Review

ANSWERS

1. No, a change in speed corresponds to a change in kinetic energy, which cannot occur without work (either positive or negative) being done on the object.
2. **a.** yes, positive
   b. no
   c. yes, positive
   d. yes, negative
3. No, force would decrease, but distance would increase, which would keep work constant.
4. The tension is perpendicular to the bob's motion, so it does not do work on the bob. The component of the bob's weight that is perpendicular to the bob's motion does not do work on the bob, but the component that is in the direction of its motion does.
5. The car leaving longer skid marks was moving faster.
6. yes; no; yes, the ball's weight and air resistance
7. 53 J, −53 J
8. 2.4×10^5 J
9. 47.5 J
10. **a.** 6230 J
    b. −6230 J
    c. 0.640
11. **a.** no
    b. yes
    c. yes

Review

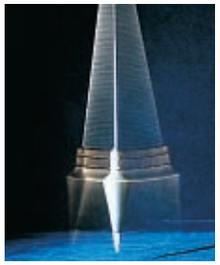
WORK

Review Questions

1. Can the speed of an object change if the net work done on it is zero?
2. Discuss whether any work is being done by each of the following agents and, if so, whether the work is positive or negative.
   a. a chicken scratching the ground
   b. a person reading a sign
   c. a crane lifting a bucket of concrete
   d. the force of gravity on the bucket in **(c)**
3. Furniture movers wish to load a truck using a ramp from the ground to the rear of the truck. One of the movers claims that less work would be required if the ramp's length were increased, reducing its angle with the horizontal. Is this claim valid? Explain.

Conceptual Questions

4. A pendulum swings back and forth, as shown at right. Does the tension force in the string do work on the pendulum bob? Does the force of gravity do work on the bob? Explain your answers.



5. The drivers of two identical cars heading toward each other apply the brakes at the same instant. The skid marks of one of the cars are twice as long as the skid marks of the other vehicle. Assuming that the brakes of both cars apply the same force, what conclusions can you draw about the motion of the cars?
6. When a punter kicks a football, is he doing work on the ball while his toe is in contact with it? Is he doing work on the ball after the ball loses contact with his toe? Are any forces doing work on the ball while the ball is in flight?

Practice Problems

For problems 7–10, see Sample Problem A.

7. A person lifts a 4.5 kg cement block a vertical distance of 1.2 m and then carries the block horizontally a distance of 7.3 m. Determine the work done by the person and by the force of gravity in this process.
8. A plane designed for vertical takeoff has a mass of 8.0×10^3 kg. Find the net work done by all forces on the plane as it accelerates upward at 1.0 m/s^2 through a distance of 30.0 m after starting from rest.
9. When catching a baseball, a catcher's glove moves by 10 cm along the line of motion of the ball. If the baseball exerts a force of 475 N on the glove, how much work is done by the ball?
10. A flight attendant pulls her 70.0 N flight bag a distance of 253 m along a level airport floor at a constant velocity. The force she exerts is 40.0 N at an angle of 52.0° above the horizontal. Find the following:
    a. the work she does on the flight bag
    b. the work done by the force of friction on the flight bag
    c. the coefficient of kinetic friction between the flight bag and the floor

ENERGY

Review Questions

11. A person drops a ball from the top of a building while another person on the ground observes the ball's motion. Each observer chooses his or her own location as the level for zero potential energy. Will they calculate the same values for:
    a. the potential energy associated with the ball?
    b. the change in potential energy associated with the ball?
    c. the ball's kinetic energy?