General Physics I (PHYS 2010)
Spring 2014
Prof Richard Ignace

HOMEWORK #4

Notes:

- This homework is due by the beginning of class on Mar 6. It covers material from chapter 5.
- You will need a calculator and lots of scrap paper.
- Answers are to be recorded on a scantron that you will turn in. You may keep the questions (i.e., these sheets).
- You may (should) use your book. You may even work with other students. However, you should not copy the answers of other students. The homeworks are exam prep, and so you need to be able to work these problems yourself. If you do not apply yourself and do your own work, you are not likely to perform well on the exams.

1. The unit of work, joule, is dimensionally the same as:

   a. newton/second.
   b. newton/kilogram.
   c. newton second.
   d. newton meter.

2. A car is moving along a flat road at speed v_0. Brakes are applied, and the vehicle comes to rest. The work, W, done on the care is

   a. $W > 0$ b. $W < 0$ c. $W = 0$

3. Which of the following is that form of energy associated with an object's motion?

   a. potential
   b. thermal
   c. bio chemical
   d. kinetic

4. A horizontal force of $F = 130$ N is applied to a 35-kg cart across a 10-m level surface. If the cart accelerates at 2.3 m/s^2, then what is the amount of work done by the force of friction as it acts to retard the motion of the cart? (Hint: The net work is the difference in the work done by F and that by friction.)

   a. 295 J
   b. 395 J
   c. 495 J
   d. 595 J

5. A 1,100-kg automobile moving at 20 m/s has the brakes applied with a deceleration of 6.0 m/s^2. How far does the car travel before it stops?

   a. 19 m
   b. 27 m
   c. 33 m
   d. 58 m

6. A skier reaches a speed of 42 m/s on a 25° ski slope. Ignoring friction, what was the distance along the slope the skier would have had to travel, starting from rest?

   a. 90 m
   b. 134 m
   c. 212 m
   d. 389 m

7. An amount of work equal to 2.0 J is required to compress the spring in a spring gun. What is the launch speed of a 15 g marble?

   a. 16 m/s
   b. 5 m/s
   c. 8 m/s
   d. 27 m/s

8. The SI units for k, the spring constant, are equivalent to:

   a. J.
   b. kg / s^2.
   c. J / N.
   d. None of the above.

9. A pile driver drives a post into the ground. The mass of the pile driver is 4,000 kg and it is dropped through a height of 8.0 m on each stroke. If the resisting force of the ground is 3.0×10^6 N, how far is the post driven in on each stroke?

   a. 4 cm
   b. 6 cm
   c. 10 cm

d. 29 cm