Welcome back, Bill Wiecking

>>Working in AP Physics B (SC651)

Current Course
Course Home
Edit Course Info
Syllabus/Assignments
Grades
Student administration
Instructor administration

My Courses
AP Physics B
AP Physics C
Honors Physics
ePhysicsC
ePhysicsE

My Account
Change password
Manage courses

Homework Home
Logout

ch 6 alpha

Chapter 6: Applications of Newton's Laws

Conceptual problems

6.C.1 **(5.00)** Only one non-zero force acts on an object. Can the object be and remain at rest? Explain.

Yes No

6.C.2 **(5.00)** If an object has no velocity, does that necessarily mean no forces are acting on it? Explain your answer.

Yes No

6.C.3 **(5.00)** A massless rope is hanging over a massless and frictionless pulley. A large bunch of bananas is tied to one end of the rope, and a monkey of equal weight is clinging to the other end, at a lower height. The monkey decides he wants the bananas and starts to climb his side of the rope. What happens to the bananas as the monkey climbs?

6.C.4 **(5.00)** A car is parked on a downhill section of a hill. What forces are acting on the car?

6.C.5 **(5.00)** Imagine using a spring scale on the Moon, where the acceleration of gravity is less than on Earth. Would the scale display different values on the Moon and Earth? Explain why.

Yes No

Section 0: Introduction

6.0.1 **(5.00)** Use the simulation in the interactive problem in Section 6.0 to answer the following questions. (a) If $\mathbf{F}_1$ is set to 12 N directly to the left, what should $\mathbf{F}_2$ be set to so that the ball does not move when you press GO? (b) If $\mathbf{F}_1$ is set to 10 N directly to the left, what should $\mathbf{F}_2$ be set to so that the ball hits the target directly to the right of the ball? (c) If $\mathbf{F}_1$ is set to 10 N straight up, what should $\mathbf{F}_2$ be set to so that the ball hits the target that is up and to the right of the ball?

(a) ______ N, ______

(b) ______, ______

(c) ______ N, ______

Section 1: Sample problem: a mass on ropes

6.1.1 **(5.00)** A child sits still on a swing that is supported by two chains. Each chain makes a 15.0° angle with the vertical. The child's mass is 25.0 kg. What is the tension in each chain? (Ignore the mass of the seat and chains.)

______ N

6.1.3 **(7.00)** A painting of mass 3.20 kg hangs on a wall. Two thin pieces of wire, each 0.250 m long, connect the painting's center to two hooks in the wall. The hooks are at the same height and are 0.330 m apart. When the painting hangs straight on the wall, how much tension is in each piece of wire?

______ N

6.1.4 **(7.00)** A rubber chicken of mass 0.850 kg is dangling as shown. What is the tension in each string?

T_1 = N

T_2 = N

Section 3: Sample problem: pulling up a scaffold

6.3.2 **(7.00)** Your fellow climber is stuck in a crevasse and you need to get him out using a pulley system shown in the diagram. You are pulling your friend, of mass *M*, out of the crevasse at constant speed by applying a force *F*. The pulleys are frictionless and have negligible mass, as do the ropes. Find each tension: (a) T_1, (b) T_2, (c) T_3, (d) T_4, (e) T_5 and (f) the magnitude of *F*. (Hint: Drawing a free body diagram for each pulley will help.)

(a) N
(b) N
(c) N
(d) N
(e) N
(f) N

Section 5: Interactive problem: mountain rescue

6.5.1 **(5.00)** Use the information given in the interactive problem in Section 6.5 to answer the following question. What is the force required to save the food from the bear? As in the interactive, subtract 2 N from your answer to ensure that the chock does not come loose. Test your answer using the simulation.

[ ] N

Section 6: Sample problem: airplane at constant velocity

6.6.1 **(7.00)** A climber of mass 64.8 kg is rappelling down a cliff, but has momentarily paused. She stands with her feet pressed against the icy, frictionless rock face and her body horizontal. A rope of negligible mass is attached to her near her waist, 1.04 m horizontally from the rock face. There is 5.25 m of rope between her waist and where the rope is attached to a chock in the face of the vertical wall she is descending. Calculate the tension in the rope.

[ ] N

Section 7: Sample problem: an inclined plane and static friction

6.7.1 **(5.00)** Two people are pushing their stalled car up a hill with an incline of *angle*°. They are pushing parallel to the surface of the hill. The car's mass is 954 kg. What is the combined force they must apply to keep the car moving at a constant speed up the hill? Ignore the forces of friction and air resistance.

[ ] N

Section 9: Sample problem: an Atwood machine

6.9.1 **(7.00)** A 10.4 kg block sits on a frictionless horizontal table. The block is attached to a horizontal ideal string that goes over an ideal pulley and is connected to another identical 10.4 kg block that hangs freely. What is the acceleration of the block on the table? State the acceleration as a positive quantity.

[ ] m/s^2

6.9.2 **(7.00)** Two blocks are connected by an ideal string that passes over a massless, frictionless pulley. The two blocks hang freely. The first block has a mass of

14.3 kg, and the second block weighs 98.0 N. Determine (a) the magnitude of the blocks' acceleration, (b) the magnitude of the tension in the string.

(a) ______ m/s^2

(b) ______ N

Section 11: Interactive checkpoint: two “blocks” at an angle

6.11.1 **(7.00)** You and your friend are sledding on two sides of a triangle-shaped hill. On your side, the hill slopes up at 30.0° from the horizontal; on your friend's side, it slopes down at the same angle. You do not want to climb up the hill, so you tell your friend to thread a rope through an ideal pulley that is conveniently atop the hill. He connects the rope to his sled and tosses the other end of the rope to you. The sleds on the snow have a coefficient of kinetic friction, μ_k, of 0.0500. The total mass of your friend and his sled is 82.0 kg while you and your sled have a mass of 68.0 kg. (a) What is the magnitude of the acceleration of each sled? (b) What is the tension in the rope?

(a) ______ m/s^2

(b) ______ N

Back to assignments list

Current server time is: 2008-02-17 16:27