Chapter 11 Homework **Physics**

1. A compact car has a mass of 750.0 kg.
   (a) What is the kinetic energy of the car if it is moving at 50.00 km/hr?
   (b) How much work is done on the car to accelerate it from 50.00 km/hr to 100.0 km/hr?
   (c) How much work is done on the car to bring it from 100.0 km/hr to rest?
   (d) What average force is exerted on the car if it has a stopping distance of 500.0 meters?

2. A rifle can shoot a 4.20 gram bullet at a speed of 965 m/s.
   (a) What is the kinetic energy of the bullet when it leaves the rifle?
   (b) How much work is done on the bullet if it starts from rest?
   (c) If the bullet is fired into an anchored wooden block and stops before exiting the block, how far into the block does it stop if the block exerts an average force of -135000 N?

3. A 90.0 kg rock climber ascends 45.0 meters up to the top of a quarry, then descends 85.0 meters from the top of the quarry to the ground.
   (a) Find the potential energy of the climber at the top relative to his starting position.
   (b) Find the potential energy of the climber at the bottom relative to his starting position.

4. A carpenter carries a 1.00 kg hammer up a ladder to a height of 5.00 meters. He then accidentally drops the hammer, and it falls to the ground.
   (a) Find the potential energy of the hammer at a height of 5.00 meters.
   (b) Find the potential energy of the falling hammer when it reaches a height of 2.00 meters.
   (c) Find the kinetic energy of the falling hammer when it reaches a height of 2.00 meters.
   (d) Find the velocity of the falling hammer when it reaches a height of 2.00 meters.
   (e) Find the kinetic energy of the falling hammer just before it hits the ground.
   (f) Find the velocity of the falling hammer just before it hits the ground.

5. A bicyclist approaches a hill with a speed of 8.50 m/s. The total mass of the bicycle and the rider is 85.0 kg.
   (a) What is the total kinetic energy of the bicycle and the rider as she approaches the hill?
   (b) Ignoring friction, if the bicycle coasts up the hill, at what height does it come to a stop?

6. Tarzan, with a mass of 75.0 kg, swings down from a tree limb on the end of a vine. His feet touch the ground 4.00 meters below the tree limb.
   (a) Find Tarzan's potential energy relative to the ground when he stands on the tree limb.
   (b) Find Tarzan's speed when his feet touch the ground.