

## CHAPTER 8

1. A crane exerts a constant force to lift a 20 kg mass a distance of 30 m. The mass starts from rest and has a velocity of 16 m/s when it is 30 m above the ground.
  - a. How much work does the motor in the crane do?
  - b. What is the power exerted by the motor?
  
2. A person drags a 12 kg mass by a rope at an angle of 42 degrees above horizontal for a distance of 10 m. The surface has a coefficient of friction of 0.25, and the person exerts a force of 50 N.
  - a. How much work does the person do?
  - b. How much work does the force of friction do?
  - c. What is the final kinetic energy of the mass?
  - d. What is the final speed of the mass?
  
3. A mass is sliding down a 35 degree inclined plane whose kinetic coefficient of friction is 0.24. Find the acceleration of the mass.
  
4. A skier is moving at 33 ft/s skis down a slope. Use conservation of energy to calculate the velocity when the person reaches the bottom 80 feet lower in elevation. You can neglect friction.
  
5. A spring with a force constant of 400 N/m is compressed 25 cm by a 2 kg mass on a horizontal frictionless surface in front of a 34 degree 3 m high inclined plane. It then slides on a level surface with a coefficient of friction of 0.35.

Use conservation of energy to answer the following:

  - a. What is the velocity of the mass when it arrives at the bottom of the inclined plane?
  - b. How far does the mass slide before stopping?
  
6. A skier is moving at 22 ft/s skis down a slope. Use conservation of energy to calculate the velocity when the person reaches the bottom 70 feet lower in elevation. You can neglect friction. You must use conservation of energy to receive credit.
  
7. A 3 kg block of ice starts at a speed of 4 m/s and slides down a 5 m high 27 degree inclined plane. At the bottom of the plane it travels on a level frictionless surface and compresses a spring a distance of 0.24 m.
  - a. What is the velocity of the ice at the bottom of the ramp?
  - b. What is the value of the spring constant?

8. A skier is moving at 22 ft/s skis down a slope. Use conservation of energy to calculate the velocity when the person reaches the bottom 70 feet lower in elevation. You can neglect friction. You must use conservation of energy to receive credit.
  
9. Body A in diagram #6 has a mass of 5 kg and B has a mass of 6 kg. The coefficient of friction acting on B is 0.3 Calculate the velocity of the masses after mass A has fallen a distance of 1.28 m.