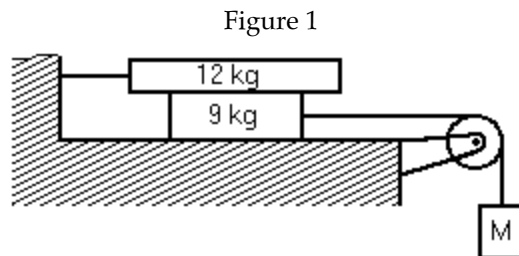


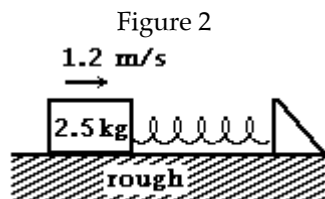
**Physics 1A– 9 AM class**  
**Quiz # 3      Nov. 16, 2007**  
**Prof. Jose Onuchic**

**MULTIPLE CHOICE.** Choose the one alternative that best completes the statement or answers the question.



A system comprising blocks, a light frictionless pulley, and connecting ropes is shown. The 9 kg block is on a smooth horizontal table ( $\mu = 0$ ). The surfaces of the 12 kg block are rough, with  $\mu = 0.30$ .

- 1) In Figure 1, mass M is set at 5.0 kg. It accelerates downward when it is released. The acceleration of mass M is closest to:
- A)  $1.6 \text{ m/s}^2$       B)  $1.0 \text{ m/s}^2$       C)  $1.8 \text{ m/s}^2$       D)  $1.2 \text{ m/s}^2$       E)  $1.4 \text{ m/s}^2$



A 2.5 kg, sliding on a rough surface, has a speed of 1.2 m/s when it makes contact with a spring. The block comes to a momentary halt when the compression of the spring is 5.0 cm. The work done by the friction, from the instant the block makes contact with the spring until it comes to a momentary halt, is  $-0.50 \text{ J}$ .

- 2) In Figure 2, after compressing the spring, the block moves away from it. The speed of the block, upon separation from the spring, is closest to:
- A) 0.80 m/s      B) 0.85 m/s      C) 0.90 m/s      D) 0.75 m/s      E) 0.95 m/s
- 3) A worker pushes a sled with a force of 40 N over a level distance of 6.0 m. If a frictional force of 24 N acts on the wheelbarrow in a direction opposite to that of the worker, what net work is done on the wheelbarrow?
- A) 240 J      B) 216 J      C) 144 J      D) 96 J      E) 64 J
- 4) Preston pushes a wheelbarrow weighing 500 N to the top of a 50.0-m ramp, inclined at  $20^\circ$  with the horizontal, and leaves it. Tamara accidentally bumps the wheelbarrow. It slides back down the ramp, during which an 80.0-N frictional force acts on it over the 50.0 m. What is the wheelbarrow's kinetic energy at the bottom of the ramp? ( $g = 9.8 \text{ m/s}^2$ )
- A) 2275 J      B) 4550 J      C) 6550 J      D) 8150 J      E) 13100 J

- 5) A 10.0-kg box starts at rest and slides 3.5 m down a ramp inclined at an angle of  $10^\circ$  with the horizontal. If there is no friction between the ramp surface and crate, what is the velocity of the crate at the bottom of the ramp? ( $g = 9.8 \text{ m/s}^2$ )
- A) 6.1 m/s                      B) 10.7 m/s                      C) 3.5 m/s                      D) 14.2 m/s                      E) 8.3 m/s
- 6) A simple pendulum, 1.00 m in length, is released from rest when the support string is at an angle of  $35.0^\circ$  from the vertical. What is the speed of the suspended mass at the bottom of the swing? ( $g = 9.80 \text{ m/s}^2$  and ignore air resistance)
- A) 0.67 m/s                      B) 0.94 m/s                      C) 1.33 m/s                      D) 1.88 m/s                      E) 2.14 m/s
- 7) A parachutist of mass 50.0 kg jumps out of an airplane at a height of 1 000 m. The parachute deploys, and she lands on the ground with a speed of 5.0 m/s. How much energy was lost to air friction during this jump?
- A) 49 400 J                      B) 98 700 J                      C) 198 000 J                      D) 322 000 J                      E) 489 000 J
- 8) The coefficient of static friction between the tires of a car and the street is 0.77. Of the following, what is the steepest inclination angle of a street on which a car can be parked (with wheels locked) without slipping?
- A)  $22.5^\circ$                       B)  $30^\circ$                       C)  $37^\circ$                       D)  $42^\circ$                       E)  $45^\circ$

Answer Key

Testname: QUIZ3AB.TST

**MULTIPLE CHOICE.** Choose the one alternative that best completes the statement or answers the question.

- 1) B
- 2) A
- 3) D
- 4) B
- 5) C
- 6) D
- 7) E
- 8) C