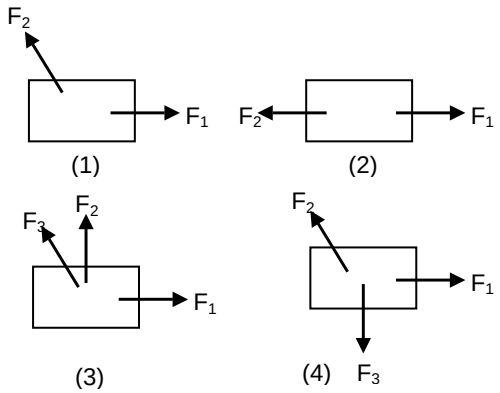
Lectures 8-10 Multiple Choice Questions

Overhead views of a block that lies on a frictionless floor are shown below. If the force magnitudes are chosen properly, in which situations is it possible that the block is either stationary or moving with constant velocity?



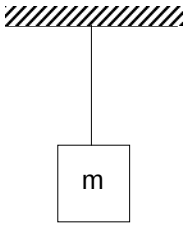
1. (2) and (3)
2. (2) and (4)
3. (2), (3), and (4)
4. All four

"Do stop pulling the cat's tail, Darling."

"I'm not pulling Mummy, Kitty's pulling!"

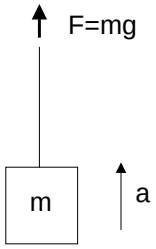
How does the force that Darling the daughter exerts on Kitty the cat compare with the force that Kitty exerts on Darling?

1. $F_{\text{Darling on Kitty}} > F_{\text{Kitty on Darling}}$
2. $F_{\text{Darling on Kitty}} = F_{\text{Kitty on Darling}}$
3. $F_{\text{Darling on Kitty}} < F_{\text{Kitty on Darling}}$



Which of the following forces are 3rd-law interaction pairs?

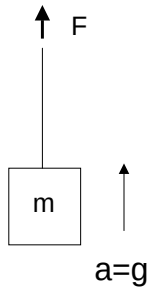
1. Weight W of mass m and tension T of rope
2. W and gravitational force of mass m on earth
3. T and force of mass m on rope
4. Two of the above
5. Three of the above



a=?

1. 0
2. g
3. >g
4. insufficient information

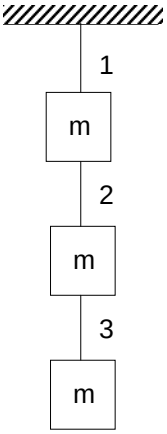
L8-5



F=?

1. 0
2. mg
3. 2mg
4. 3mg

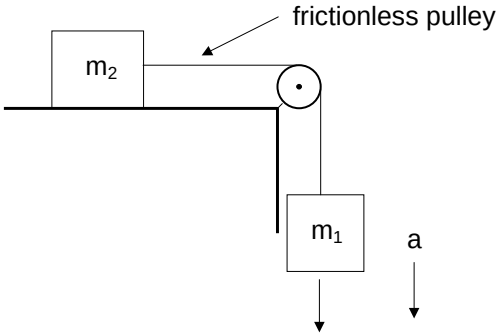
L8-6



T_1/T_3=?

1. 1/3
2. 1/2
3. 1
4. 2
5. 3

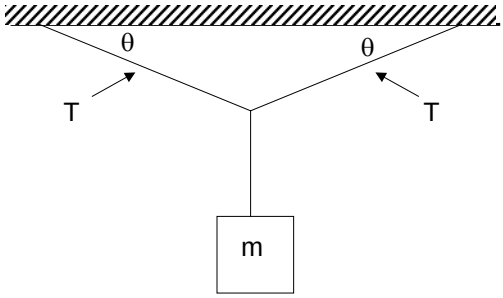
L8-7



a=?

1. 0
2. g
3. $m_1 g / (m_1 + m_2)$
4. $m_2 g / (m_1 + m_2)$
5. $(m_1 - m_2) g / (m_1 + m_2)$

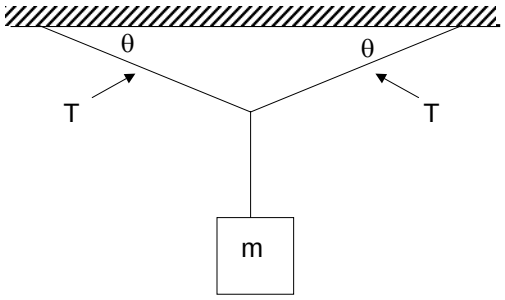
L8-8



T=?

1. mg
2. mg /sin(θ)
3. mg / cos(θ)
4. mg / 2 sin(θ)
5. mg / 2 cos(θ)

L8-9

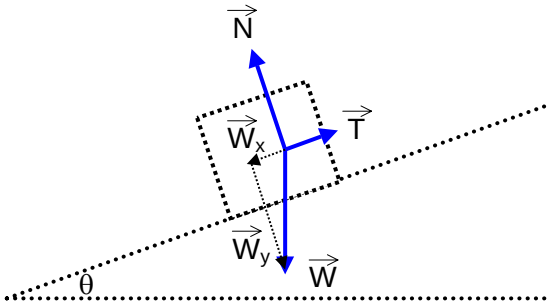


As $\theta \rightarrow 0$ (i.e., the ropes approach horiz-ontal), $T \rightarrow ?$

$T \rightarrow ?$

1. 0
2. mg / 2
3. mg
4. 2mg
5. ∞

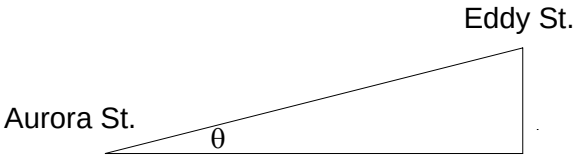
L8-10



$W_x = ?$

1. W cos θ
2. W sin θ
3. W tan θ
4. W / cos θ
5. W / sin θ

L8-11

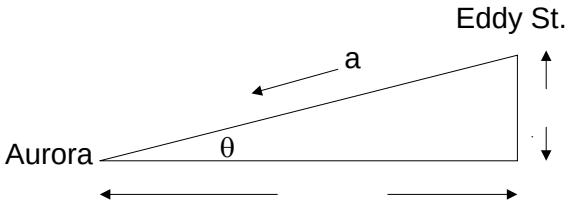


What is the average angle θ of Buffalo St. between Eddy and Aurora Sts.?

1. ~5°
2. ~10°
3. ~20°
4. ~30°
5. ~45°

L8-12

What is the acceleration of a cyclist if he coasts without pedaling down Buffalo St.?



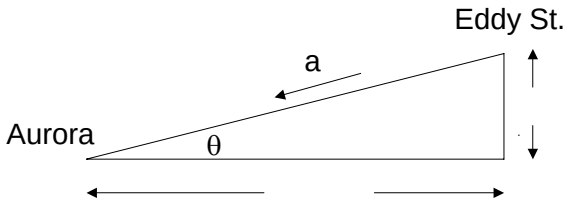
(Neglect air resistance.)

a=?

1. g cos (θ)
2. g sin (θ)
3. g tan (θ)
4. g / cos (θ)
5. g / sin (θ)

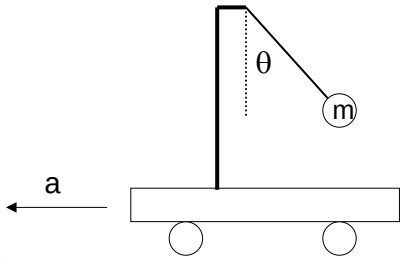
L8-13

If the cyclist starts from rest at Eddy St., what is his speed when he reaches Aurora St.? (Neglect air resistance.)



L8-14

The cart and pendulum accelerate so that the cord makes an angle θ with the vertical. What is the tension in the cord?

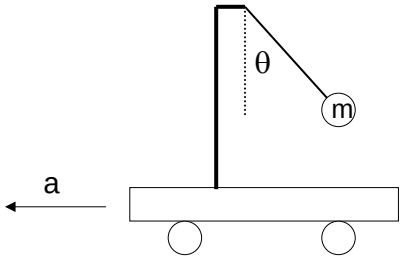


T= ?

1. mg cos (θ)
2. mg sin (θ)
3. mg tan (θ)
4. mg / cos (θ)
5. mg / sin (θ)

L8-15

The cart and pendulum accelerate so that the cord makes an angle θ with the vertical. What is the acceleration a?

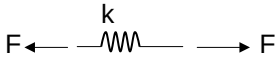


a= ?

1. g cos θ
2. g sin θ
3. g tan θ
4. g / cos θ
5. g / sin θ

L8-16

By how much does the spring stretch from its relaxed length?

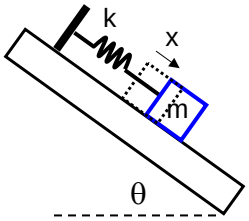


x=?

1. x=F/2k
2. x=F/k
3. x=2F/k

L8-17

The spring has stretched an amount x. What is the angle θ? (Assume the surface on which the mass m slides is frictionless.)

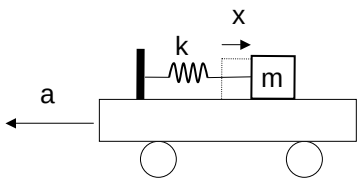


θ=?

1. $\sin^{-1}$ (kx/mg)
2. sin (kx/mg)
3. $\cos^{-1}$ (kx/mg)
4. cos (kx/mg)

L8-18

The spring has stretched an amount x. What is the acceleration a? (Assume the surface on which the mass m slides is frictionless.)

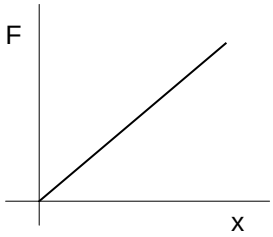


a=?

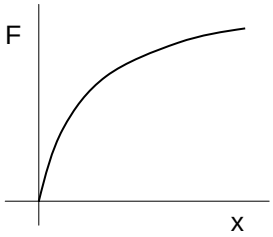
1. a=kx/m
2. a=k x m
3. a=kx
4. Insufficient information

L8-19

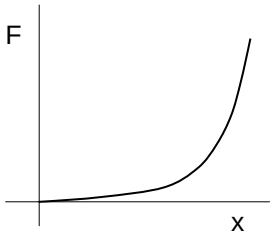
Which of the following best describes the force versus displacement (F-x) curve for an earlobe?



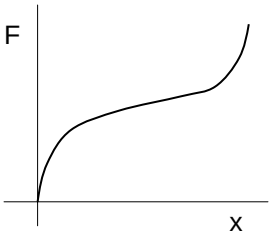
(1)



(2)



(3)



(4)