

## PHYS 101

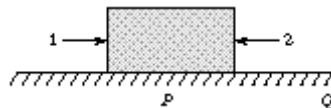
### Homework # 6

**DUE DATE: October 27, 2009**

Please do not submit copycat answers from the solutions book or some other solution you have in hand. You should at least show your understanding of the problem. Otherwise, this will be considered as cheating.

1) Is it possible to have a non-zero net force on an object that does no work on the object? Give an example of this for (a) an object going in a straight line and (b) an object along a curved trajectory. Explain.

2) Two people push in opposite directions on a block that sits atop a friction-less surface (The soles of their shoes are glued to the frictionless surface). If the block, originally at rest at point P, moves to the right without rotating and ends up at rest at point Q, describe qualitatively how much work is done on the block by person 1 relative to that done by person 2?



3) A train composed of flat cars, travels with a constant speed  $V$  along a straight track. A crate of mass  $m$ , is attached to a rope and is slowly lowered from a bridge when the train passes under it. At the instant that the crate touches the train, the rope is released. The crate then slides some distance along the train and after some time  $T$ , comes to rest relative to it. In answering the following questions, describe all quantities relative to the reference frame of the bridge,

- Is the work done on the crate, by the force due to the train, positive, negative or zero?
- Is the work done on the train, by the force due to the crate, positive, negative or zero?
- Is the magnitude of the work done on the crate, by the force due to the train, larger than, smaller than, or equal to the magnitude of the work done on the train by the force due to the crate? Explain your answer.
- What is the distance, which the crate slides, relative to the train before coming to rest relative to it?
- During the time  $T$ , what is the work done on crate by the train?
- During the time  $T$ , what is the work done on the train by the crate?
- What is the coefficient of kinetic friction between the crate and the train?

4) Problem 6-69 in the text. Chapter 6.

5) Problem 6-90 in the text. Chapter 6.

6) Problem 6-100 in the text. Chapter 6.

7) Discussion Questions 6.12, 6.16, 6.20, Chapter 6. Page 204