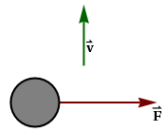
HW3 - due 6 pm Day 6 (Mon. Aug. 4)

1. Question Details OSColPhys1 4.P.005.WA. [2707257]

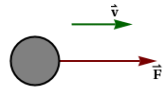
In each of the cases shown below, the direction of motion of the object is indicated by the velocity vector $\vec{v}$. One or more forces act on the object as shown in the diagram. How will the velocity of the object change in each case in the direction of motion? Assume the forces shown remain constant in magnitude and direction.

(a)



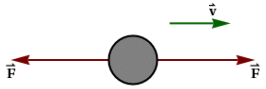
- magnitude will increase, direction will be the same
- magnitude will decrease, direction will be the same
- magnitude will increase, direction will change
- magnitude will decrease, direction will change
- no change in magnitude or direction

(b)



- magnitude will increase, direction will be the same
- magnitude will decrease, direction will be the same
- magnitude will increase, direction will change
- magnitude will decrease, direction will change
- no change in magnitude or direction

(c)



- magnitude will increase, direction will be the same
- magnitude will decrease, direction will be the same
- magnitude will increase, direction will change
- magnitude will decrease, direction will change
- no change in magnitude or direction

Supporting Materials

Physical Constants

2. Question Details OSColPhys1 4.P.007.WA. [2707312]

An object of mass 12.0 kg subjected to a non-zero net force moves with an acceleration of 1.5 m/s^2.

(a) Determine the net force acting on it. (Enter the magnitude only.)

18 N

(b) What acceleration would a 24.0-kg object have if the same net force is applied to it?

0.75 m/s^2

Supporting Materials

Physical Constants

3. Question Details OSColPhys1 4.P.009.WA. [2707387]

An object of mass 0.69 kg is initially at rest. When a force acts on it for 2.9 ms it acquires a speed of 16.9 m/s. Find the magnitude of the average force acting on the ball during the 2.9 ms time interval.

4020 N

Supporting Materials

Physical Constants

4. Question Details 4.P.025 mod [2969667]

Tom and Jerry are enjoying an afternoon at the ice rink. They playfully place their hands together and push against each other. Tom's mass is 64 kg and Jerry's mass is 15 kg.

(a) Which of the following statements is correct?

- The magnitude of the force Jerry exerts on Tom is equal to the magnitude of the force Tom exerts on Jerry.
- The magnitude of the force Jerry exerts on Tom is less than the magnitude of the force Tom exerts on Jerry.
- The magnitude of the force Tom exerts on Jerry is less than the magnitude of the force Jerry exerts on Tom.

(b) Which of the following statements is correct?

- They both have the same acceleration.
- Tom's acceleration is more than Jerry's acceleration.
- Tom's acceleration is less than Jerry's acceleration.

(c) If Jerry's acceleration is 3.0 m/s^2 in magnitude, what is the magnitude of Tom's acceleration?

[ ] 0.703 m/s^2

5. Question Details OSColPhys1 4.P.027.Tutorial.WA. [2707379]

A 86-kg man stands on a bathroom scale inside an elevator.

(a) The elevator accelerates upward from rest at a rate of 1.25 m/s^2 for 1.50 s. What does the scale read during this 1.50 s interval?

[ ] 950 N

(b) The elevator continues upward at constant velocity for 8.50 s. What does the scale read now?

[ ] 843 N

(c) While still moving upward, the elevator's speed decreases at a rate of 0.500 m/s^2 for 3.00 s. What is the scale reading during this time?

[ ] 800 N

Supporting Materials

Physical Constants

6. Question Details OSColPhys1 4.P.017.WA. [2707279]

Two forces $\vec{P}$ and $\vec{Q}$ act on an object of mass 11.0 kg with $\vec{Q}$ being the larger of the two forces. When both forces are directed to the left, the magnitude of the acceleration of the object is 1.40 m/s^2. However, when the force $\vec{P}$ is directed to the left and the force $\vec{Q}$ is directed to the right, the object has an acceleration of 0.700 m/s^2 to the right. Find the magnitudes of the two forces $\vec{P}$ and $\vec{Q}$.

P = [ ] 3.85 N

Q = [ ] 11.6 N

Supporting Materials

Physical Constants

7. Question Details OSColPhys1 4.P.008.WA. [2707404]

You work at a garden store for the summer. You lift a bag of fertilizer with a force of 119 N, and it moves upward with an acceleration of 0.814 m/s^2.

(a) What is the mass of the fertilizer bag?

[ ] 11.2 kg

(b) How much does the fertilizer bag weigh?

[ ] 110 N

Supporting Materials

Physical Constants

8. Question Details OSColPhys1 4.P.029.Tutorial.WA. [2707258]

A contestant in a winter games event pushes a 33.0-kg rock across a frozen lake with a force of 25 N at 18° below the horizontal as shown in Figure (a) below, and it moves with an acceleration of 0.72 m/s^2 to the right.

(a) What is the normal force exerted by the lake surface on the rock?

[ ] 331 N

(b) Instead of pushing on the rock, the contestant now pulls on it with a rope over his shoulder at the same angle above the horizontal as in part (a). See Figure (b) above. Now what is the normal force exerted by the lake surface on the rock?

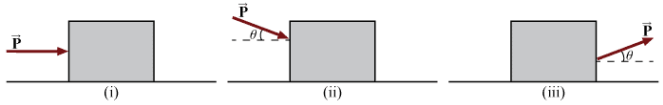
[ ] 316 N

Supporting Materials

Physical Constants

9. Question Details OSColPhys1 4.P.032.WA. [2707299]

The three diagrams below show a block of mass m being pulled or pushed at constant velocity along a table with a force $\vec{\mathbf{P}}$. Assume the surfaces to be frictionless.



(a) What is the magnitude of the normal force in each case? Use the following as necessary: g, P, and θ.

case (i) N = mg

case (ii) N = $mg + P\sin(\theta)$

case (iii) N = $mg - P\sin(\theta)$

(b) How would your answer to part (a) change if, all else being the same, the object moved with constant acceleration?

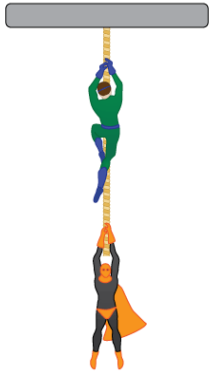
- The normal force will increase.
- The normal force will decrease.
- The normal force will remain the same.

Supporting Materials

Physical Constants

10. Question Details OSColPhys1 4.P.037.Tutorial.WA. [2707389]

The figure below shows Superhero hanging motionless from a rope, with Trusty Sidekick hanging below him. Superhero's mass is 80.5 kg, while Trusty Sidekick's is 50.0 kg, and the mass of the rope is negligible.



(a) Find the tension in the rope at a point between Superhero and Trusty Sidekick.

490 N

(b) Find the tension in the rope at a point above Superhero.

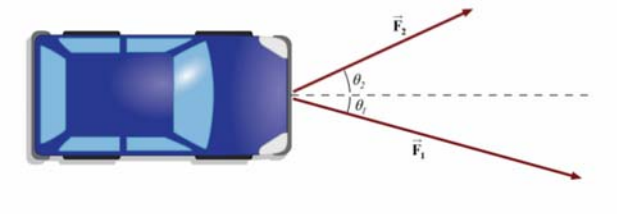
1280 N

Supporting Materials

Physical Constants

11. Question Details OSColPhys1 4.P.035.WA. [2707414]

Tom enlists the help of his friend John to move his car. They apply forces to the car as shown in the diagram. Here F_1 = 445 N and F_2 = 368 N and friction is negligible. In the diagram below, the mass of the car = 3500 kg, $\theta_1 = -25°$ and $\theta_2 = 12°$. (Assume the car faces the positive x-axis before the forces are applied.)



(a) Find the resultant force exerted on the car.

magnitude [ ] 771 N

direction [ ] -8.32 ° (counterclockwise from the +x-axis)

(b) What is the acceleration of the car?

magnitude [ ] 0.22 N

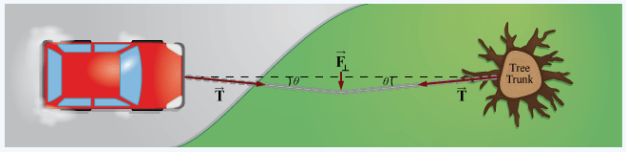
direction [ ] -8.32 ° (counterclockwise from the +x-axis)

Supporting Materials

Physical Constants

12. Question Details OSColPhys1 4.P.042.WA. [2707381]

Suppose your car was mired deeply in the mud and you wanted to use the method illustrated in the figure below to pull it out.



(a) What force would you have to exert perpendicular to the center of a rope to produce a force of 10,000 N on the car if the angle is θ = 2.10°? (Enter the magnitude only.)

[ ] 733 N

(b) Real ropes stretch under such forces. What force would be exerted on the car if the angle increases to 7.00° and you still apply the force found in part (a) to its center? (Enter the magnitude only.)

[ ] 3010 N

Supporting Materials

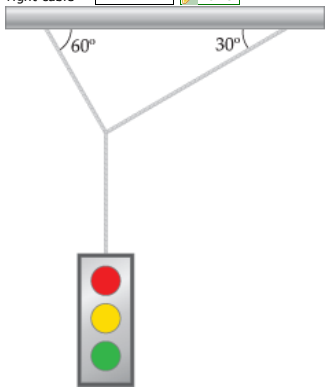
Physical Constants

13. Question Details OSColPhys1 4.P.044.WA. [2707297]

A 19.9-kg traffic light is suspended from two cables as shown in the figure below. Find the tension in each cable.

left cable [ ] 169 N

right cable [ ] 97.5 N



Supporting Materials

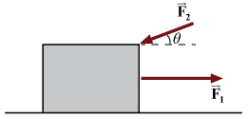
Physical Constants

14. Question Details OSColPhys1 4.P.056.WA. [2707259]

A block is acted on by two forces as shown in the diagram below. If the magnitudes of the forces are F_1 = 58.0 N and F_2 = 28.5 N, what are the magnitude and direction of the acceleration of the block? Let m = 8.00 kg and θ = 45.0°.

magnitude [ ] 4.73 m/s^2

direction ---Select--- toward the right



Supporting Materials

Physical Constants

15. Question Details OSColPhys1 4.P.055.WA. [2707289]

A skier speeds down a smooth ski slope which is at an angle of θ = 23° with the horizontal. The mass of the skier is 77 kg. Take the downhill direction to be positive and uphill to be negative.

(a) What net force is acting on the skier? (Indicate the direction with the sign of your answer.)

[ ] 295 N

(b) What is the acceleration experienced by the skier? (Indicate the direction with the sign of your answer.)

[ ] 3.83 m/s^2

(c) How does the net force experienced by the skier change if the ski slope becomes steeper?

- increases
- decreases
- remains the same

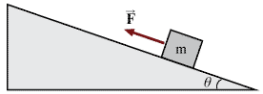
Supporting Materials

Physical Constants

16. Question Details OSColPhys1 4.P.050.WA. [2707356]

The block in the figure below has a mass of 5.3 kg and it rests on an incline of angle θ. You pull on the rope with a force F = 37 N. Assume the incline is smooth and determine the angle of the incline if the block moves with constant speed.

[ ] 45.4 °

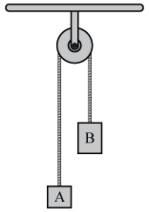


Supporting Materials

Physical Constants

17. Question Details OSColPhys1 4.P.058.WA. [2707318]

A pulley and string arrangement is used to connect two objects A and B as shown in the diagram below. Here, m_A = 2.30 kg and m_B = 8.40 kg. The string connecting the two objects is of negligible mass and the pulley is frictionless. The objects start from rest and move with constant acceleration.



(a) What is the magnitude of the acceleration of each of the objects?

[ ] 5.59 m/s^2

(b) What is the magnitude of the tension in the string?

[ ] 35.4 N

(c) Through what distance will the two objects move in the first three seconds of motion?

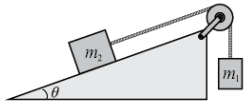
[ ] 25.1 m

Supporting Materials

Physical Constants

18. Question Details OSColPhys1 4.P.060.Tutorial.WA. [2707366]

The figure below shows two blocks connected by a string of negligible mass passing over a frictionless pulley. m_1 = 3.0 kg and θ = 12.0°. Assume that the incline is smooth.



(a) For what value of m_2 the will the system be in equilibrium?

m_2 = [ ] 14.4 kg

(b) If the block has to slide down the incline with an acceleration of 1.1 m/s^2, what should be the value of m_2?

m_2 = [ ] 34.9 kg

Supporting Materials

Physical Constants

Assignment Details

Name (AID): **HW3 - due 6 pm Day 6 (Mon. Aug. 4) (5973051)**
Submissions Allowed: **5**
Category: **Homework**
Code:
Locked: **No**

Feedback Settings
Before due date
Question Score
Assignment Score
Publish Essay Scores