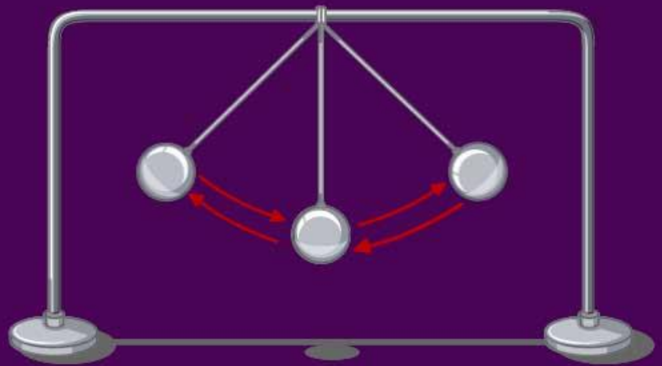
PRACTICE SESSION: NEWTON'S LAWS OF MOTION



PHYSICS

ANUSHRI MA'AM

LIVE → 2nd Sept Friday 6:00 pm

DOUBT SOLVING SESSION

PHYSICS

SEND YOUR DOUBTS NOW

LINK IN DESCRIPTION

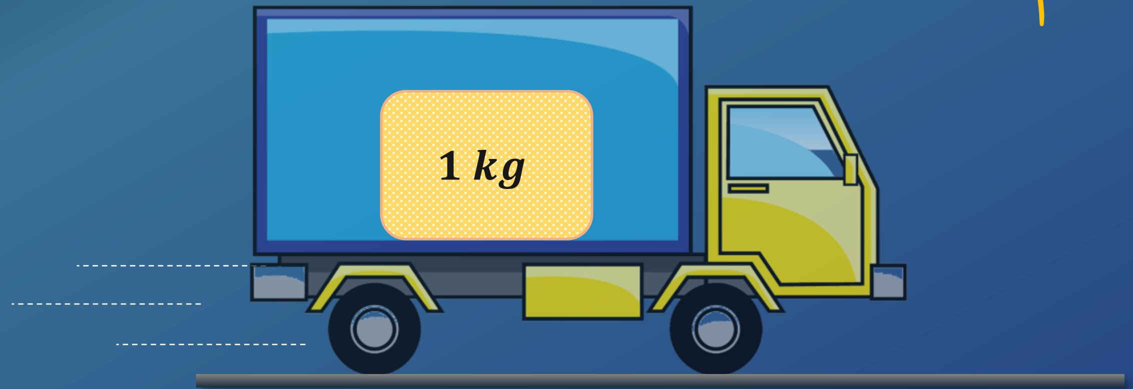
QUESTION

A body of mass $1\ kg$ travelling with a velocity of $3\ m/s$ accelerating uniformly with $8\ m/s^2$ to travel for $2\ s$. Find its change in momentum in $N\text{-}s$

$\Delta p = (\Delta v) \times m$

$(v-u) \times m$

$v = 3\ m/s,\ a = 8\ m/s^2$



A 16

B 6

C 12

D 20

TIME UP!!

SOLUTION

A body of mass $1\,kg$ travelling with a velocity of $3\,m/s$ accelerating uniformly with $8\,m/s^2$ to travel for $2\,s$. Find its change in momentum in N-s

$v = 3\,m/s,\ a = 8\,m/s^2$

$(v-u) \times m$

$v = u + at$

$v - u = at$

$8 \times 2 \times 1$

$= 16\ Ns$

16

ANSWER

A body of mass $1\ kg$ travelling with a velocity of $3\ m/s$ accelerating uniformly with $8\ m/s^2$ to travel for $2\ s$. Find its change in momentum in N-s

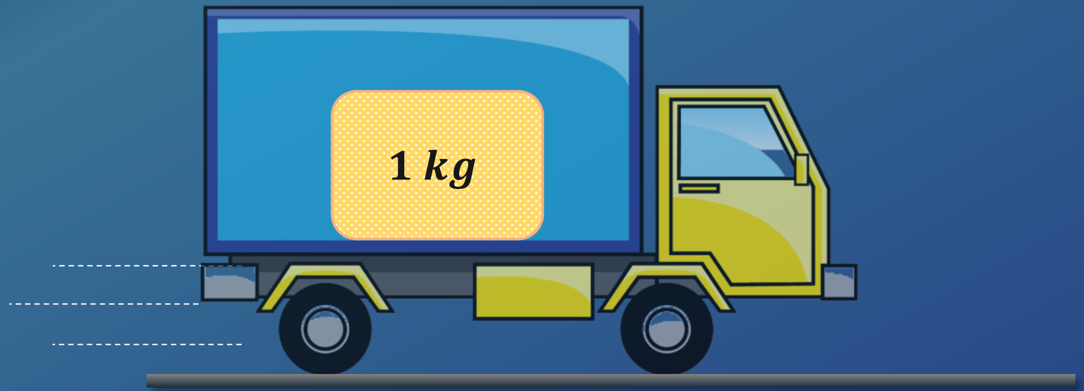
(A) 16

(B) 6

(C) 12

(D) 20

$v = 3\ m/s,\ a = 8\ m/s^2$



QUESTION

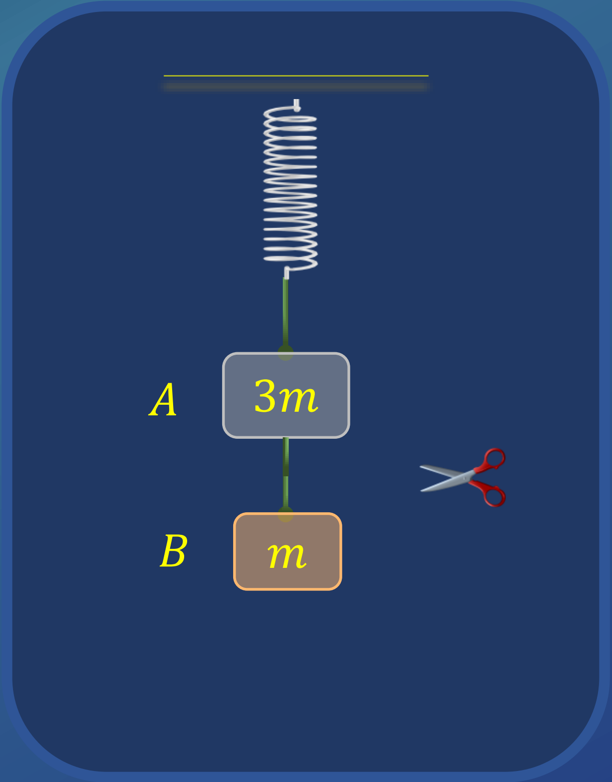
Two blocks A and B of masses $3m$ and m respectively are connected by a massless and inextensible string. The whole system is suspended by a massless spring as shown in figure. The magnitudes of acceleration of A and B immediately after the string is cut, are respectively

(A) $\frac{g}{3}; \frac{g}{3}$

(B) $g; \frac{g}{3}$

(C) $\frac{g}{3}; g$

(D) $g; g$



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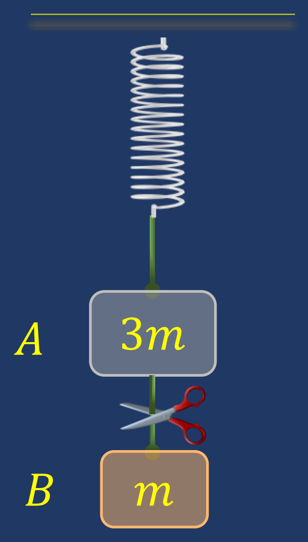
NEET-2017

A $\frac{g}{3};\frac{g}{3}$

B $g;\frac{g}{3}$

C $\frac{g}{3};g$

D $g;g$



SOLUTION

Two blocks A and B of masses $3m$ and m respectively are connected by a massless and inextensible string. The whole system is suspended by a massless spring as shown in figure. The magnitudes of acceleration of A and B immediately after the string is cut, are respectively

String/spring cutting problems

T_{string} can change instantaneously

T_{spring} cannot

$F_{sp} = 4mg$ before

FBD After cutting: $4mg$ up, $3mg$ down on A

$a = \dfrac{4mg - 3mg}{3m} = g/3$

B: g

$\dfrac{g}{3}, g$

ANSWER

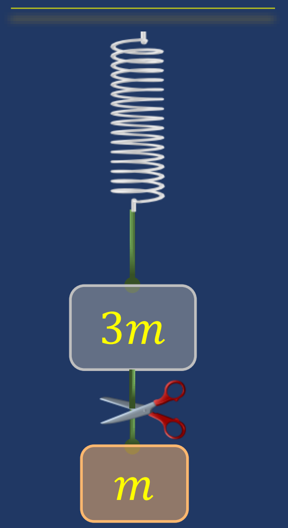
Two blocks A and B of masses $3m$ and m respectively are connected by a massless and inextensible string. The whole system is suspended by a massless spring as shown in figure. The magnitudes of acceleration of A and B immediately after the string is cut, are respectively

A $\frac{g}{3};\frac{g}{3}$

B $g;\frac{g}{3}$

C $\frac{g}{3};g$

D $g;g$



QUESTION

Find the total change in momentum of a body up to $8\ s$ from the $F - t$ graph shown.

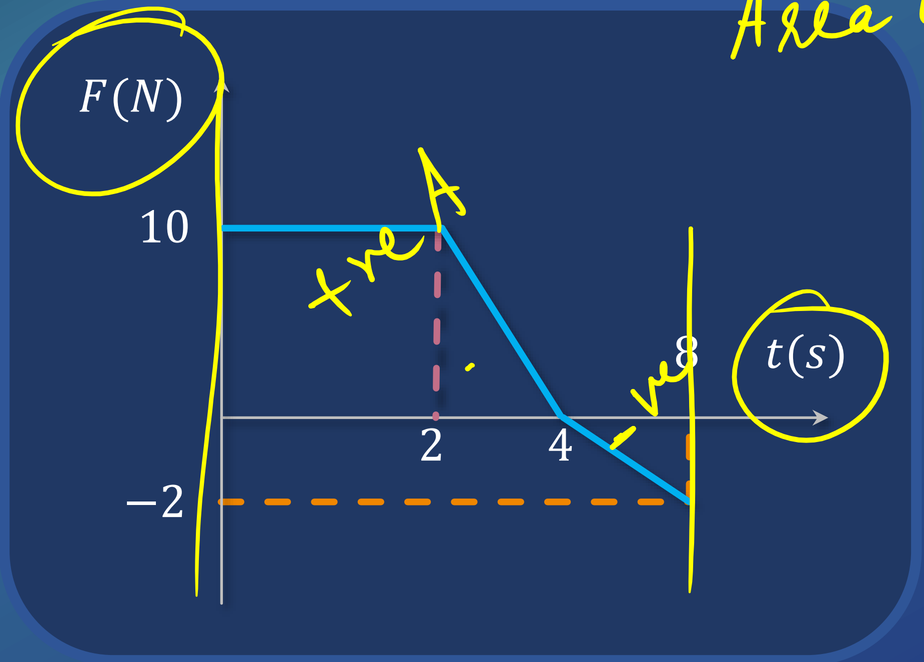
Area under F-t graph = Δp

A. $20\ Ns$

B. $26\ Ns$

C. $14\ Ns$

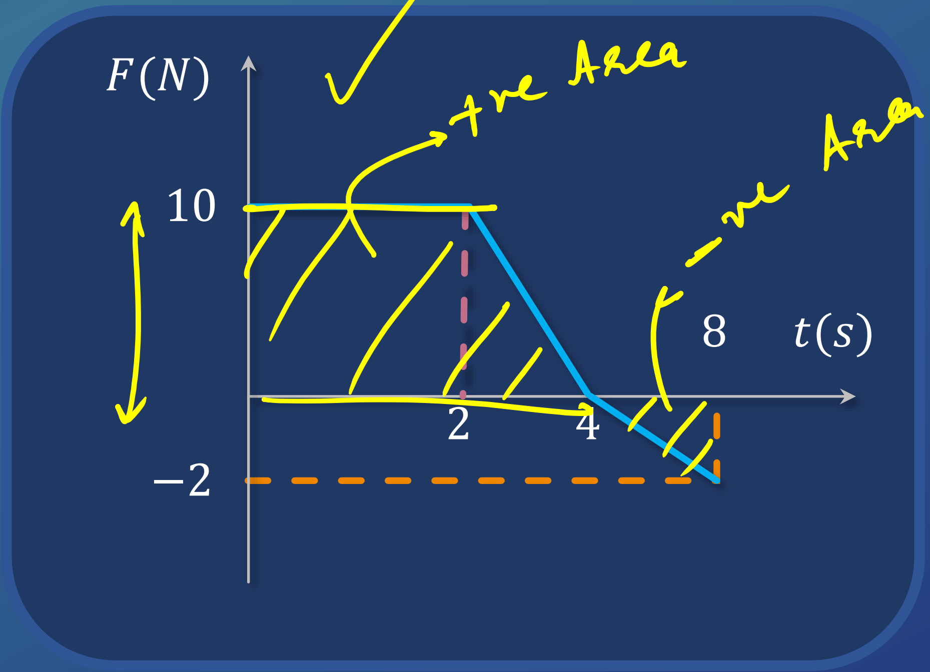
D. $40\ Ns$



TIME UP!!

SOLUTION

Find the total change in momentum of a body up to $8\ s$ from the $F - t$ graph shown.



Area $= \frac{1}{2}(2+4) \times 10 - \frac{1}{2} \times 4 \times 2$

$= 30 - 4$

$= 26\ Ns$

$26\ N$

ANSWER

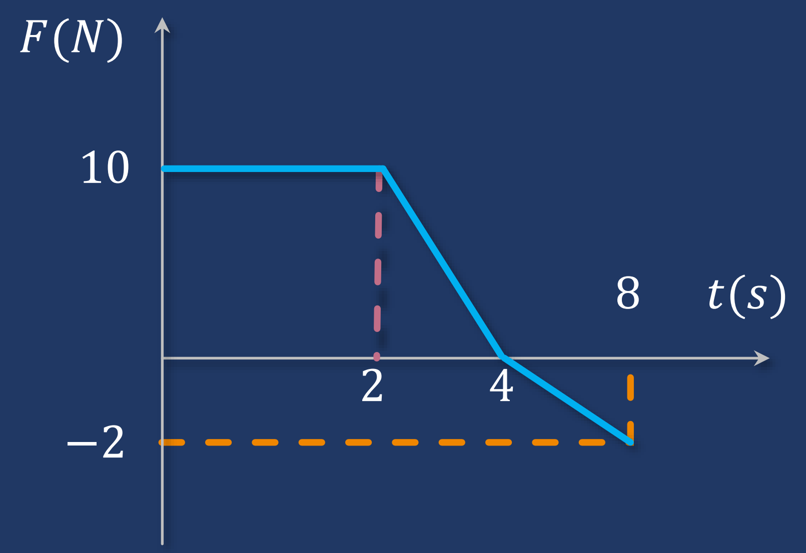
Find the total change in momentum of a body up to **8 s** from the ***F* − *t*** graph shown.

A. $20\ N s$

B. $26\ N s$ ✓

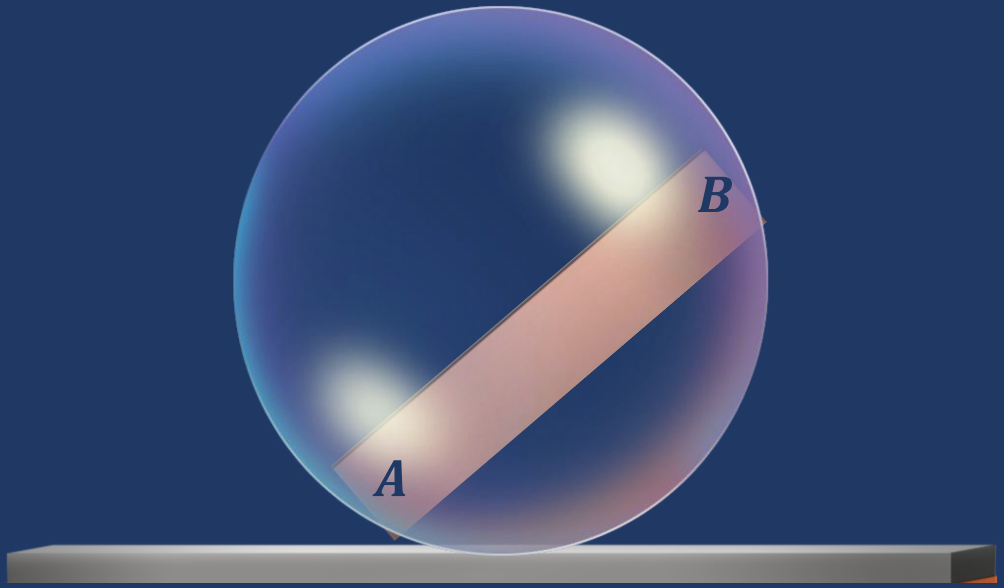
C. $14\ N s$

D. $40\ N s$



QUESTION

A rod is placed inside a hollow spherical shell as shown in figure. Friction acts between the rod and the shell. The number of forces to be shown in FBD of rod is/are?



A 2

B 4

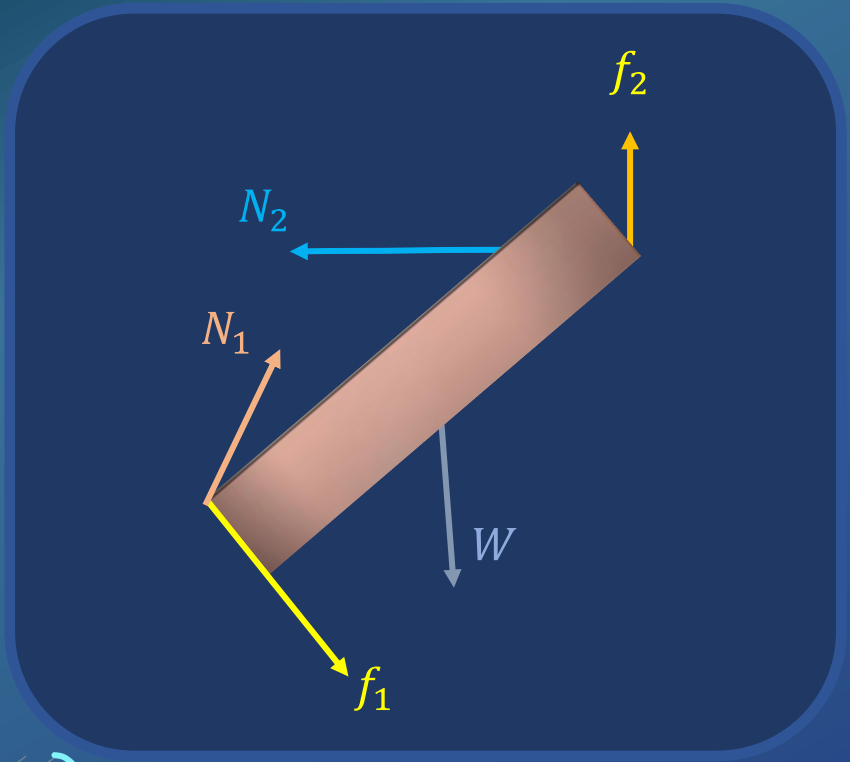
C 5

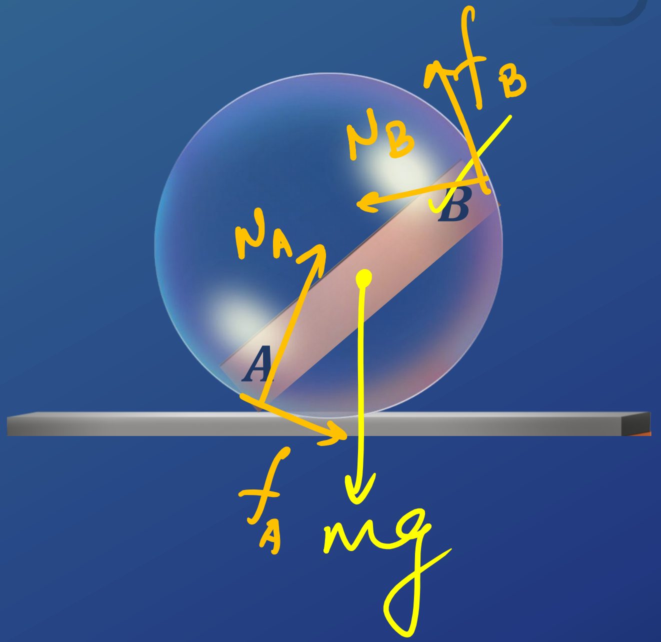
D 6

TIME UP!!

SOLUTION

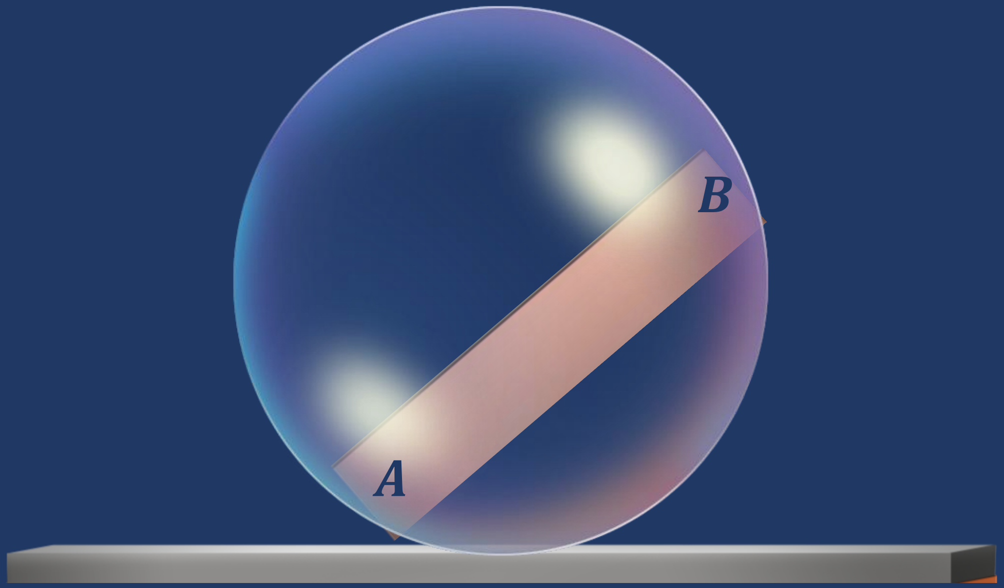
A rod is placed inside a hollow spherical shell as shown in figure. Friction acts between the rod and the shell. The number of forces to be shown in FBD of rod is/are?





5

A rod is placed inside a hollow spherical shell as shown in figure. Friction acts between the rod and the shell. The number of forces to be shown in FBD of rod is/are?



(A) 2

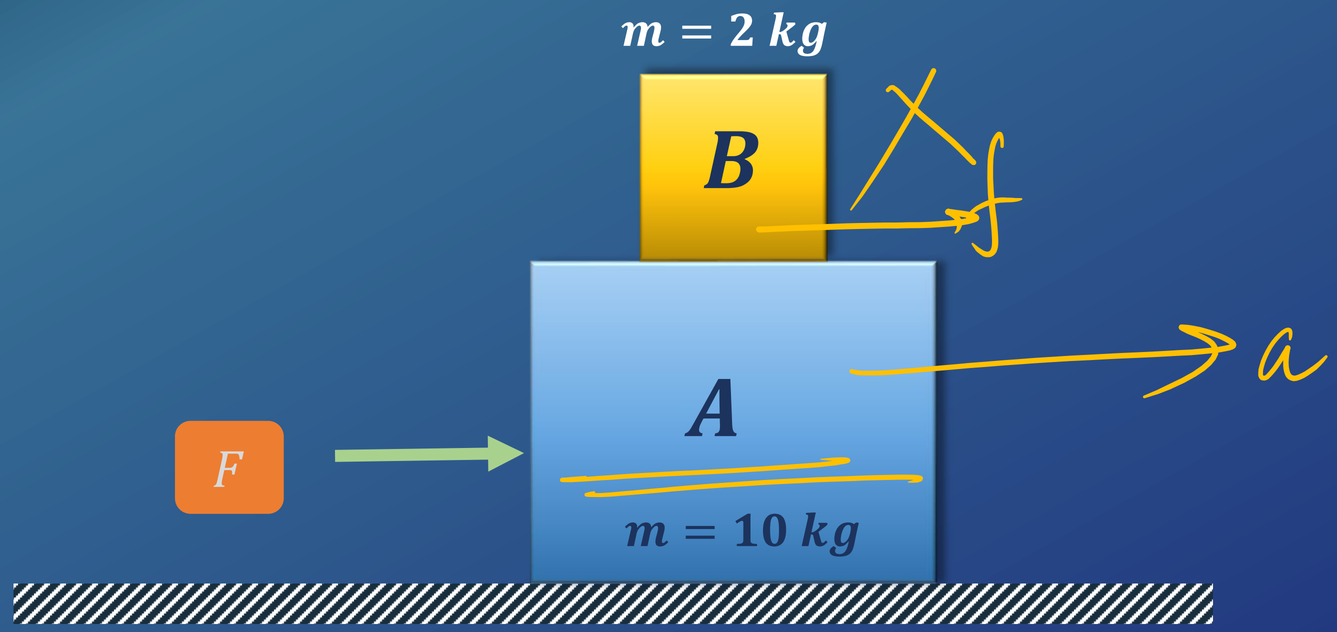
(B) 4

(C) 5

(D) 6

QUESTION

In the figure, a force $F = 20\ N$ is applied on block A. What would be the acceleration of the block B after 10 seconds from the start? (Assume all surfaces are smooth).



(A) $\frac{10}{6}\ m/s^2$

(B) $2\ m/s^2$

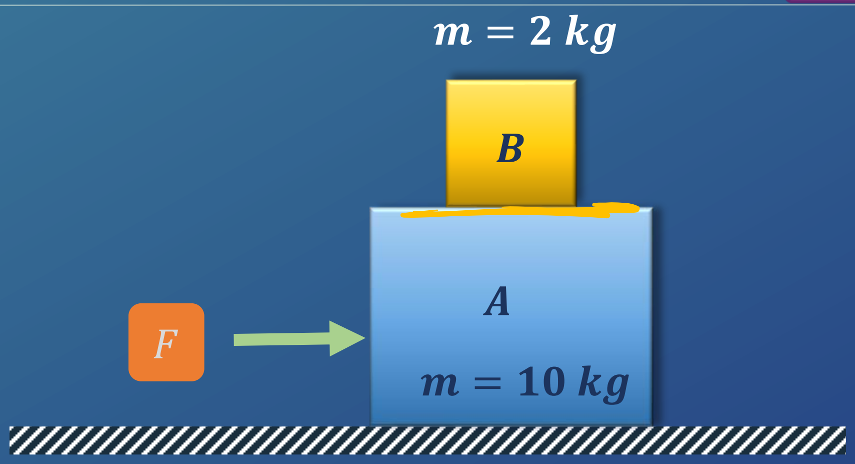
(C) zero

(D) Cannot be calculated

TIME UP!!

SOLUTION

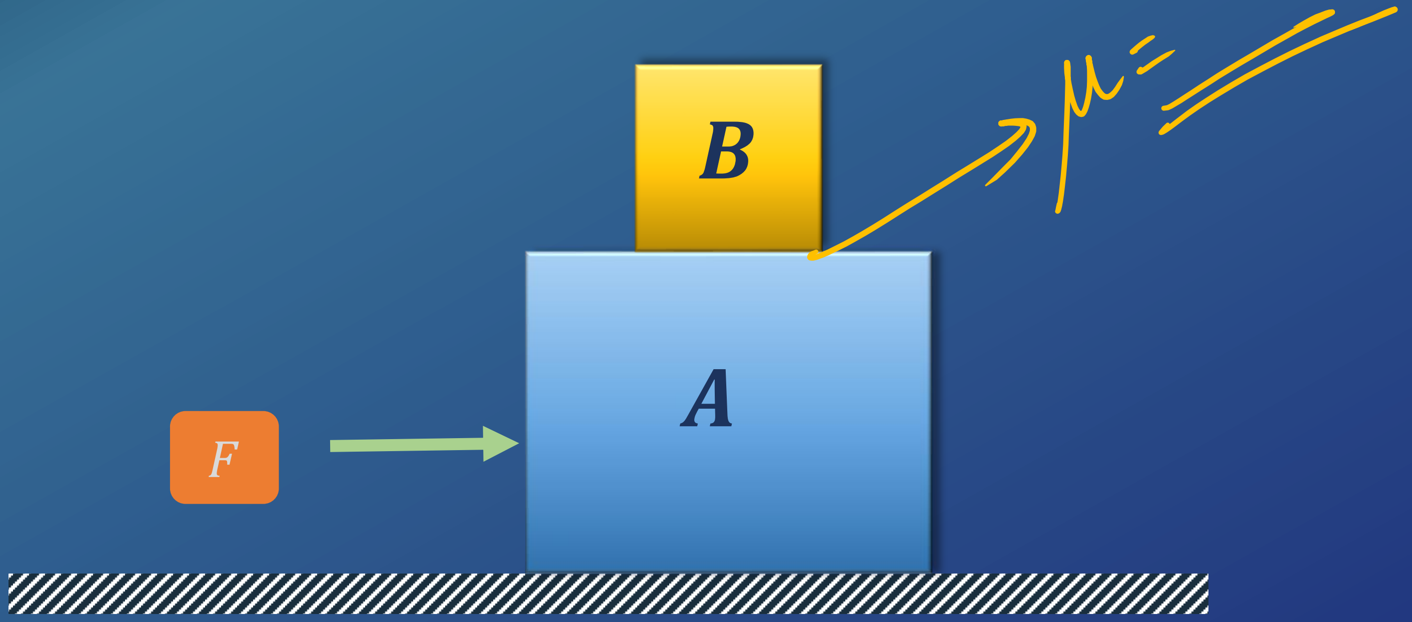
$a = 0$



Zero

ANSWER

In the figure, a force $F = 20\ N$ is applied on block A. What would be the acceleration of the block B after 10 seconds from the start? (Assume all surfaces are smooth).



A $\frac{10}{6}\ m/s^2$

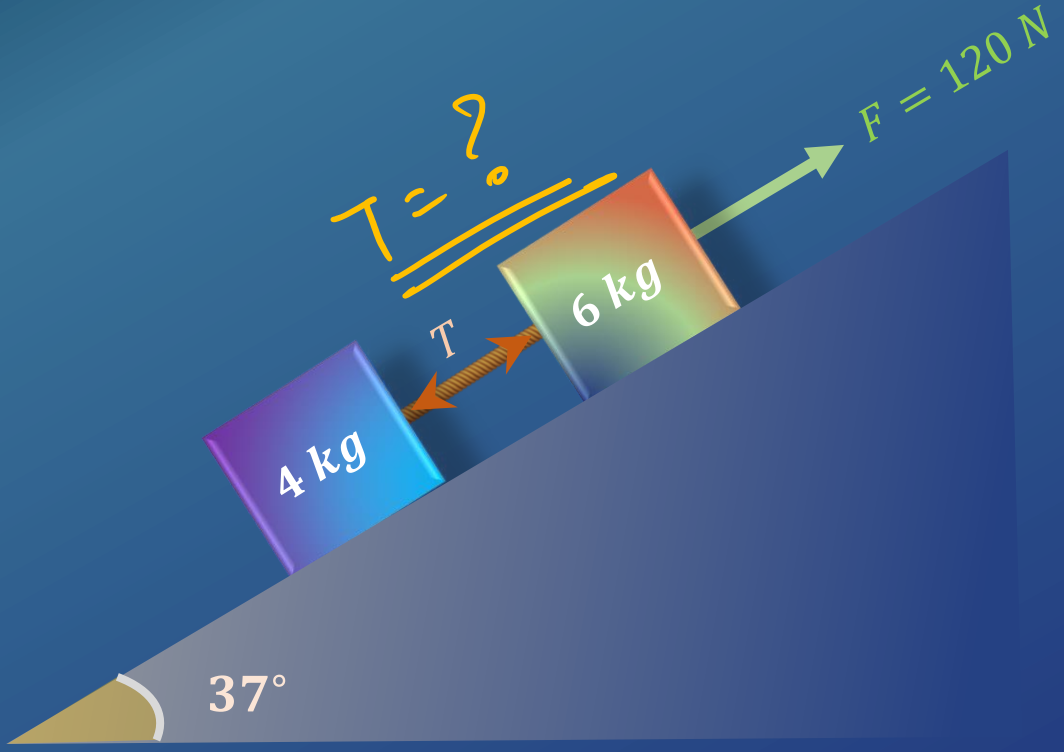
B $2\ m/s^2$

C zero

D Cannot be calculated

QUESTION

If force, $F = 120\ N$ is acting parallel to the inclined plane, find tension T in the string as shown in the figure. All surfaces are smooth. (Take $g = 10\ m/s^2$).



(A) $15\ N$

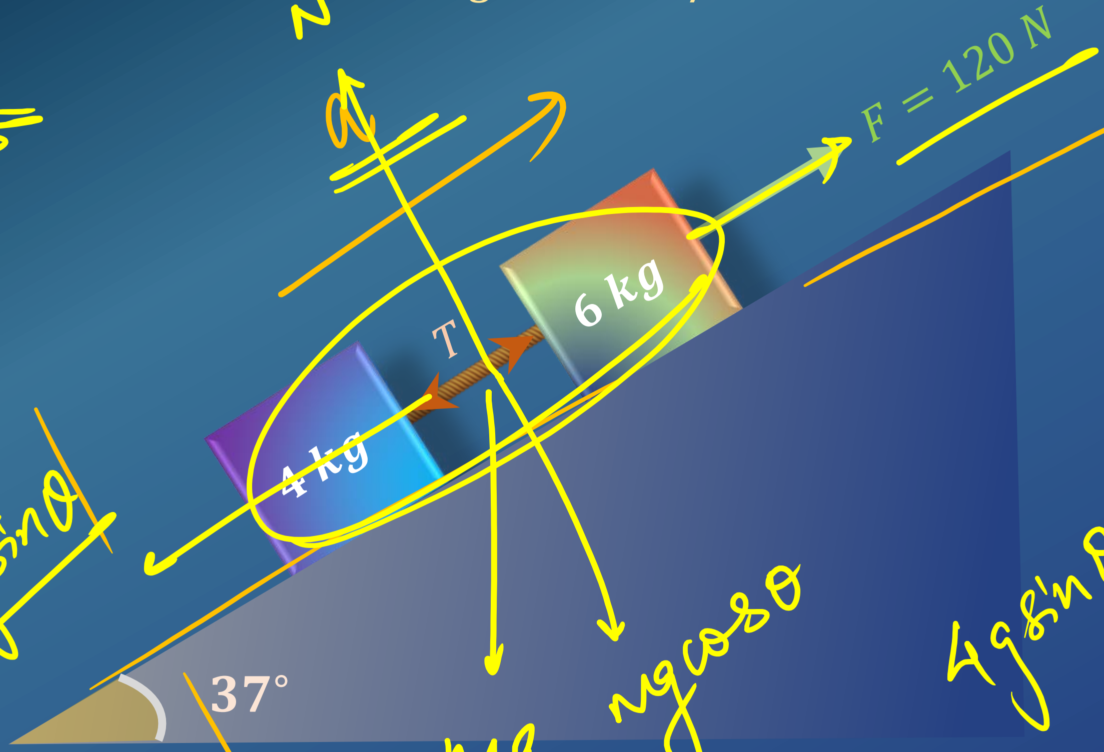
(B) $30\ N$

(C) $48\ N$

(D) $60\ N$

TIME UP!!

If force, $F = 120\ N$ is acting parallel to the inclined plane, find tension T in the string as shown in the figure. All surfaces are smooth. (Take $g = 10\ m/s^2$).



$a = \frac{120 - 10 \times 10 \times 3/5}{10}$

$a = 6\ m/s^2$

$T - 4g\sin\theta = 4a$

$T = 4 \times 10 \times \frac{3}{5} + 4 \times 6$

$T = 48\ N$

48 N

ANSWER

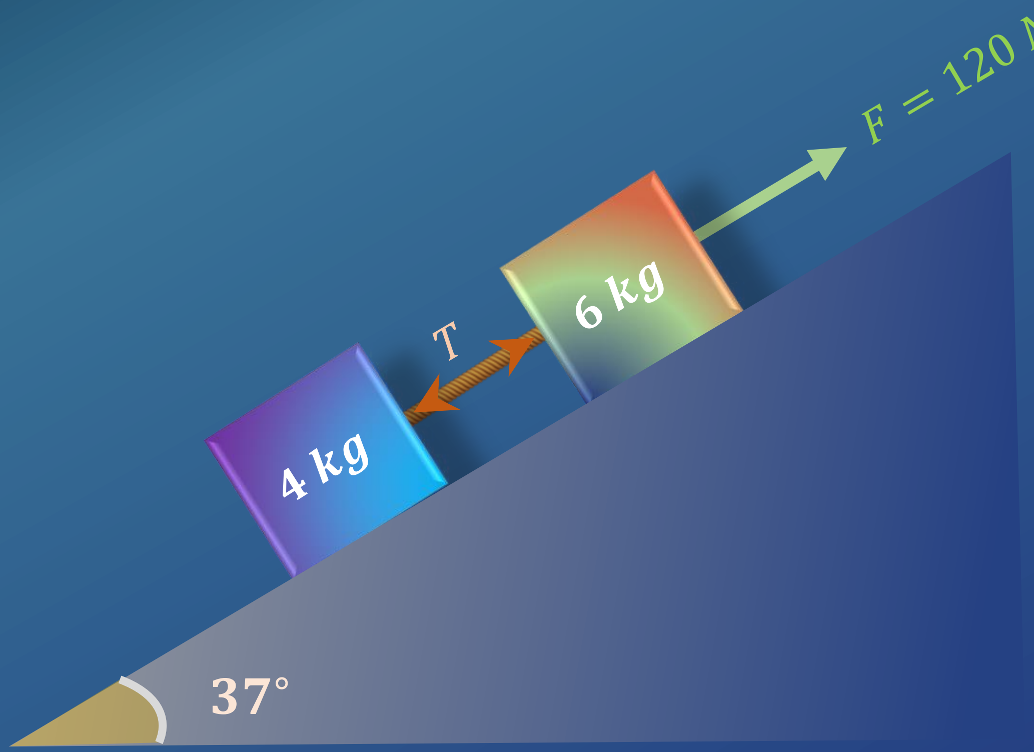
If force, $F = 120\ N$ is acting parallel to the inclined plane, find tension T in the string as shown in the figure. All surfaces are smooth. (Take $g = 10\ m/s^2$).

A $15\ N$

B $30\ N$

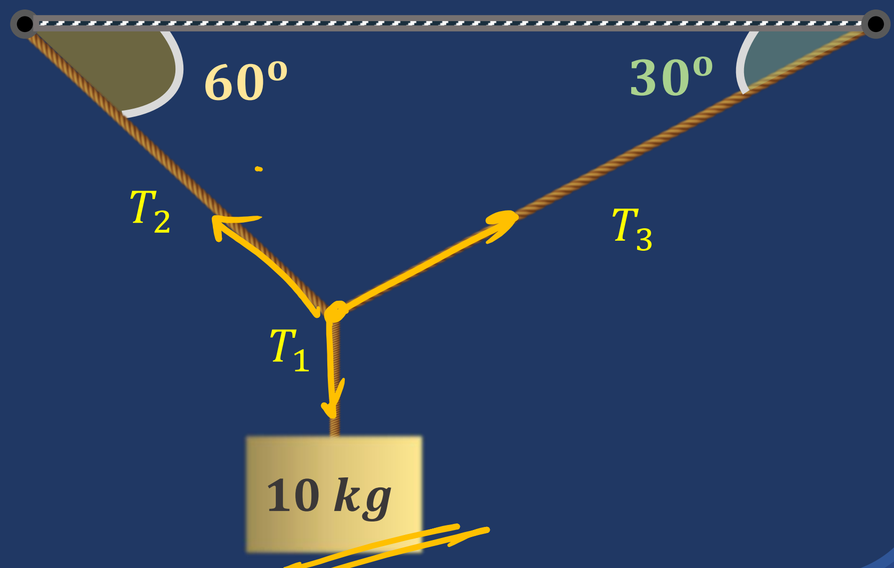
C $48\ N$

D $60\ N$



QUESTION

A block of mass $10\ kg$ is suspended by three strings as shown in the figure. The tension T_2 is (Take $g = 10\ m/s^2$)



(A) $100\ N$

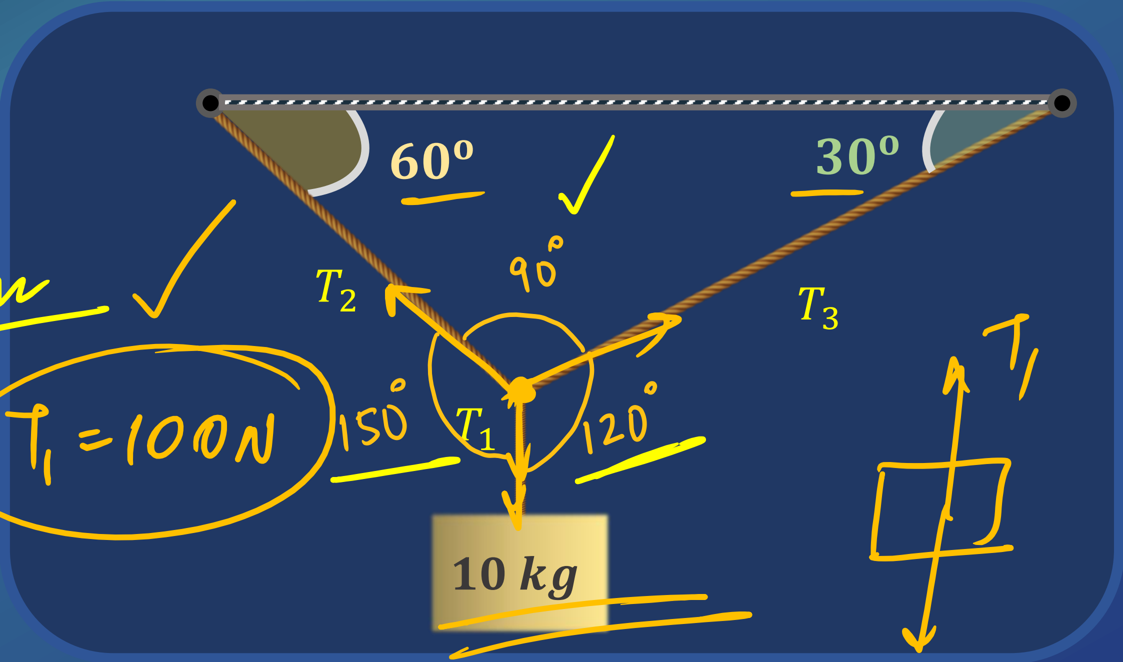
(B) $\frac{100}{\sqrt{3}}\ N$

(C) $100\sqrt{3}\ N$

(D) $50\sqrt{3}\ N$

SOLUTION

A block of mass $10\ kg$ is suspended by three strings as shown in the figure. The tension T_2 is (Take $g = 10\ m/s^2$)



$\vec{T_1} + \vec{T_2} + \vec{T_3} = 0$ Lami's theorem

$\frac{T_1}{\sin 90^\circ} = \frac{T_2}{\sin 120^\circ} = \frac{T_3}{\sin 150^\circ}$

$T_1 = 100 N$

$T_2 = \frac{100}{1} \times \frac{\sqrt{3}}{2} = 50\sqrt{3}\ N$

$T_3 = 100 \times \frac{1}{2} = 50 N$

$50\sqrt{3}\ N$

ANSWER

A block of mass $10\ kg$ is suspended by three strings as shown in the figure. The tension T_2 is (Take $g = 10\ m/s^2$)

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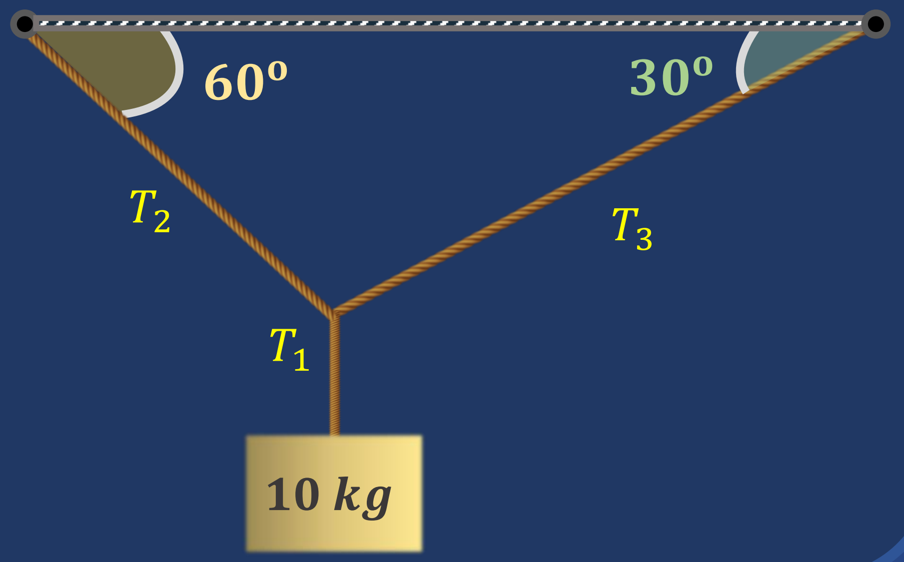


QUESTION

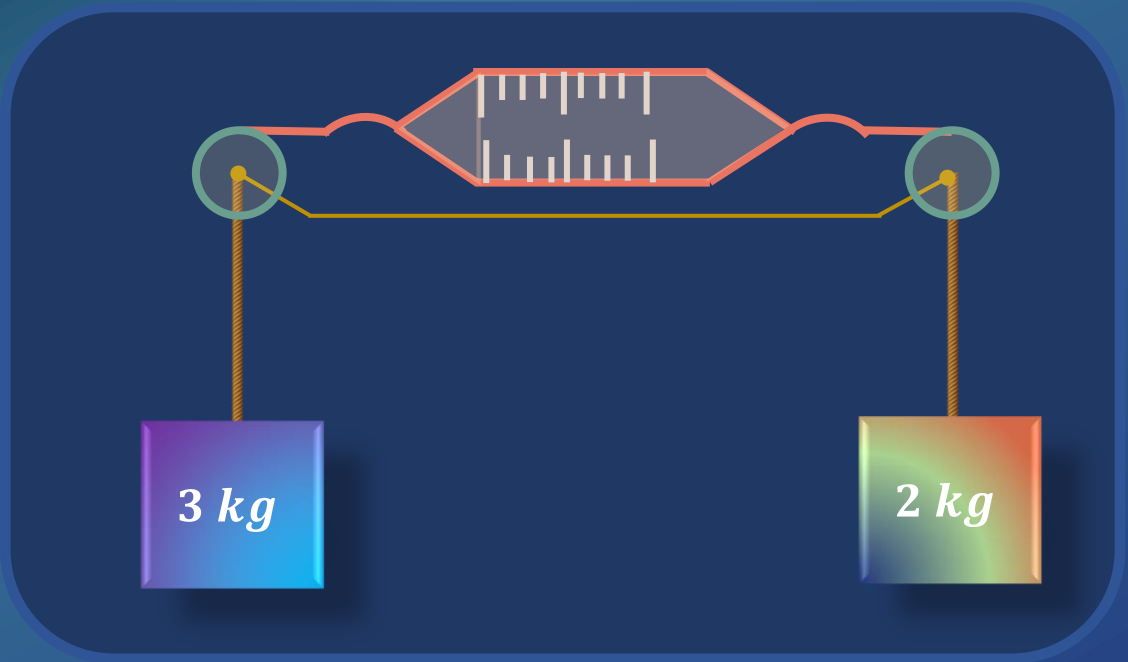
Find the reading of the spring balance if it is assumed to be of negligible mass. (Take $g = 10\ m/s^2$)

A $3\ kg$

B $2\ kg$

C $2.5\ kg$

D $2.4\ kg$

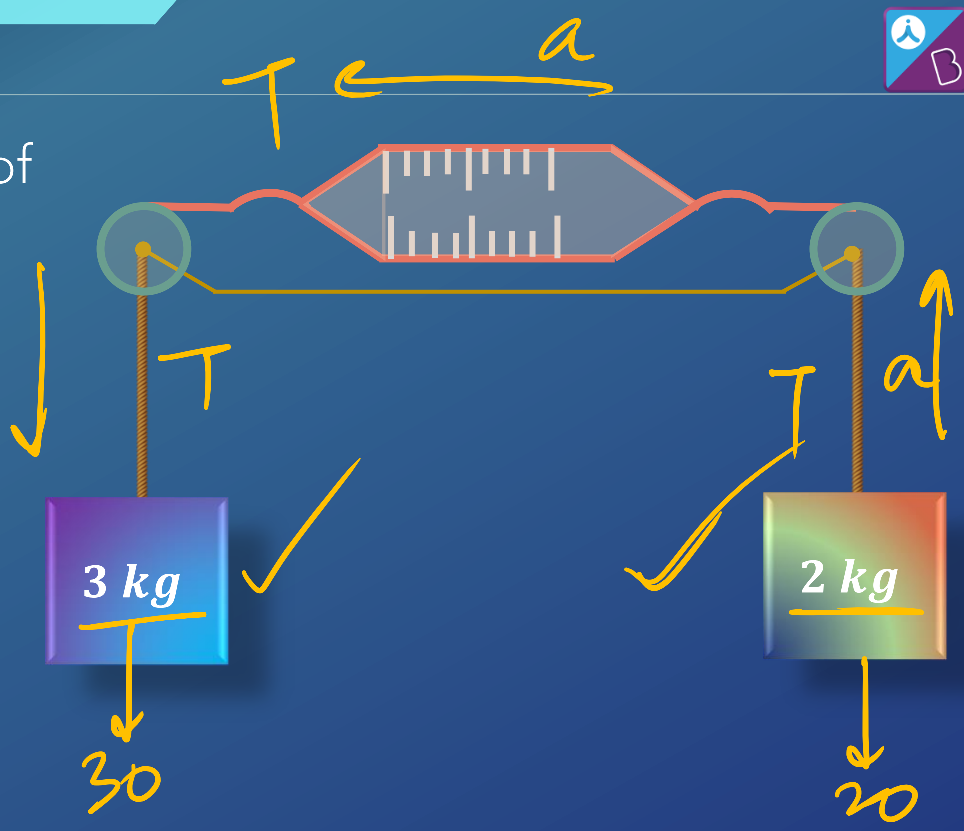


$\frac{T}{g}$ = reading (in kg)

TIME UP!!

SOLUTION

Find the reading of the spring balance if it is assumed to be of negligible mass. (Take $g = 10\, m/s^2$)



$$a = \frac{30 - 20}{5} = 2\, m/s^2$$

2kg: $T - 20 = 2 \times a$

$$T = 20 + 2 \times 2$$

$$= 24\, N$$

$$\text{reading} = \frac{24}{10} = 2.4\, kg$$

2.4 kg

ANSWER

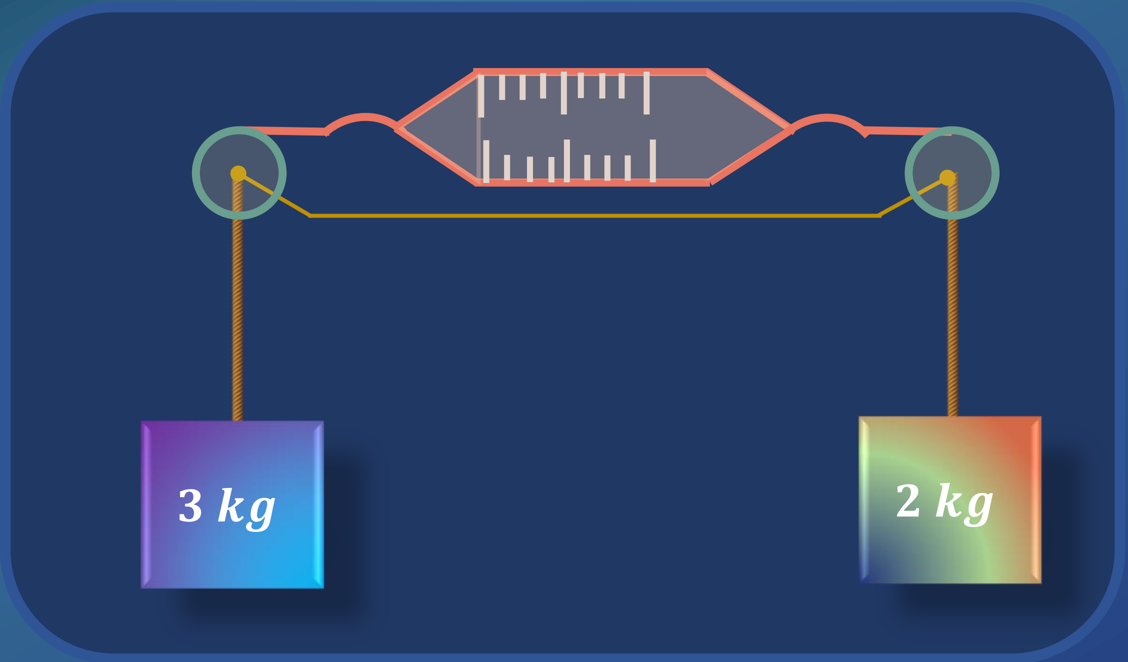
Find the reading of the spring balance if it is assumed to be of negligible mass. (Take $g = 10\ m/s^2$)

A $3\ kg$

B $2\ kg$

C $2.5\ kg$

D $2.4\ kg$



QUESTION

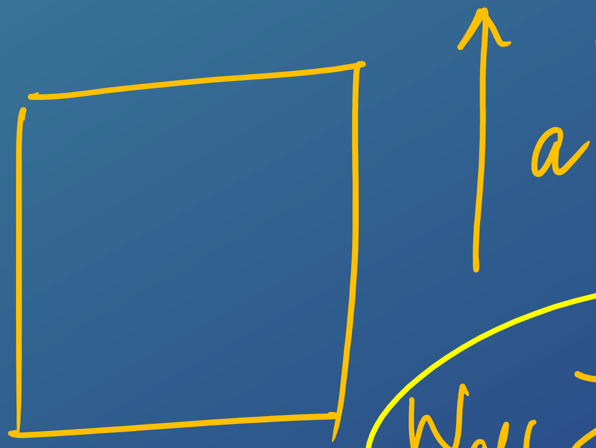
A weighing scale in a moving lift measures $47\ N$ when a block of mass $4\ kg$ is kept on it. If $g = 9.8\ ms^{-2}$ then acceleration of the lift is

A) $9.80\ ms^{-2}$ downwards

B) $9.80\ ms^{-2}$ upwards

C) $1.95\ ms^{-2}$ downwards

D) $1.95\ ms^{-2}$ upwards



$W_{app} > mg$

$W_{app} < mg$

$W_{app} = m(g+a)$

TIME UP!!

SOLUTION

A weighing scale in a moving lift measures $47\ N$ when a block of mass $4\ kg$ is kept on it. If $g = 9.8\ ms^{-2}$ then acceleration of the lift is

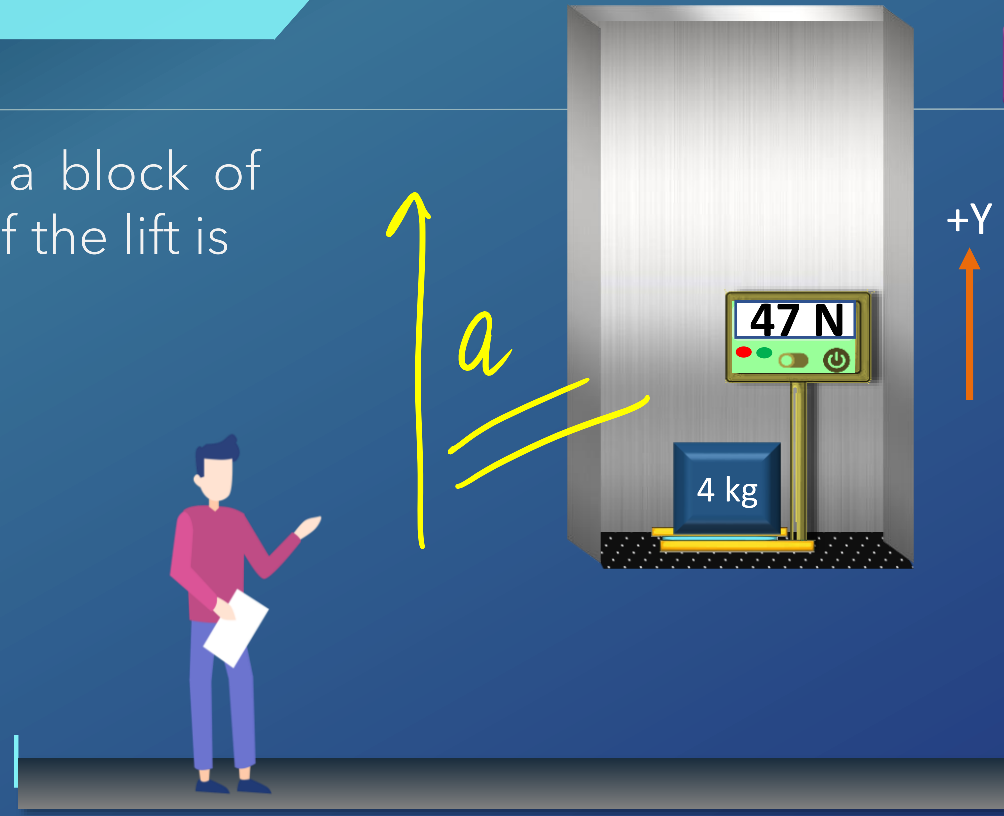
$$W_{app} = m(g + a)$$

$$47 = 4(9.8 + a)$$

$$9.8 + a = \frac{47}{4}$$

$$a = 1.95\ m/s^2$$

$1.96\ ms^{-2}$ **upwards**



ANSWER

A weighing scale in a moving lift measures $47\ N$ when a block of mass $4\ kg$ is kept on it. If $g = 9.80\ ms^{-2}$ then acceleration of the lift is

A. $9.80\ ms^{-2}$ downwards

B. $9.80\ ms^{-2}$ upwards

C. $1.95\ ms^{-2}$ downwards

D. $1.95\ ms^{-2}$ upwards

QUESTION

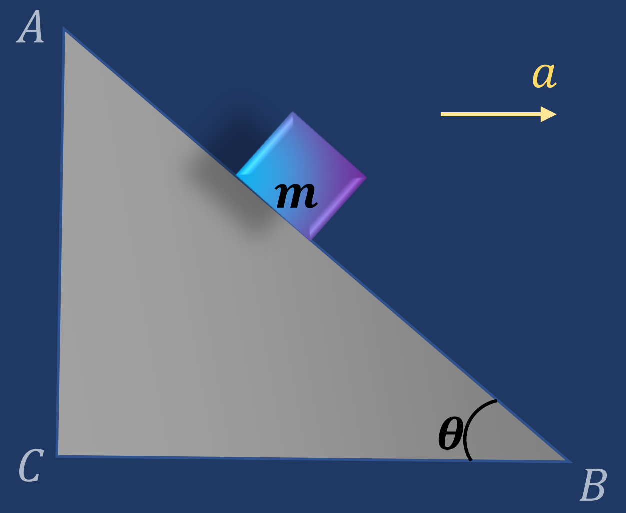
A block of mass m is placed on a smooth inclined wedge ABC of inclination θ as shown in the figure. The wedge is given acceleration a towards the right. The relation between a and θ for the block to remain stationary on the wedge is

A. $a = \dfrac{g}{\text{cosec}\,\theta}$

B. $a = \dfrac{g}{\sin\theta}$

C. $a = g\cos\theta$

D. $a = g\tan\theta$



TIME UP!!

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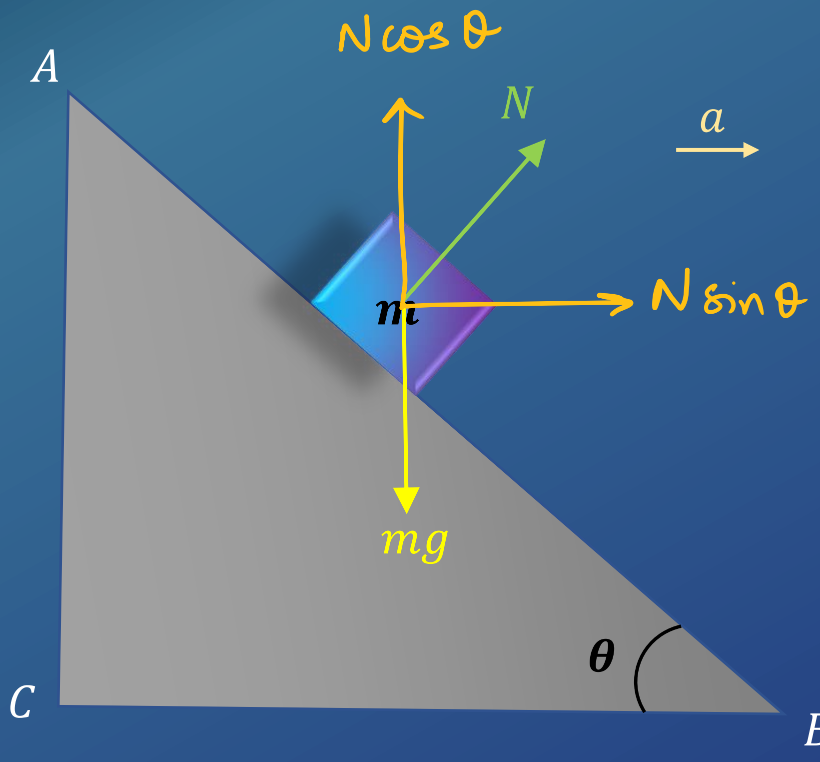

$$a = g\tan\theta$$

ANSWER

A block of mass m is placed on a smooth inclined wedge ABC of inclination θ as shown in the figure. The wedge is given acceleration a towards the right. The relation between a and θ for the block to remain stationary on the wedge is

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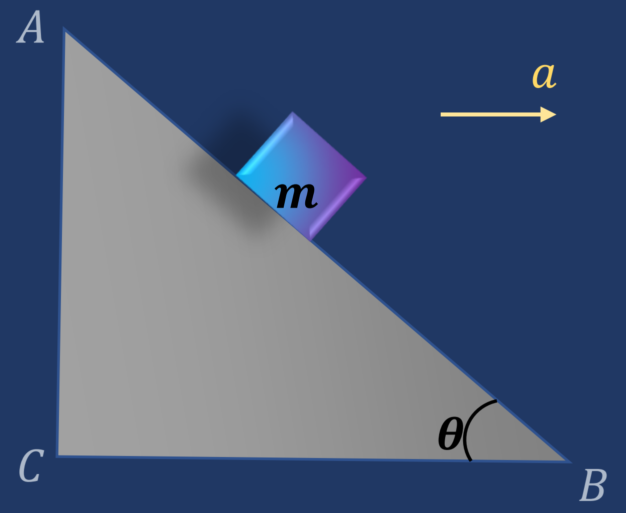


QUESTION

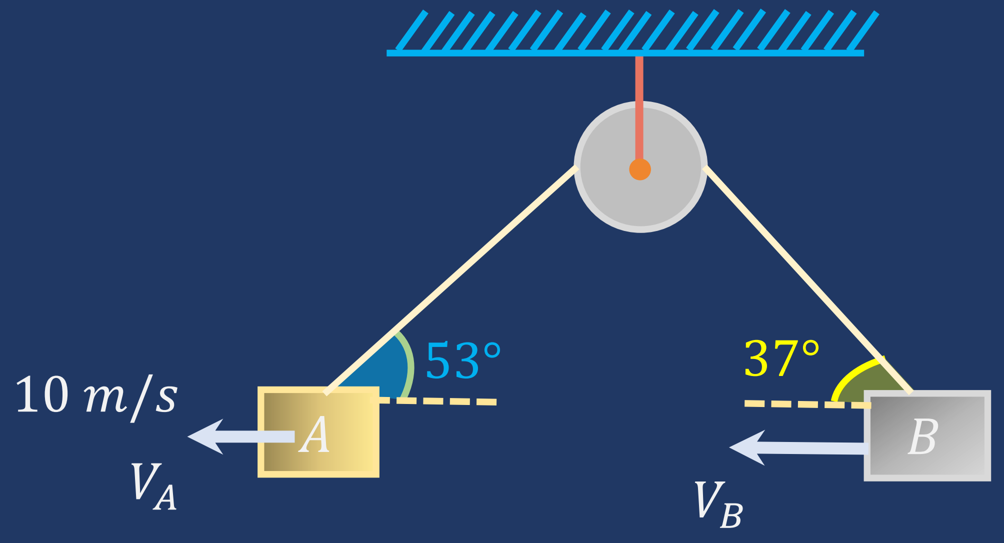
The speed of block B in a pulley-block B in a pulley-block system as shown in figure is

A $5\ m/s$

B $6.5\ m/s$

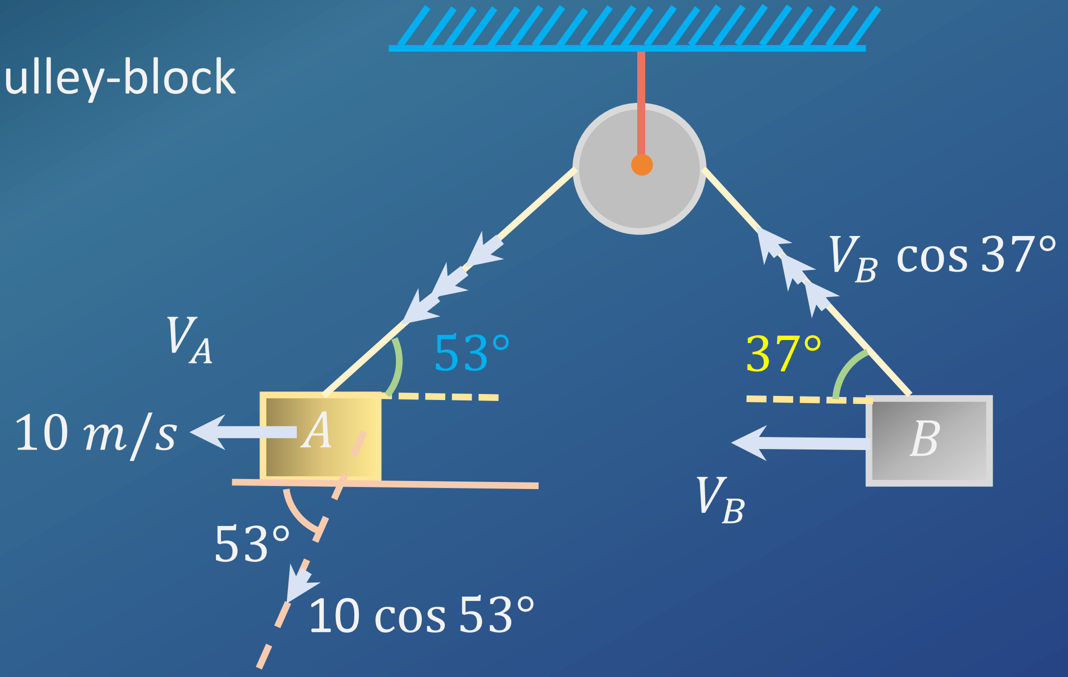
C $7.5\ m/s$

D $10\ m/s$



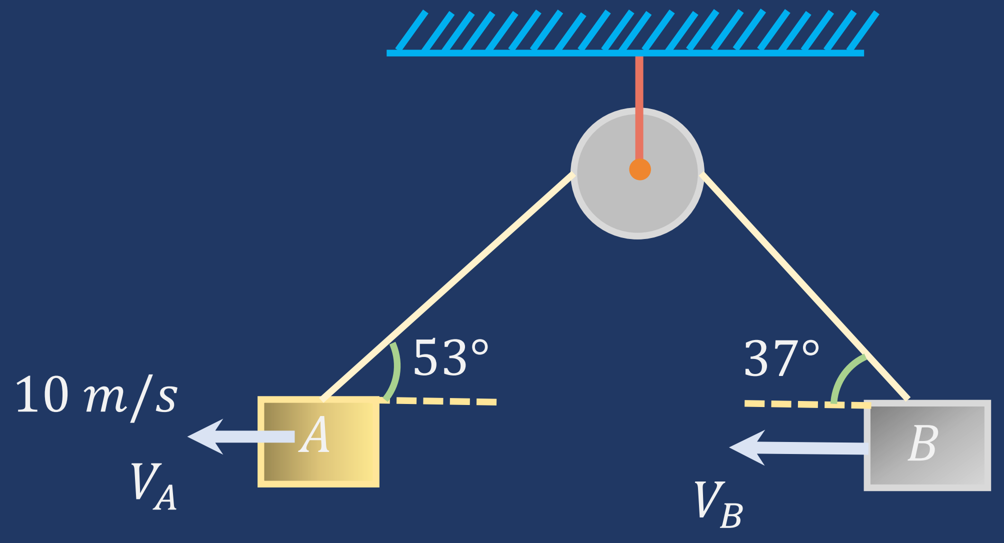
TIME UP!!

The speed of block B in a pulley-block B in a pulley-block system as shown in figure is



$7.5\ m/s$

The speed of block B in a pulley-block B in a pulley-block system as shown in figure is



(A) $5\ m/s$

(B) $6.5\ m/s$

(C) $7.5\ m/s$

(D) $10\ m/s$

FREE FOR 14 DAYS!

60 Questions everyday

Aakash + BYJU'S

12TH CLASS | TUESDAY, THURSDAY

11TH CLASS | MONDAY, WEDNESDAY, FRIDAY

3 PM | 4 PM | 5 PM | 6 PM

VIVEK SIR

CHEMISTRY | 3:00 PM

ANUSHRI MA'AM

PHYSICS | 4:00 PM

SACHIN SIR

ZOOLOGY | 5:00 PM

PANKHURI MA'AM

BOTANY | 5:00, 6:00 PM

PUSHPENDU SIR

ZOOLOGY | 6:00 PM

MISSION MBBS

Aakash + BYJU'S

DROPPERS BATCH

FROM 1st AUGUST

MONDAY AND WEDNESDAY | 1 PM CHEMISTRY, 2 PM BOTANY

TUESDAY AND THURSDAY | 1 PM PHYSICS, 2 PM ZOOLOGY

VIVEK SIR

CHEMISTRY | 1:00 PM

PANKHURI MA'AM

BOTANY | 2:00 PM

ANUSHRI MA'AM

PHYSICS | 1:00 PM

SACHIN SIR

ZOOLOGY | 2:00 PM

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(link in description)
*Terms and conditions apply