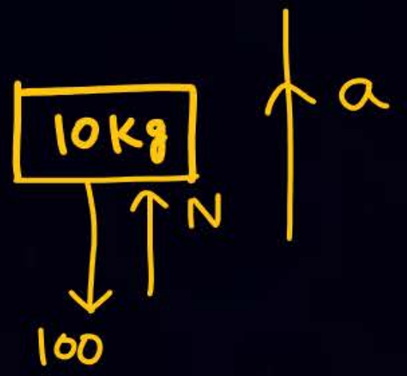
$T_A = ?$

Q



find the normal contact force b/w block & plateform.

Sol^{n}



$N - 100 = 10 \times a$

$N = 100 + 10 \times 2 = \underline{120}$

Q. block is at rest wrt platform.

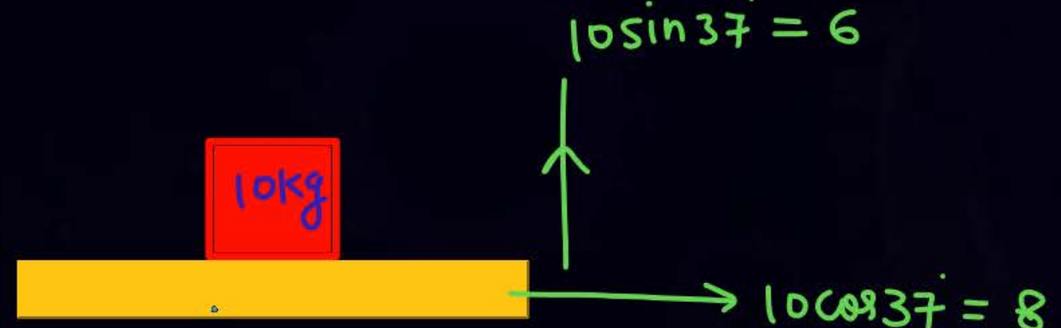
(a) find the normal contact force b/w block & plateform.

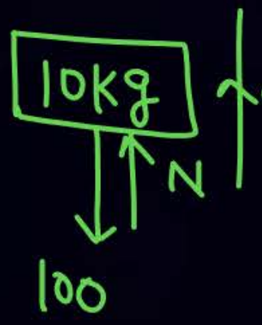
(b) find frictim b/w block & plate form.

(c) $\mu_{min} = ?$

(d) find contact force b/w block & platforms.

Soln

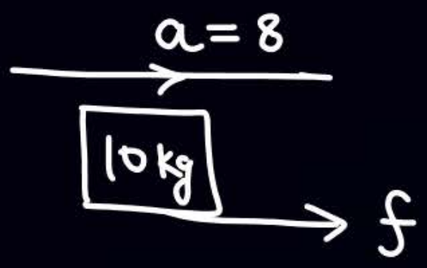




$a = 6 \Rightarrow N - 100 = 10 \times 6$

$N = 160$

(2)



$f = 10 \times 8 = 80$

** (4) Leave it if $\mu = 0$

$f = \mu N = 80$

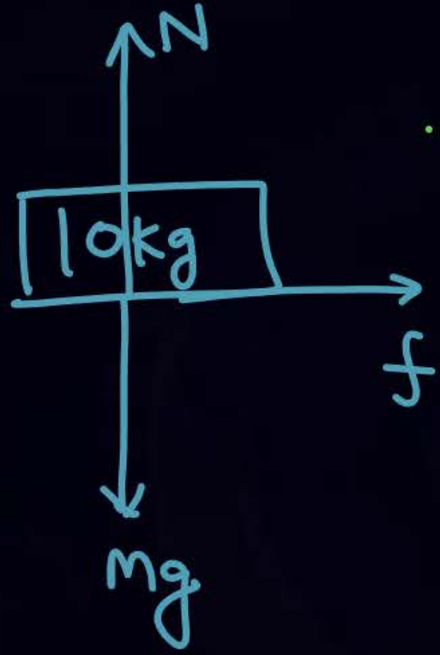
$\mu \times 160 = 80$

$\mu = .5$

Q. block is at rest wrt platform.

(a) find contact force b/w block & platform

Sol^n Ans ~~160 Newton~~



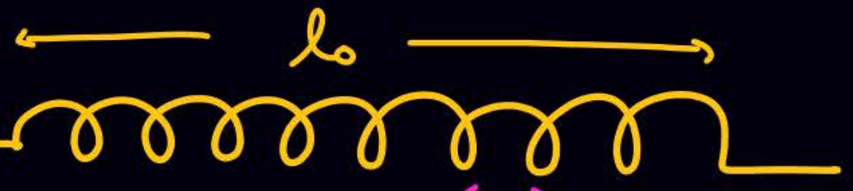
Normal contact force = 160 ✓

Contact force = $\sqrt{N^2 + f^2}$

$= \sqrt{(160)^2 + (80)^2}$ = ✓

$\vec{F} = 80\hat{i} + 160\hat{j}$

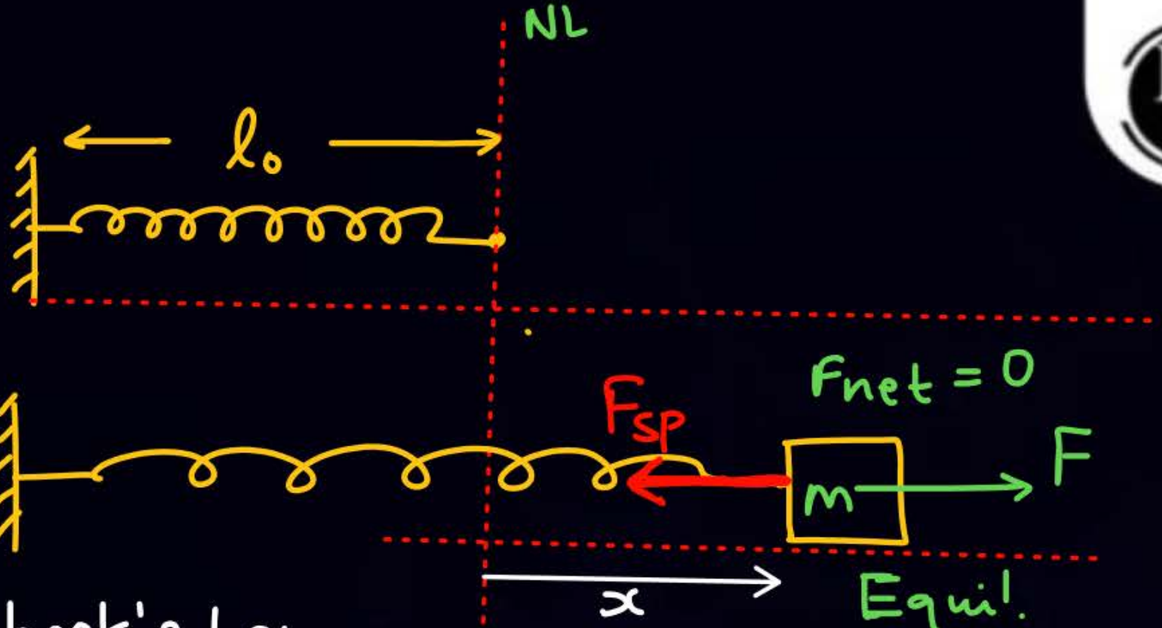
Ideal Spring.



- massless
- pitch same.
- Tension throughout the ideal spring is same.

l_0 → Natural length
Relax length
"

→ Agar main spring par koi force Na lagaa. Usko Uske hal par chor do



hook's Law

$$F_{sp} \propto x$$

$$F_{sp} = kx$$

(magnitude) (Spring const)

$$\vec{F}_{sp} = -k\vec{x}$$

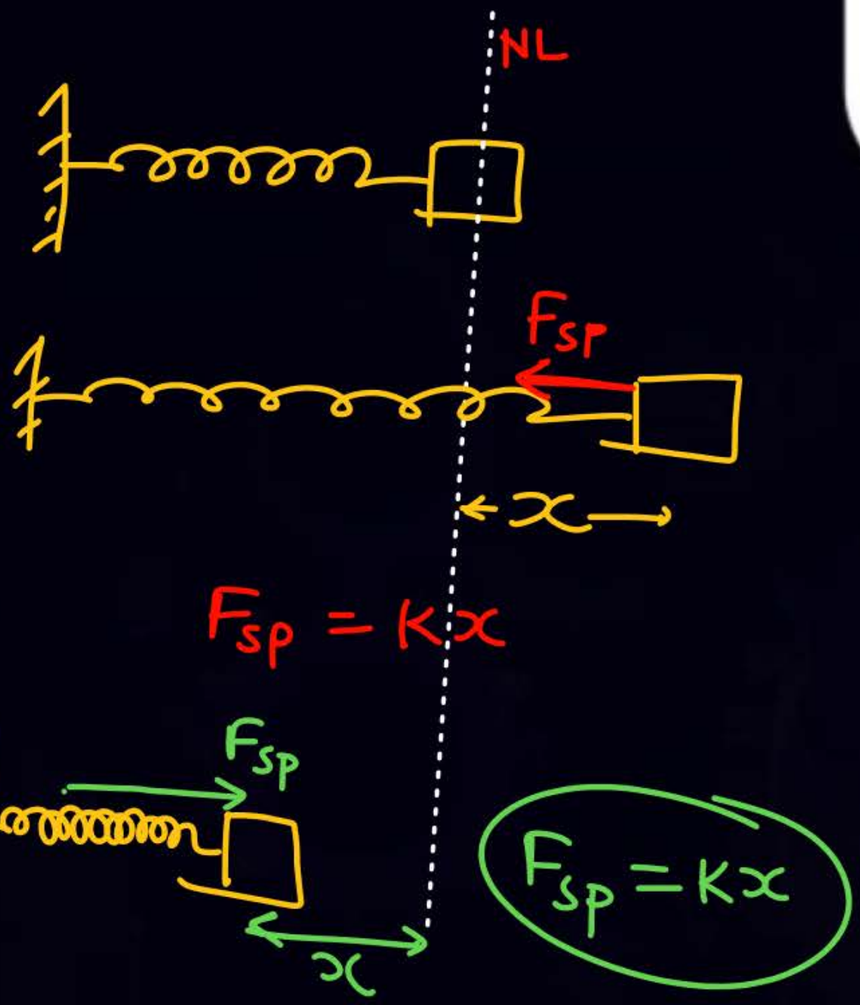
Displ. from natural length.

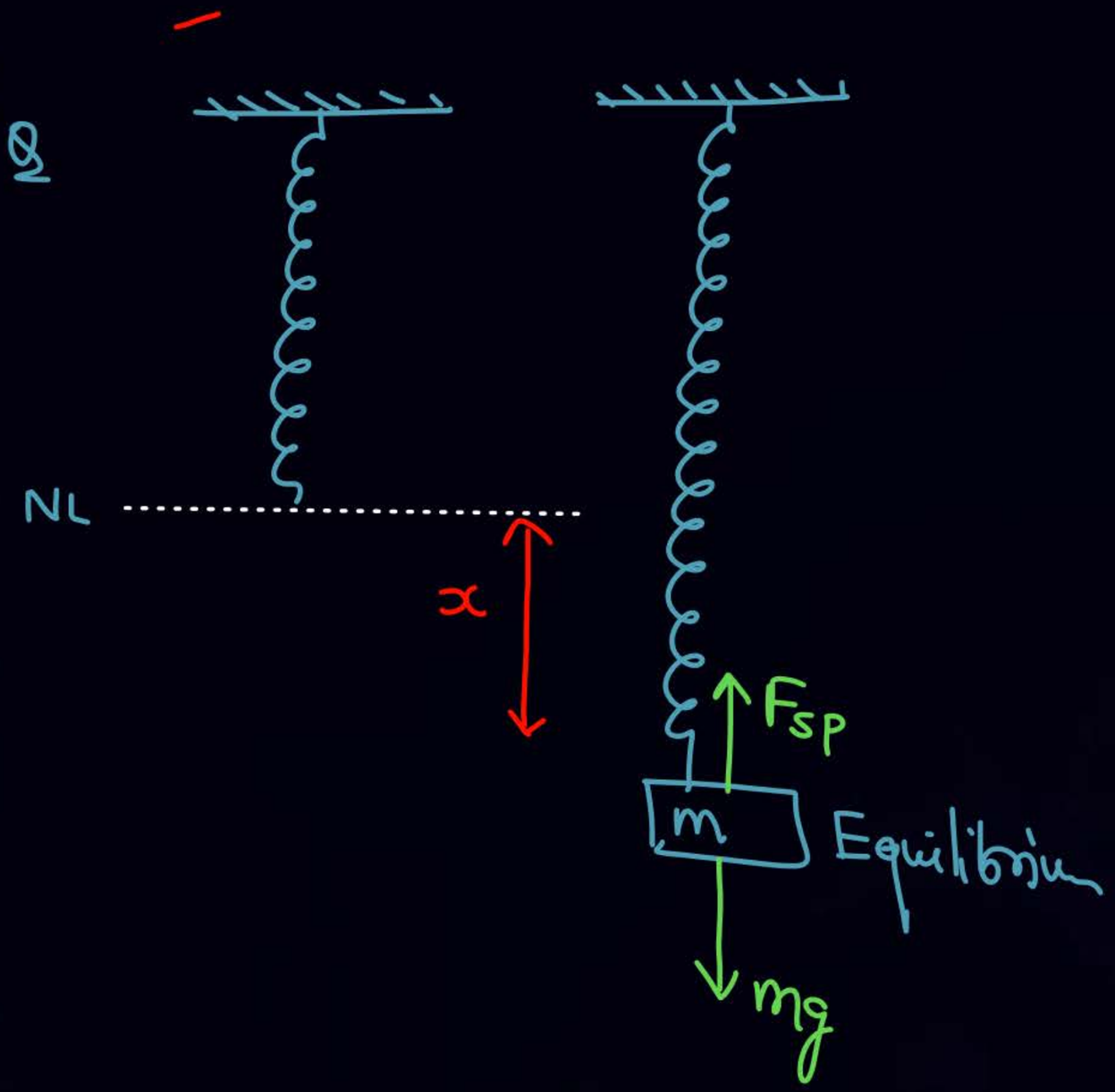
$F_{sp} = kx$ (magnitude)

x → elongation or Compression

$\vec{F}_{sp} = -k\vec{x}$

→ Towards the natural length.





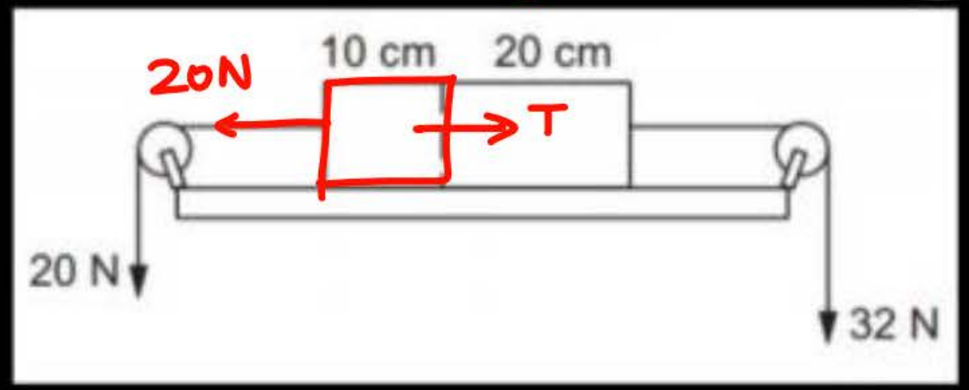
$$F_{sp} = mg$$

$$kx = mg$$

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

HW

Figure (5-E8) shows a uniform rod of length 30 cm having a mass of 3·0 kg. The strings shown in the figure are pulled by constant forces of 20 N and 32 N. Find the force exerted by the 20 cm part of the rod on the 10 cm part. All the surfaces are smooth and the strings and the pulleys are light.



$a = \frac{32-20}{3} = 4$

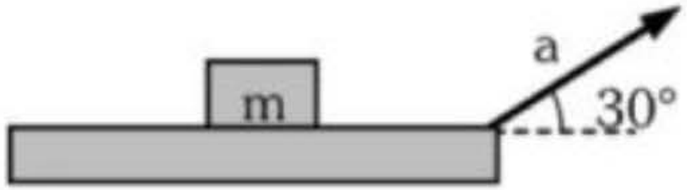
$T - 20 = 1 \times 4$

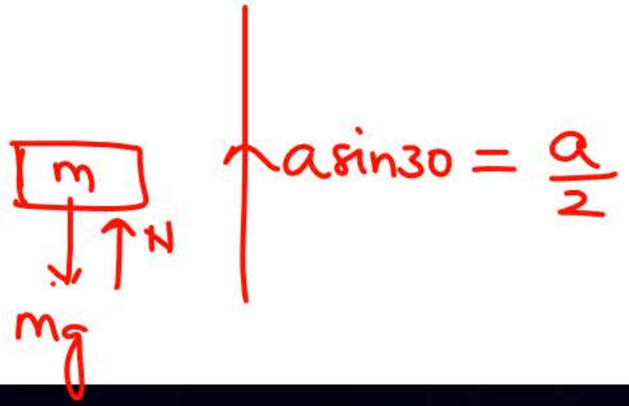
$T = 24$

Ans: (24 N)

2. A box of mass m is placed on a smooth horizontal platform as shown in the figure. The platform is made to move in direction 30° above the horizontal with acceleration a so that the contact force between the box and the platform becomes $3mg/2$. Find the magnitude of the acceleration.

एक m द्रव्यमान का बक्सा चित्रानुसार एक चिकने क्षैतिज प्लेटफॉर्म पर स्थित है। प्लेटफॉर्म को क्षैतिज से 30° कोण पर a त्वरण से त्वरित किया जाता है ताकि बक्से तथा प्लेटफॉर्म के मध्य संपर्क बल का मान 3mg/2 हो जाये। त्वरण का परिमाण ज्ञात कीजिये।





Ans. g m/s²

$N - mg = m\left(\frac{a}{2}\right)$

$\frac{3mg}{2} - mg = \frac{ma}{2}$

$a = g$

Homework

- KPP-23 (NLM)
- HCV → must try Page 80 ⇉ 19, 20, 22, 24, 25, 26, 27, 35, 39, 42.

Module → 28, 30, 31, 32, 33, 34, 45, 48,

Prabal → 2, 3, 5, 40 → (hint v = const, $a = 0$)

THANK YOU