CHAPTER 6

1. A car is traveling at a speed of 50.0 m/s on a circular track of radius 320m.
a. What is its centripetal acceleration in m/s2?
b. What is the centripetal force on the car if its mass is 800kg?
c. What is the minimum static coefficient of friction which will prevent the car from skidding if the track is level?

2. Body A in diagram # 2 has a mass of 10 kg and B has a mass of 13 kg. The coefficient of friction acting on B is 0.213. What is the velocity of the masses after A has fallen a distance of 2.87 m?

3. A mass is sliding up a frictionless inclined plane whose angle of inclination is 59 degrees. Find the acceleration of the mass.

4. A mass is sliding down an inclined plane whose angle of inclination is 43 degrees and kinetic coefficient of friction is 0.324.
a. Find the acceleration of the mass.
b. If it starts with a velocity of 14.3 m/s how fast will it be going after 3 seconds?

5. Block A in diagram #3 has a mass of 12 kg, and block B has a mass of 8 kg, and is traveling downwards. The kinetic coefficient of friction is 0.33 and A is traveling to the right.
a. Find the acceleration of the two masses.
b. Find the tension in the string.

6. A person drags a 7 kg mass by a rope at an angle of 29 degrees above horizontal. The frictional force of the surface is 10 N, and the person exerts a force of 30 N.
a. What is the acceleration of the mass?
b. If the mass starts with a velocity of 7 m/s how far does it travel in 4 seconds?

7. Block A is moving to the right in diagram #2 has a mass of 5 kg, and block B has a mass of 3 kg. The coefficient of friction of A on the surface is 0.4.
a. Find the acceleration of the two masses.
b. Find the tension in the string.

8. You are designing a freeway exit for cars going at 60 mph (88 ft/s). The exit road is level, circular in shape and the coefficient of friction is 0.4. What minimum radius of curvature is required for the exit?