

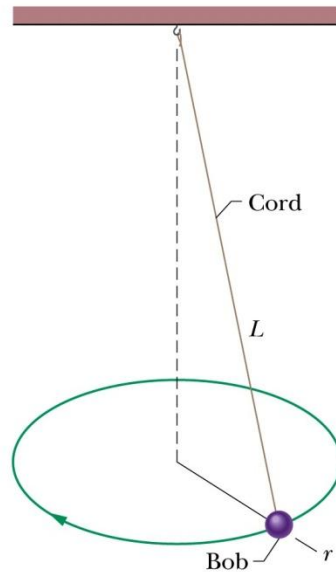
**DO NOT TURN THIS PAGE!!!!**

Name: \_\_\_\_\_

Physics 50  
Spring 2013  
Exam 3

**MAKE SURE TO SHOW ALL WORK IN COMPLETE DETAIL. NO CREDIT WILL  
BE GIVEN IF NO WORK IS SHOWN. EXPRESS ALL ANSWERS IN SI UNITS.**

1. In the figure below the bob moves in a horizontal circle at a constant speed. The mass of the bob is  $0.040\text{ kg}$ , the string has a length  $L = 0.90\text{ m}$ . The string makes an angle of  $40^\circ$  with the vertical. (10 pts)
- Calculate the tension in the string.
  - Calculate the period of rotation.



Copyright © 2011 John Wiley & Sons, Inc. All rights reserved.

halliday\_9e\_fig\_06\_53

2. A force of 12.5 N pulls horizontally on a 1.2 kg block that slides on a rough, horizontal surface. The block is connected by a horizontal string to a second block of mass 1.80 kg on the same surface. The coefficient of kinetic friction is  $\mu_k = 0.37$  for both blocks.
- a) Calculate the acceleration of both blocks.
  - b) Calculate the tension in the string.

3. A 10 kg block is pulled upward from rest by a cable with an acceleration of  $3.0 \text{ m/s}^2$ . The block is displaced 20 m vertically upward. (10 pts)
- a) Calculate the work done by the tension force.
  - b) Calculate the speed of the block when it's displaced 10 m. (Solve this part of problem using the Work-KE Theorem)

4. A block of mass  $m = 3 \text{ kg}$  is dropped from a height  $h = 30 \text{ cm}$  onto a spring of spring constant  $k = 2210 \text{ N/m}$ . (see diagram below). Calculate the maximum distance the spring is compressed using the Work-KE Theorem. (10 pts)

