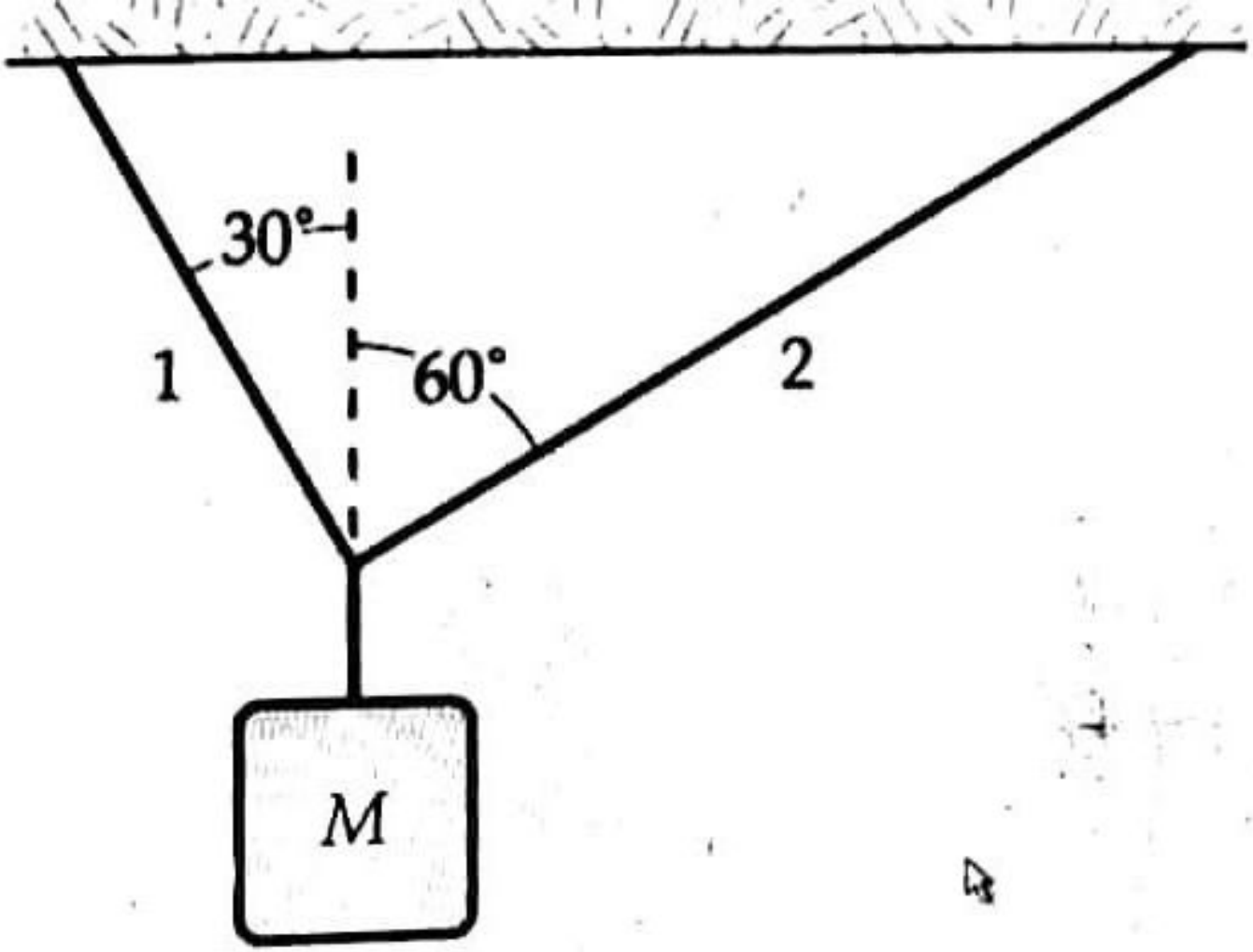


Question 9 / 10

The system in the figure is in equilibrium. If the tension in string 2 is 20 N, what is the mass M? (Consider g=10 m/s^2)

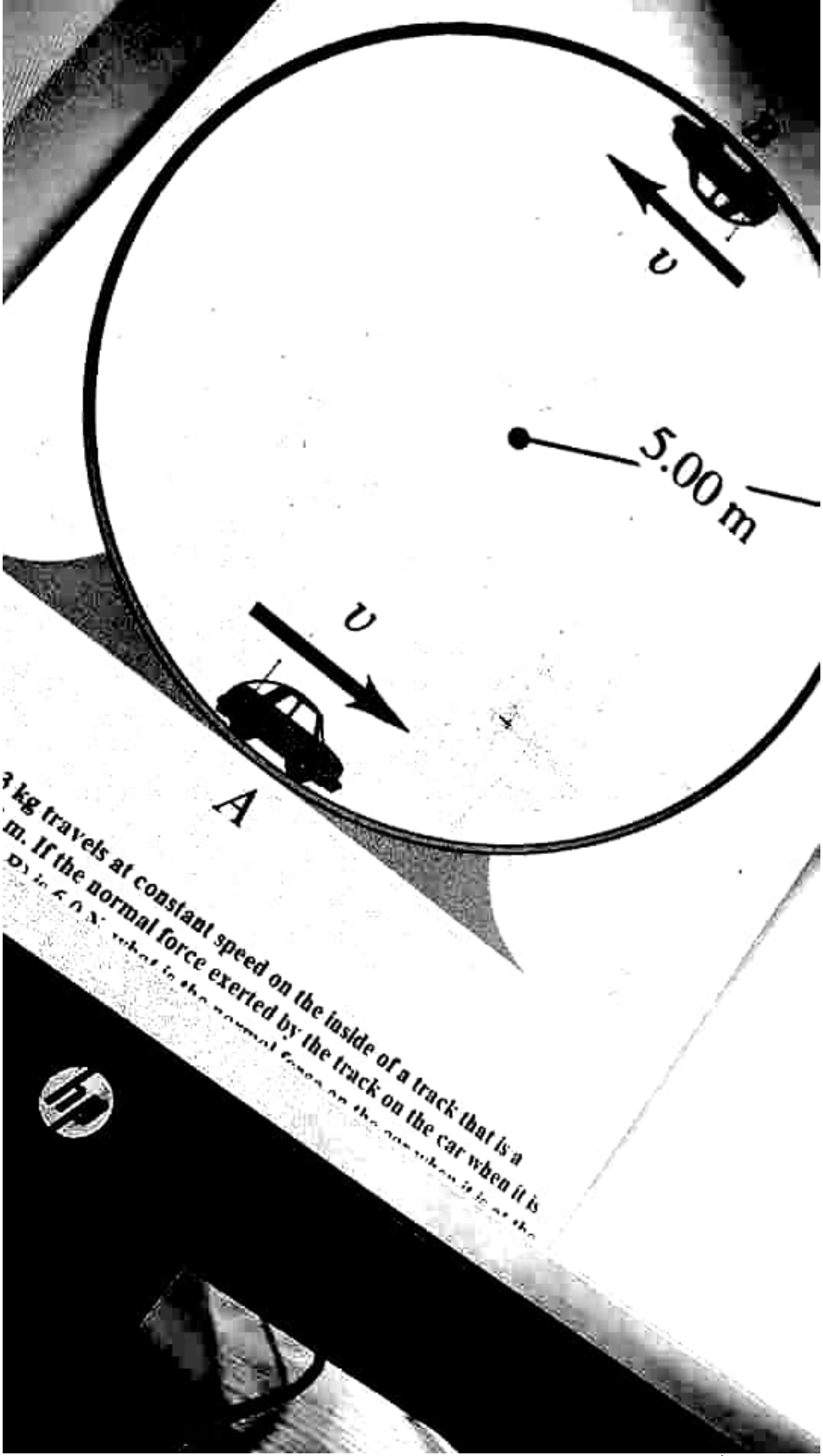
1. ○2.0 kg
2. ○4.0 kg
3. ○6.0 kg
4. ○8.0 kg
5. ○10.0 kg

00 : 51 : 57

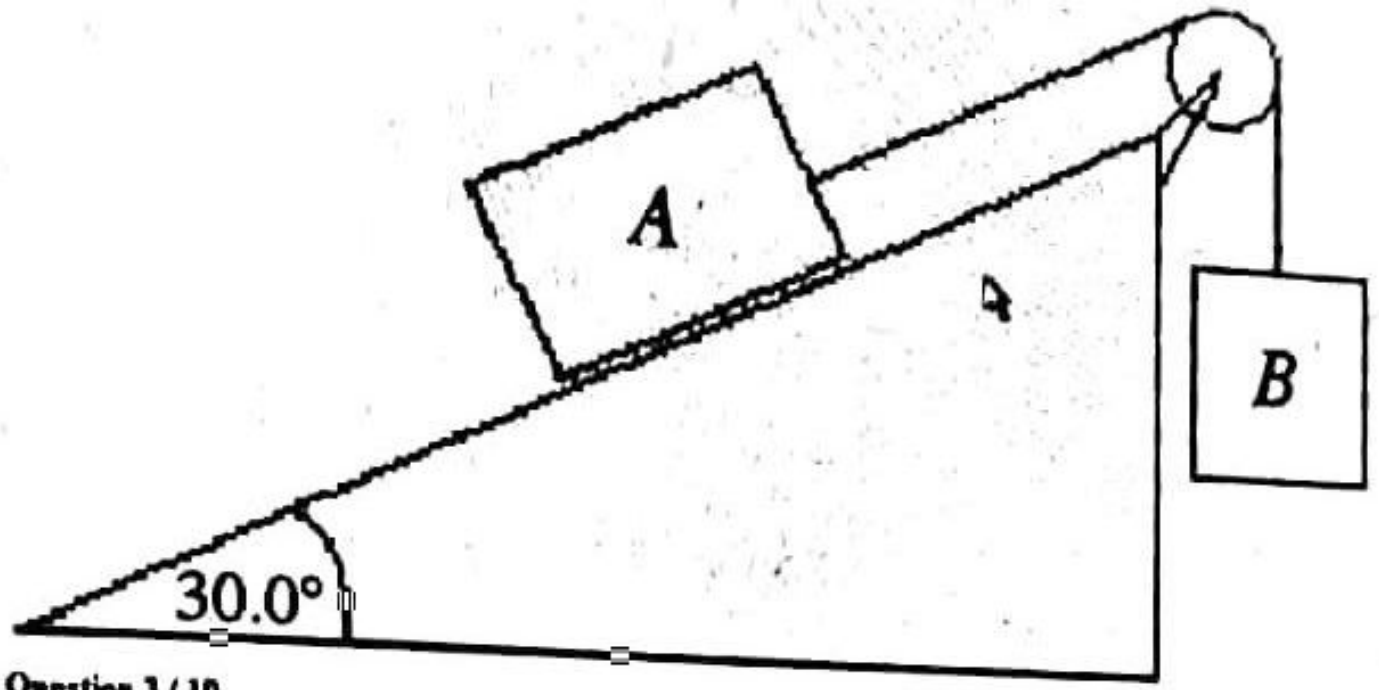
Question 4 / 10

A ball is tied to the end of a cable of negligible mass. The ball is spun in a horizontal circle with a radius 2.0 m making 11.0 revolutions every 10.0 seconds. What is the magnitude of the acceleration (in units of m/s^2) of the ball?

1. ○7.1
2. ○19.7
3. ○38.7
4. ○64.0
5. ○95.5



kg travels at constant speed on the inside of a track that is a
m. If the normal force exerted by the track on the car when it is

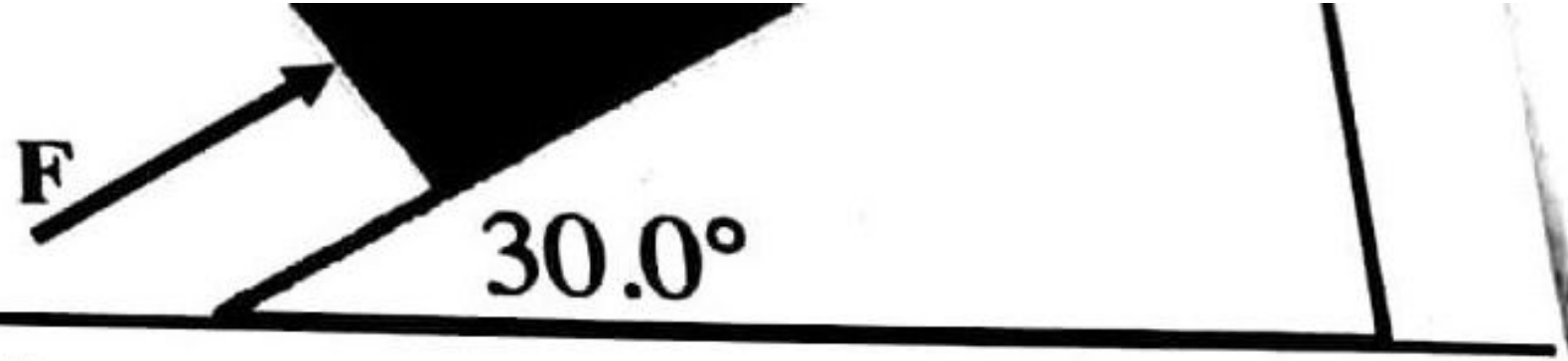


Question 3 / 10

Two blocks are connected by a string that goes over a light frictionless pulley as shown in the figure. Block A has a mass of 3.0 kg and can slide over a rough plane inclined 30.0° to the horizontal. The coefficient of kinetic friction between block A and the plane is 0.4. Block B has a mass of 3.0 kg. What is the acceleration (in units of m/s^2) of the blocks? (Consider $g=10\ m/s^2$)

1. ○0.8
2. ○3.9
3. ○5.4
4. ○6.3
5. ○7.1

Previous Next



Question 2 / 10

A 9.0 kg block rests on a 30.0° incline as shown in the figure. If the coefficient of static friction between the block and the incline is 0.7, what is the maximum possible magnitude of the force F that allow the block to remain stationary? (Consider g=10 m/s^2)

1. O33.2 N
2. O55.3 N
3. O77.4 N
4. O99.6 N
5. O121.7 N

Previous | Next

A

Question 6 / 10

A small car with mass 2.3 kg travels at constant speed on the inside of a track that is a vertical circle of radius 5.0 m. If the normal force exerted by the track on the car when it is at the top of the track (point B) is 6.0 N, what is the normal force on the car when it is at the bottom of the track (point A)? (Consider g=10 m/s^2)

1. ○22.0 N
2. ○32.0 N
3. ○42.0 N
4. ○52.0 N
5. ○62.0 N

00 : 51 : 9

Question 5 / 10

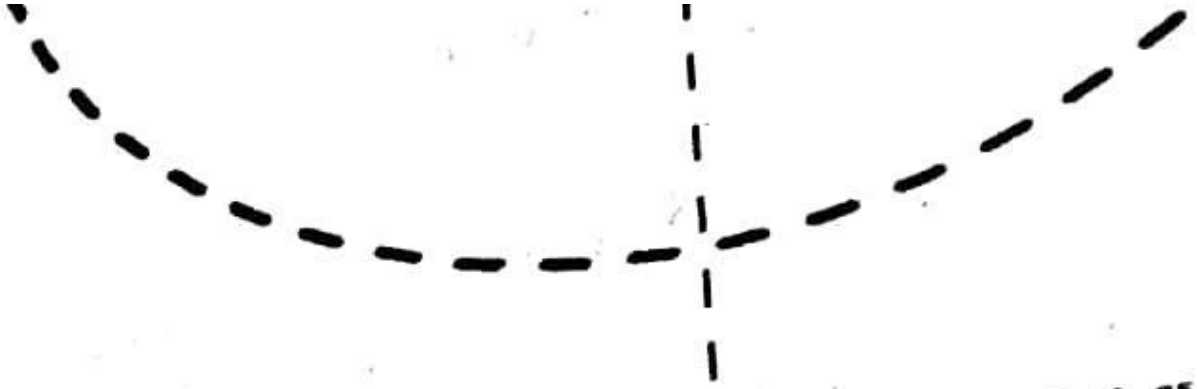
A pilot drops a package from a plane flying horizontally at a constant speed. Neglecting air resistance, when the package hits the ground the horizontal location of the plane will

1. O be behind the package.
2. O be over the package.
3. O be in front of the package.
4. O depend of the speed of the plane when the package was released.

Question 8 / 10

The figure shows a 100 kg block being released from rest from a height of 1.0 m. It then takes it 1.50 seconds to reach the floor. What is the mass m of the other block? The pulley has no appreciable mass or friction. (Consider g=10 m/s^2)

1. ○11.1 kg
2. ○42.0 kg
3. ○60.4 kg
4. ○78.8 kg
5. ○83.7 kg

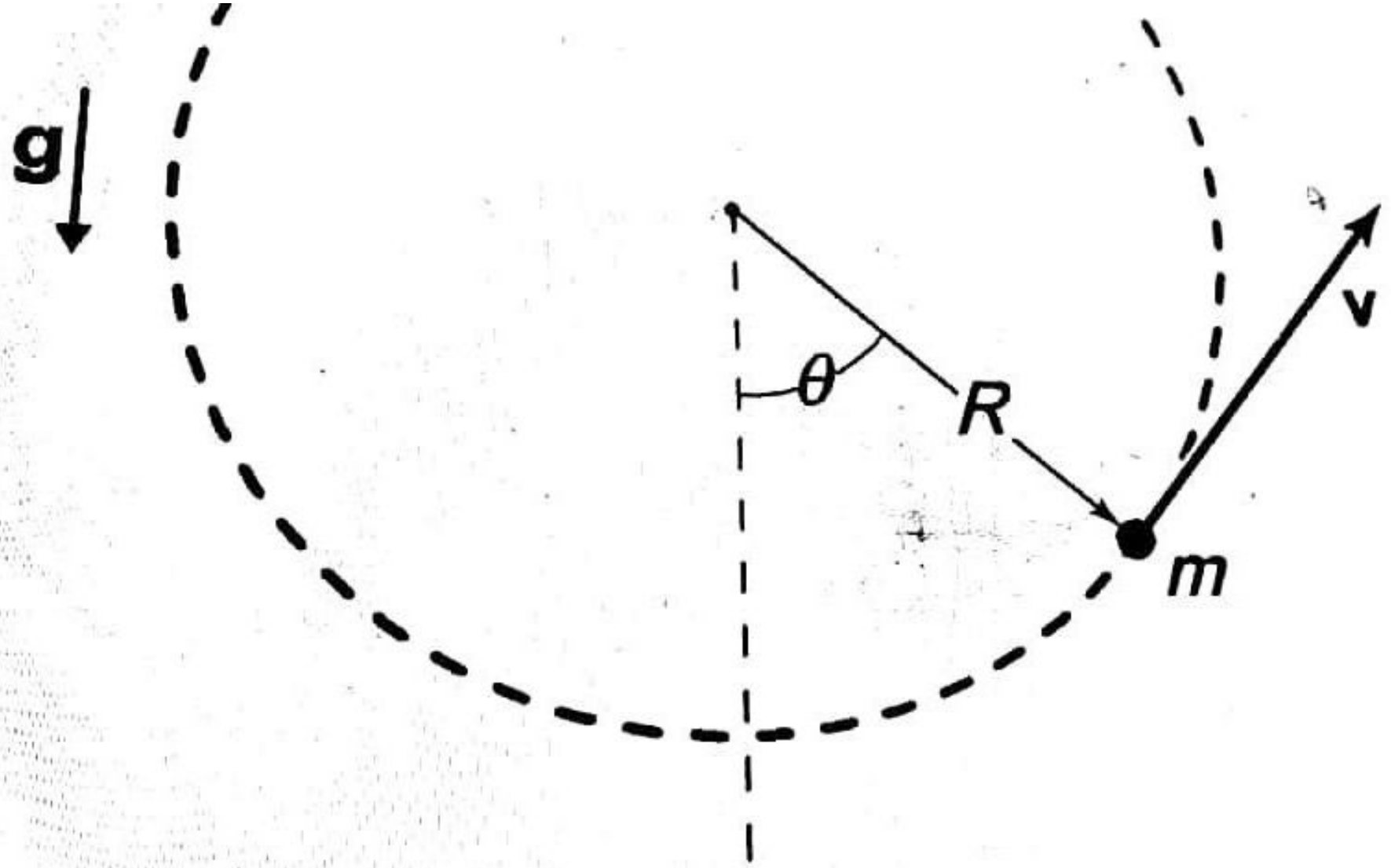


stion 7 / 10

1.0 kg mass attached to the end of a string swings in a vertical circle (R = 1.6 m), as own. At an instant when θ=50°, the speed of the mass is 6.0 m/s. What is the magnitude of tension in the string at this instant? (Consider g=10 m/s^2)

- O5.8 N
- O11.6 N
- O17.4 N
- O23.1 N
- O28.9 N

Previous Next



7 / 10

g mass attached to the end of a string swings in a vertical circle (R = 1.6 m), as

Q1/

$v_{ix} = 10\ m.s^{-1}$

$\Delta y = 80m$

$\Delta y = a - 5t^2$

$80 = 0 - 5t^2$

$t = 4\ sec$

$v_{fy} = v_{iy} + at$

$v_{fy} = 0 + -10$

$v_{fy} = -80\ m.s^{-1}$

$t = 4s$

$v_{ix} = 10\ m.s^{-1}$

~~$\Delta x = v_{ix} t$~~

~~$\Delta x = 80m$~~

$v_{fx} = v_{ix} + at$

$v_{fx} = v_{ix}$

$v_{fx} = 10\ m.s^{-1}$

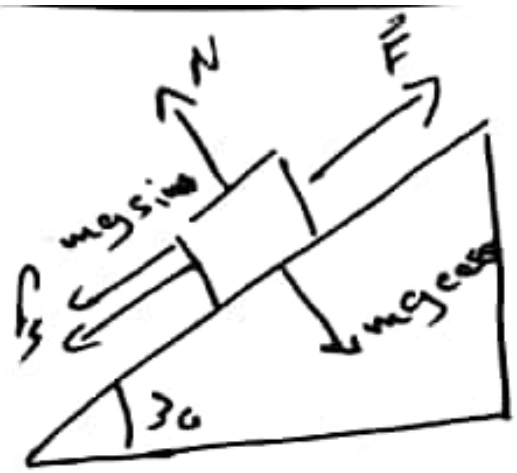
$|\vec{v}| = \sqrt{(80)^2 + (10)^2}$

$|\vec{v}| = 82.4\ m.s^{-1}$

Q.8

$m = 9\ kg$

$\mu_s = 0.7$



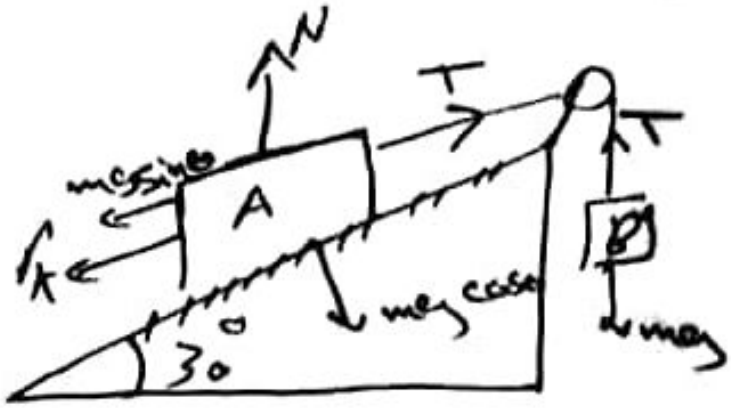
$$F - f_s - mg\sin\theta = 0$$

$$F = 0.7 \times N + mg\sin 30$$

$$F = 54.56 + 45$$

$$F = 99.6\ N$$

Q3



$m_A = 3kg$

$\mu_{kA} = 0.4$

$m_B = 3kg$

∴ Net mass (B) is pulling (A)

$T - f_k - m_A g \sin\theta = a m_A \longrightarrow (1)$

$m_B g - T = a m_B \longrightarrow (2)$

(1) + (2)

$mg - f_k - mg\sin 30 = 2am$

$30 - 10.4 - 15 = 6a$

$a = 0.8 m/s^2$

Q4

r = 2 m

1 Rev every 1.8 sec

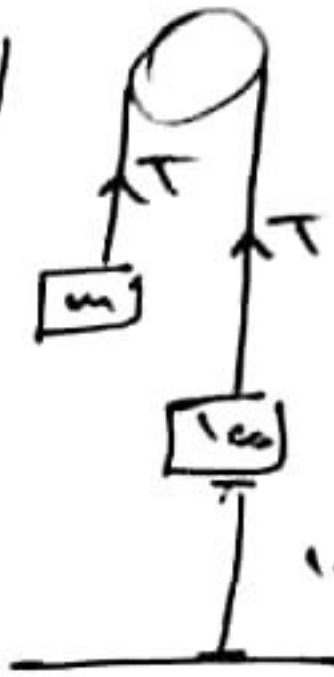
$a_r = \frac{v^2}{r} = \frac{(1.1 \times (4\pi))^2}{2} = 95.5 \ m.s^{-2}$

Q5

(2) be over the package

because the package will have an intial velocity the same one that the plane has.

Q.8 Final Answer is 83.7



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

$\frac{-1}{1.125} = 0 + a$

$a = 0.88\,m/s^2$

$100g - T = 100a \rightarrow (1)$

$T - mg = ma \rightarrow (2)$

(1) + (2)

$1000 - 10m = a(100 + m)$

$1000 - 8.8 = 10m + am$

$83.7\,kg = \frac{991.2}{10.88} = m$

$m = 83.7\,kg$

Q7

$m = 1\ kg$

$R = 1.6\ m$

when $\theta = 50°$

$s = 6\ m.s^{-1}$

$$T - mg\cos\theta = a_r m$$

$$T - 6.4\cos 50 = \frac{v^2 . m}{r}$$

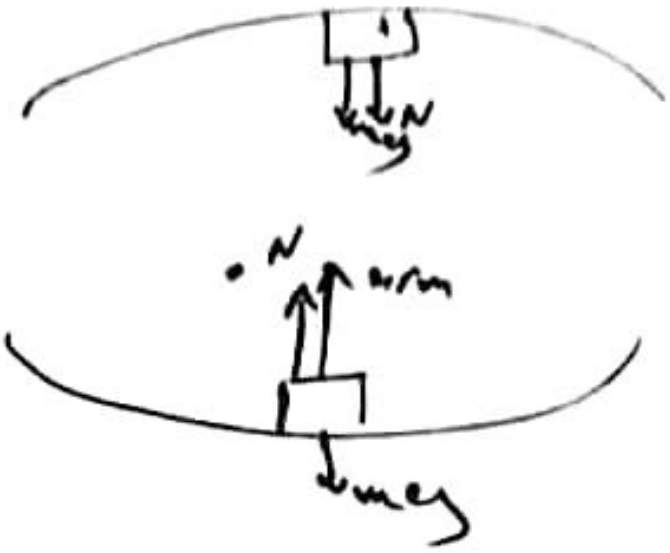
$$T = 6.4\cos 50 + 28.5$$

$$T = 28.9\ N$$

Q6

$m = 8.3\ kg$

$r = 5\ m$



top

$6 + mg = ma_r$

$\frac{6 + 83}{8.3} = a_r$

$a_r = 18.6\ m.s^{-2}$

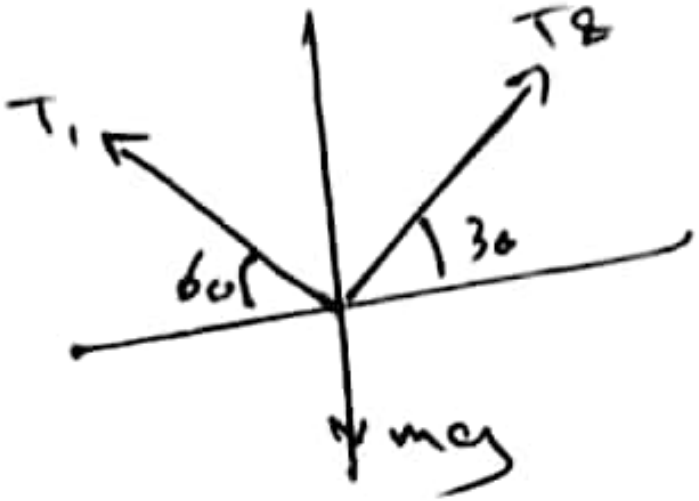
bottom

$N - mg = ma_r$

$N = 83 + 83$

$N = 166\ Newton$

Q.9



$$T_B \cos 30 - T_1 \sin 30 = 0$$

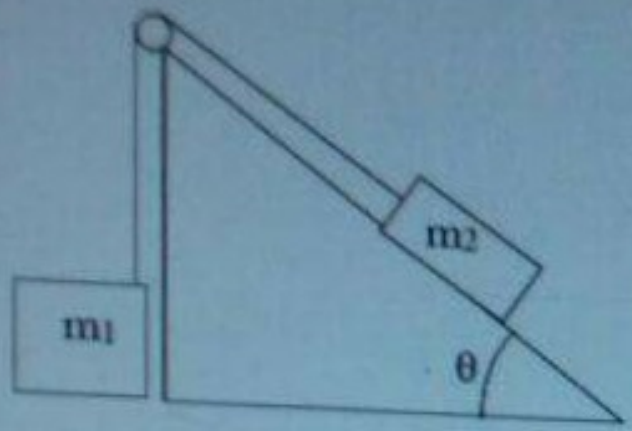
$$T_1 = 34.6 N$$

$$T_B \sin 30 + T_1 \cos 30 = mg$$

$$\frac{mg}{10} = m$$

$$m = 4 kg$$

0 : 59 : 53

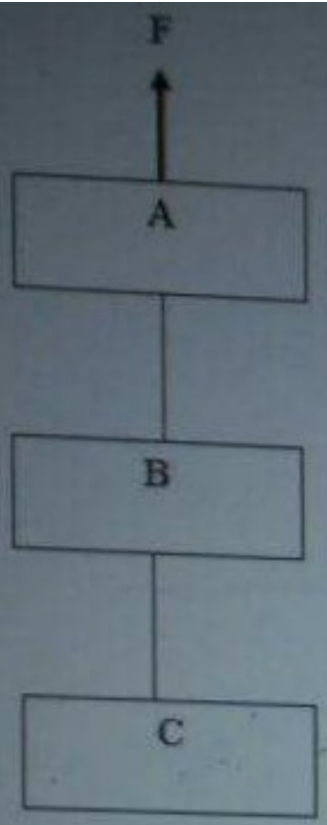


Question 1 / 10

In the figure shown the inclined plane is frictionless. If θ,=45 °, m_2 = 3 kg, m_1 = 6 kg. The tension (in N) in the cord is: (Use g=9.8 m/s^2)

1. ○ 38.5
2. ○ 30.8
3. ○ 33.5
4. ○ 35.7
5. ○ 37.4

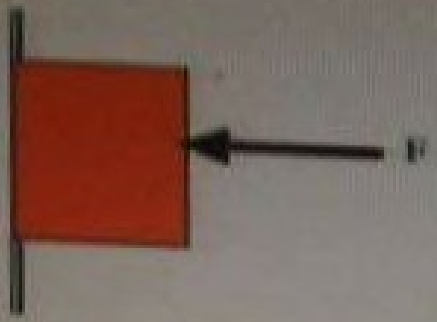
Next



Question 2 / 10

Three objects A, B and C attached to each other and have equal masses m=1 kg. If the objects are pulled vertically upward with force F=3 N. The acceleration (in m/s^2) of object C is:

1. ○ 1
2. ○ 2
3. ○ 3
4. ○ 4
5. ○ 5

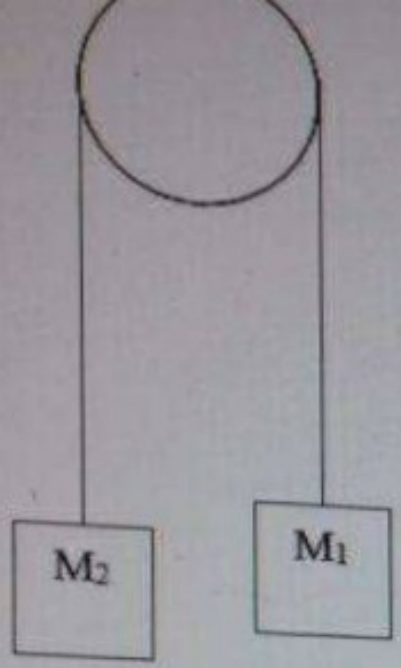


Question 3 / 10

If the coefficient of static friction between the block shown and the wall is 0.1 and the mass of the block is 0.6 Kg. Find the minimum value for the force F (in N) needed to prevent the block from motion. (Use g=9.8 m/s^2)

1. ○ 19.6
2. ○ 29.4
3. ○ 39.2
4. ○ 58.8
5. ○ 68.6

Previous | Next



Question : 4/10

For the Atwood machine shown m1=1 kg m2= 3 kg. The tension (in N) in the string is: (Use g=9.8 m/s^2)

1. ○ 13.1
2. ○ 14.7
3. ○ 15.7
4. ○ 16.3
5. ○ 16.8

Previous Next

00 : 58 : 27

5/10

Question

In the figure shown if the angle between the acceleration ($a = 14 m/s^2$) and the radius ($R = 44$ m) is ($\theta = 60°$). Find the speed (in m/s) of the particle shown.

1. 14.96
2. 16.31
3. 17.55
4. 18.71
5. 20.83

Next

إضغط على الرقم للإنتقال مباشرة للسؤال

1 2 3 4 5 6 7 8 9 10

00 : 57 : 52

Question 6 / 10

A block with mass M is whirled on the end of a thin rigid rod that moves at a constant speed in a vertical circle with radius 8 m. At the top of the circle, the tension in the rod is twice the weight of the block. What is the speed (in m/s) of the block? (Use $g = 9.8\ m/s^2$)

1. ○ 13.3
2. ○ 14.3
3. ○ 15.3
4. ○ 16.3
5. ○ 20.3

Previous | Next

1 2 3 4 5 6 7 8 9 10

00 : 48 : 0

Question 7 / 10

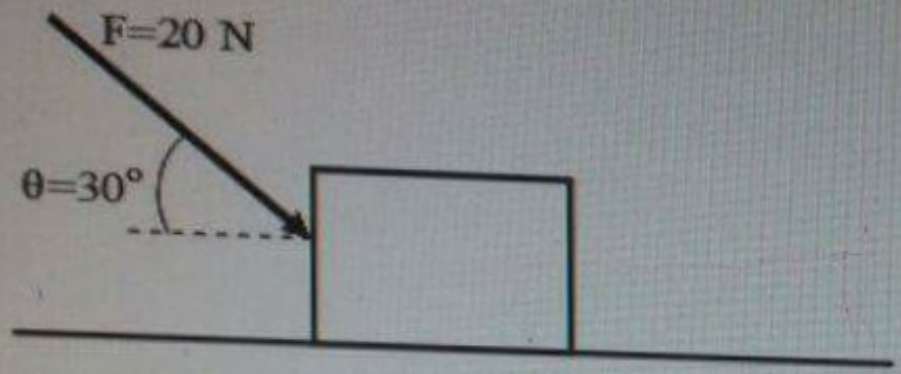
A 4.0-kg object rests on the floor of an elevator which is accelerating downward at rate of 1.8 m/s^2. What is the magnitude of the force (in N) the object exerts on the elevator? (Use g=9.8 m/s^2)

1. ○16
2. ○24
3. ○32
4. ○40
5. ○48

Previous Next

إضافة ملاحظة

00 : 47 : 47

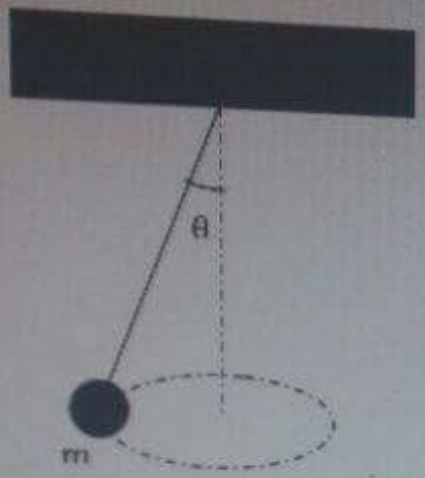


Question 8 / 10

A block is pushed across a horizontal surface by the force shown. If the coefficient of kinetic friction between the block and the surface is 0.10, F = 20 N,θ, = 30°, and M = 3.0 kg. The magnitude of the acceleration (in m/s^2) of the block is: (Use g=9.8 m/s^2)

1. ○ 4.5
2. ○ 3.8
3. ○ 3.2
4. ○ 2.5
5. ○ 1.8

Previous Next



Question 9 / 10

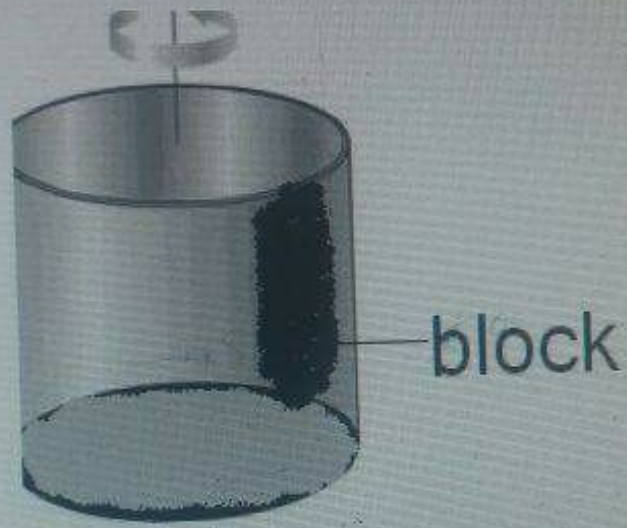
For the conical pendulum shown if m=80 kg, θ=40° and its length is 10 m. The speed (in m/s) of m is: (Use g=9.8 m/s^2)

1. ○ 6.3
2. ○ 6.8
3. ○ 7.3
4. ○ 11.6
5. ○ 16.9

00 : 44 : 5

Question 10 / 10

The cylinder shown is rotating around its axis (the dashed line). If the cylinder is opened from the bottom find the minimum velocity needed for the cylinder to have such that the mass does not fall down. (Radius of cylinder R=4 m, static friction coefficient between block and cylinder wall is μ_s=0.98, M=4 kg). (Use g=9.8 m/s^2)

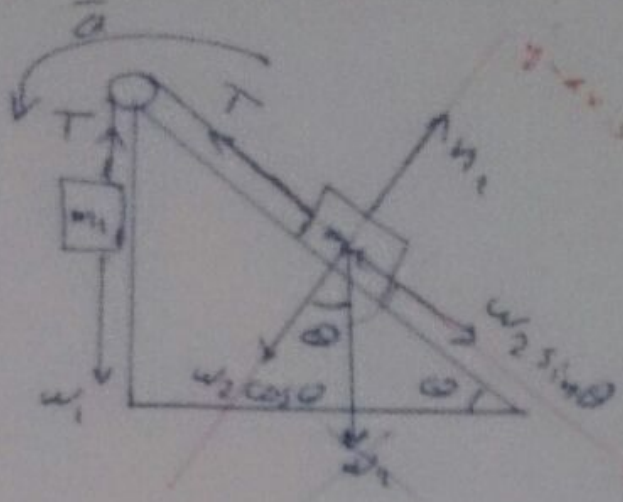


1. ○ 3.2
2. ○ 4.5
3. ○ 5.5
4. ○ 6.3
5. ○ 7.1

Previous

إضافة ملاحظة

Q1



$m_1 = 6kg, m_2 = 3kg, \theta = 45$

$g = 9.8 m/s^2$, $T = ??$

$w_1 = 58.8 N$

$w_2 = 29.4 N$

$\sum F_{y(I)} = m_1 a$

$w_1 - T = m_1 a$

$58.8 - T = 6a$ --- ①

$\sum F_{x(I)} = m_2 a$

$T - w_2 \sin\theta = m_2 a$

$T - 29.4 \sin 45 = 3a$

$T - 20.8 = 3a$ --- ②

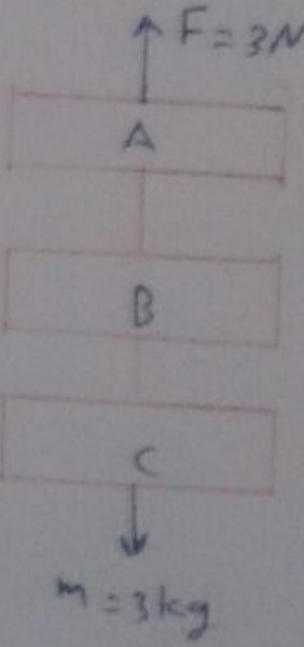
① و ② بالطرح

$\Rightarrow 38 = 9a \rightarrow \boxed{a = 4.2 m/s^2}$

نعوض في ① أو ②

$58.8 - T = 6(4.2) \rightarrow \boxed{T = 33.5 N}$

Q2 $m_A = m_B = m_C = 1kg$, $F = 3N$

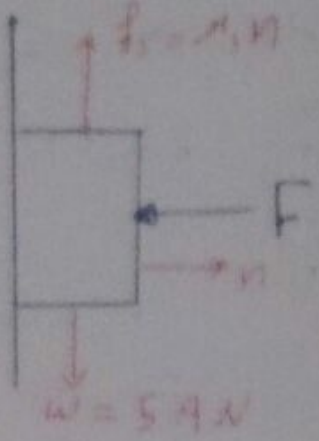


$F = ma$

$3 = 3a \rightarrow \boxed{a = 1 m/s^2}$

بالتوفيق للجميع

Q3 $m = 0.6\,kg,\ \mu_s = 0.1,\ g = 9.8\,m/s^2$



$\Sigma F_y = 0$

$f_s - w = 0 \rightarrow f_s = w = 5.9\,N$

$\Sigma F_x = 0$

$F - n = 0 \rightarrow F = n = 58.8\,N$

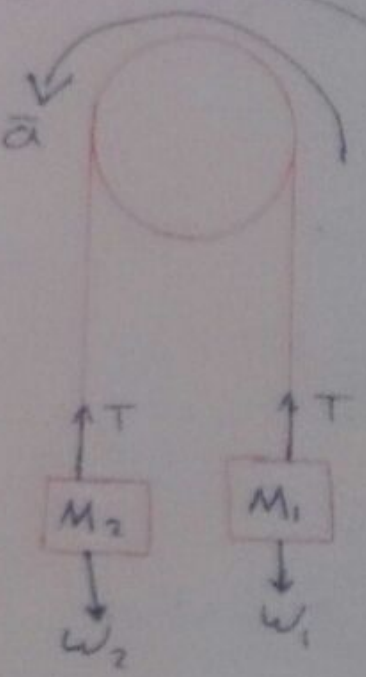
$f_s = \mu_s n$

$5.9 = 0.1\,n \rightarrow n = 59\,N$

Q4 $M_1 = 1\,kg,\ M_2 = 3\,kg,\ g = 9.8\,m/s^2$

$w_1 = 9.8\,N$

$w_2 = 29.4\,N$



$w_2 - T = m_2 a$

$29.4 - T = 3a$ ... ①

$T - w_1 = m_1 a$

$T - 9.8 = a$ ... ②

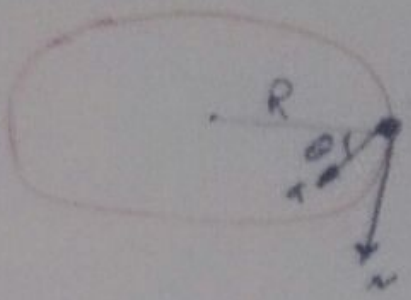
$19.6 = 4a \rightarrow a = 4.9\,m/s^2$

$29.4 - T = 14.7 \rightarrow T = 14.7\,N$

إعداد الطالب: كاس أنسولين

Q5 $a_{tot} = 14\ m/s^2$, $R = 44m$, $\theta = 60°$

Find v?



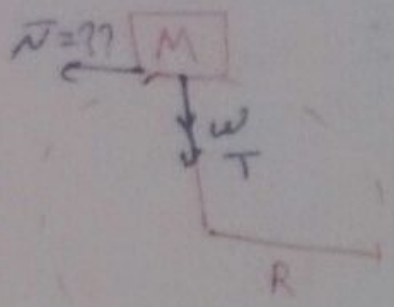
$a_r = a_{tot} \cos\theta$

$= 14 \cos 60 \rightarrow a_r = 7\ m/s^2$

$a_r = \frac{v^2}{r} \rightarrow 7 = \frac{v^2}{44} \rightarrow v = 17.55\ m/s$

Q6 $R = 8m$, $g = 9.8\ m/s^2$

$T = 2Mg$



$\Sigma F_r = ma_r$

$T + w = M\frac{v^2}{r}$

$2Mg + Mg = M\frac{v^2}{r}$

$3Mg = M\frac{v^2}{r}$

$29.4 = \frac{v^2}{8} \rightarrow v = 15.34\ m/s$

موفق باشید

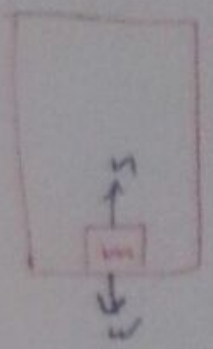
Q7 $m = 4kg$, $\vec{a} = 1.8\ m/s^2$, $g = 9.8$

$\Sigma F_y = ma$

$w - n = ma$

$39.2 - n = 7.2$

$n = 32N$



Q8 $m = 3kg$, $F = 20N$, $\theta = 30°$, $\mu_k = 0.1$

$g = 9.8\ m/s^2$

$\Sigma F_y = 0$

$n - w - F\sin 30 = 0$

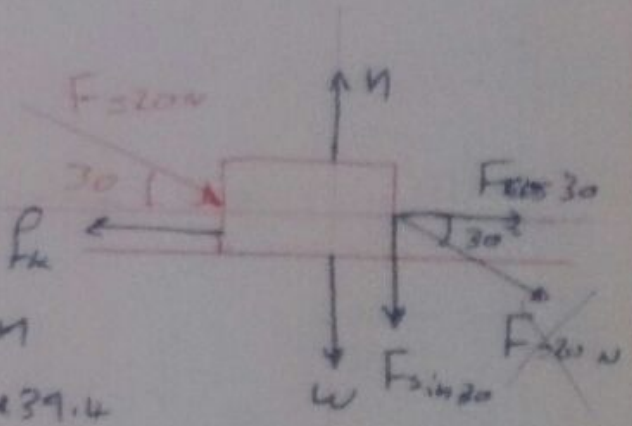
$n - 29.4 - 10 = 0$

$n = 39.4N$

$f_k = \mu_k n$

$= 0.1 \times 39.4$

$f_k = 3.9N$

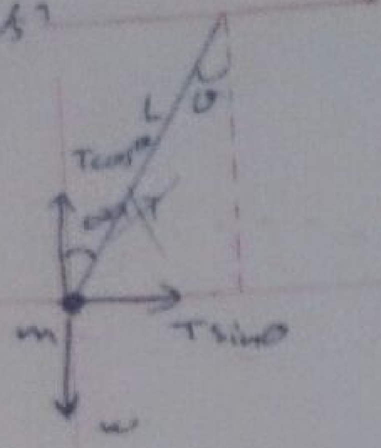


$\Sigma F_x = ma$

$F\cos 30 - f_k = ma$

$17.3 - 3.9 = 3a \longrightarrow a = 4.5\ m/s^2$

Q9 $m = 80\,kg$, $\theta = 40°$, $L = 10\,m$, $g = 9.8\,m/s^2$



$\sum F_y = 0$

$T\cos 40 - w = 0$

$T\cos 40 - 784 = 0 \rightarrow \boxed{T = 1023.4\,N}$

$\sum F_r = m a_r$

$T\sin 40 = m\frac{v^2}{r}$

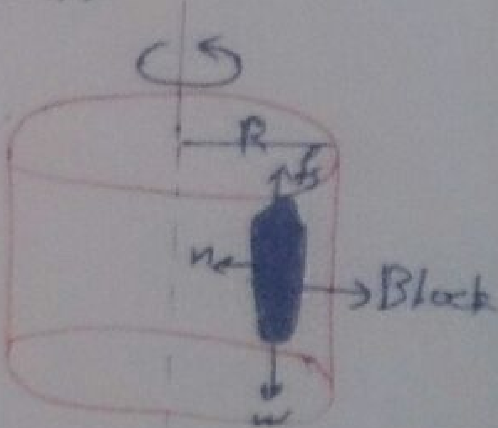
$1023.4 \sin 40 = 80\,\frac{v^2}{6.4}$

$\sin 40 = \frac{r}{10}$

$r = 6.4\,m$

$\Rightarrow \boxed{v = 7.3\,m/s}$

Q10 $R = 4\,m$, $\mu_s = 0.98$, $M = 4\,kg$, $g = 9.8\,m/s^2$



$\sum F_y = 0$

$f_s - w = 0 \rightarrow \boxed{f_s = w = 39.2\,N}$

$\sum F_r = m\frac{v^2}{r}$

$f_s = \mu_s n$

$39.2 = 0.98\,n$

$\boxed{n = 40\,N}$

$40 = 4\,\frac{v^2}{4}$

$\boxed{v_{min} = 6.3\,m/s}$

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