Answer Key
Testname: EXAM2-

1) D
2) B
3) D
4) B
5) A
6) D
7) A
8) C
9) D
10) D
11) A
12) A
13) C
14) C
15) A

PH201

Part 1: Multiple Choice Date:

Time:

Name: PSU–ID:

Figure 7–1

1) An object of mass = 2 kg is pulled by a constant force F = 4 N for a horizontal distance of 2 m. (7–1.) What is the work done along the + x axis? Neglect friction.

A) 8 kg m/s^2

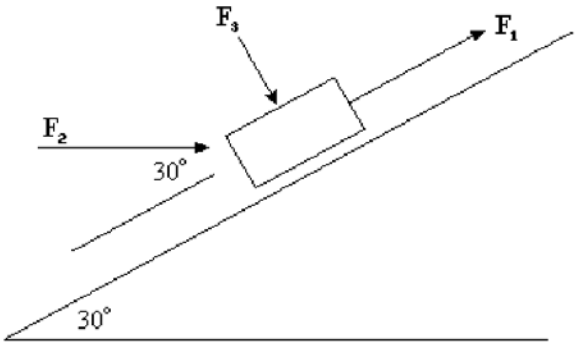
B) 7 kg m/s^2

C) 8 kg m^2/s^2

D) 7 kg m^2/s^2

Three applied forces, F_1 = 20.0 N, F_2 = 40.0 N, and F_3 = 10.0 N act on an object with a mass of 2.00 kg which can move along an inclined plane as shown in the figure. The questions refer to the instant when the object has moved 0.600 m along the surface of the inclined plane in the upward direction. Neglect friction and use g = 10.0 m/s^2.

Figure 7–5



2) Refer to Figure 7–5. What is the amount of work done by the force F_3 as the object moves up the inclined plane?

A) 20.8 J

B) 0 J

C) 24.0 J

D) 12.0 J

3) The total mechanical energy of a system

A) is split equally between kinetic and gravitational potential energy.

B) is not uniquely determined for most naturally occurring systems.

C) is either only kinetic or only gravitational potential at any given time.

D) is constant as long as only conservative forces act on it.

4) A truck has four times the mass of a car and is moving with twice the speed of the car. If K_t and K_c refer to the kinetic energies of truck and car respectively, it is correct to say that

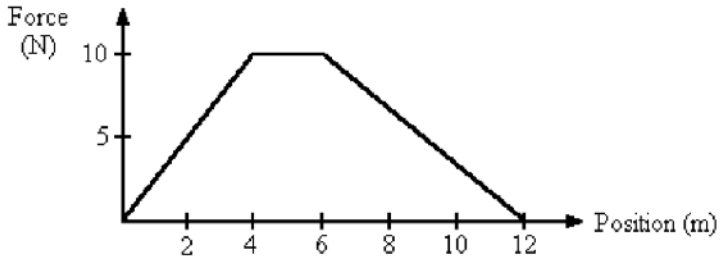
A) $K_t = K_c$.

B) $K_t = 16K_c$.

C) $K_t = 4K_c$.

D) $K_t = \frac{1}{2}K_c$.

Figure 7–4



5) An object is under the influence of a force as represented by the force vs. position graph in Figure 7–4. What is the work done as the object moves from 6 m to 12m?

A) 30 J

B) 40 J

C) 0 J

D) 20 J

6) A block of mass *m* is pushed against a spring of spring constant *k*. The spring is compressed by a distance *d*, the block is then released. It is launched by the spring along a horizontal frictionless surface with a final speed *v*. A second block, this one having mass 4*m* is pushed against the same spring by distance 6*d* and released. What is the final speed of the block in this case?

A) 2*v*

B) *v*

C) 4*v*

D) 3*v*

7) The ratio of power outputs of Jack and Jill is 2:1 to complete a certain amount of work. If Jill takes 4 minutes to complete this work, how long will Jack take to finish the same work?

A) 2 minutes

B) 6 minutes

C) 4 minutes

D) 8 minutes

8) A block of mass m slides without friction on a table with speed v. It hits and compresses a spring of force constant k by a distance l. The spring then expands again ejecting the block in the opposite direction as it was originally traveling. Neglecting the mass of the spring, what is the speed of the object after it is ejected by the spring?

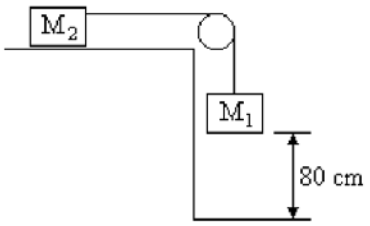
A) $v/2$

B) $v - l\sqrt{k/m}$

C) v

D) $2v$

Figure 8–4



Two masses M_1 = 2.0 kg and M_2 = 4.0 kg are attached by a string as shown in the figure. M_1 falls vertically down and M_2 moves on a frictionless surface. Initially the system is at rest. Use g = 10 m/s^2.

9) Refer to Figure 8–4. What is the speed of mass M_1 just before it touches the ground?

A) 2.9 m/s

B) 5.8 m/s

C) 4.6 m/s

D) 2.3 m/s

10) A person drops a brick from the top of a building. The height of the building is 400 m and the mass of the brick is 2.00 kg. What will be the speed of the brick right before it touches the ground? Use g = 10.0 m/s^2.

A) 10.0 m/s

B) 89.4 m/s^2

C) 10.0 m/s^2

D) 89.4 m/s

11) A firecracker breaks up into two pieces, one has a mass of 200 g and flies off along the *x*–axis with a speed of 82.0 m/s and the second has a mass of 300 g and flies off along the *y*–axis with a speed of 45.0 m/s. What is the total momentum of the two pieces?

A) 21.2 kg•m/s at 39.5° from the *x*–axis

B) 361 kg•m/s at 0.983° from the *x*–axis

C) 93.5 kg•m/s at 28.8° from the *x*–axis

D) 361 kg•m/s at 56.3° from the *x*–axis

12) A batter hits a 0.140–kg baseball that was approaching him at 40.0 m/s and, as a result, the ball leaves the bat at 30.0 m/s in the direction of the pitcher. What is the magnitude of the impulse delivered to the baseball?

A) 9.80 Ns

B) 5.60 Ns

C) 7.00 Ns

D) 1.40 Ns

13) Jacques and George meet in the middle of a lake while paddling in their canoes. They come to a complete stop and talk for a while. When they are ready to leave, Jacques pushes George's canoe with a force $\vec{\mathbf{F}}$ to separate the two canoes. It is correct to say about the final momentum and kinetic energy of the system.

A) The final momentum is zero kg•m/s and the final kinetic energy is zero J.

B) The final momentum is in the direction of $\vec{\mathbf{F}}$ but the final kinetic energy is zero J.

C) The final momentum is zero kg•m/s but the final kinetic energy is positive.

D) The final momentum is in the direction of $\vec{\mathbf{F}}$ and the final kinetic energy is positive.

14) A curling stone slides on ice with a speed of 1.70 m/s and collides elastically with an identical, stationary curling stone. After the collision, the first stone has a velocity of 0.800 m/s in a direction that makes a counterclockwise angle of 61.9° with its original direction of travel. At what speed and what direction is the second stone traveling after the collision?

A) 1.40 m/s at a clockwise angle of 19.1°

B) 1.40 m/s at a clockwise angle of 32.3°

C) 1.50 m/s at a clockwise angle of 28.1°

D) 1.60 m/s at a clockwise angle of 34.2°

15) A ping-pong ball originally at rest is hit head-on by a bowling ball moving with initial speed v_0. It is given that the mass of the ping-pong ball is as good as negligible in comparison with the mass of the bowling ball. What is the speed of the ping-pong ball after this elastic collision?

A) $2v_0$

B) $4v_0$

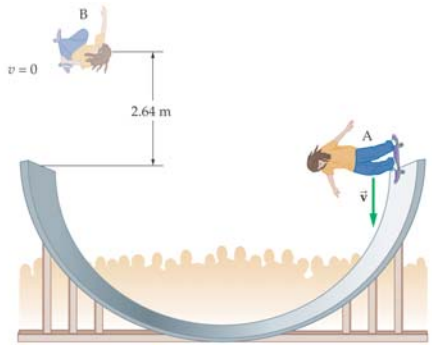
C) $\frac{v_0}{2}$

D) v_0

Makeup for Exam #2 - PH201 Fall

Part 2: Partial Credit

1. A hockey puck slows from 45 m/s to 44 m/s as it slides 25 m across the ice. **(a)** What is the coefficient of kinetic friction between the ice and the puck? **(b)** If the puck slides another 25 m, is its speed reduced to 43 m/s, more than 43 m/s, or less than 43m/s? Explain!! (10 Points)



2. A skateboarder starts at point A in the figure and rises to a height of 2.64 m above the top of the ramp at point B. What was the skateboarder's initial speed at point A? (5 Points)

3. An apple that weighs 3.0 N falls vertically downward from rest for 1.5 s. **(a)** What is the change in the apple's momentum per second? **(b)** What is the total change in its momentum during the 1.5-second fall? (10 Points)