

Practice Exam II

1. What is the maximum speed a car can go through a 52.0 m curve if the static friction coefficient is 0.200 and the curve is not banked?

- A) 10.1 m/s
- B) 14.7 m/s
- C) 22.4 m/s
- D) 17.2 m/s
- E) 18.8 m/s

2. Block A in Fig. 1 has a mass of 3.00 kg and rests on a smooth table and is connected to block B, which has a mass of 2.00 kg, after passing over an ideal pulley, as shown. Block B is released from rest. How long does it take block B to travel 80.0 cm?

- A) 0.404 s
- B) 0.494 s
- C) 0.639 s
- D) 0.785 s
- E) 0.935 s

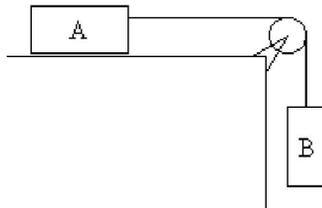


Fig. 1

3. A mass of 40.0 grams is attached to a vertical spring with a spring constant $k = 20.0$ N/m and lowered slowly until the spring stops stretching. How much does the spring stretch?

- A) 0.00200 m
- B) 0.0196 m
- C) 0.0816 m
- D) 0.800 m
- E) 0.200 m

4. A 50.0-kg block is being pulled up a 15.0° slope by a force of 300 N which is directed 30.0° above the slope. The coefficient of kinetic friction between the block and the slope is 0.200. What is the acceleration of the block?

- A) 1.36 m/s^2
- B) 0.158 m/s^2
- C) 0.924 m/s^2
- D) 0.520 m/s^2
- E) 1.47 m/s^2

5. A student slides her 80.0-kg desk across the level floor of her dormitory room a distance 4.00 m at constant speed. If the coefficient of kinetic friction between the desk and the floor is 0.400, how much work did she do?

- A) 128 J
- B) 3.14 kJ
- C) 26.7 J
- D) 1.26 kJ
- E) 24.0 J

6. An object of mass 4.0 kg starts at rest from the top of a rough inclined plane of height 10 m. The angle of incline is 30° . If the speed of the object at the bottom of the inclined plane is 10 m/s, how much work does friction do on this object as it slides down the incline?

- A) -192 J
- B) -382 J
- C) -122 J
- D) -322 J
- E) -200 J

7. A lead pendulum bob of mass 1kg is released from a height of 0.25 m above a table. At its lowest point it strikes a 0.5 kg copper block which moves off with all the momentum. What is the velocity of the copper block?

- A) 1.11 m/s
- B) 3.13 m/s
- C) 2.21 m/s
- D) 4.42 m/s
- E) 6.64 m/s

8. A 2.0-g bead slides along a wire, as shown in Figure 2. At point A, the bead is at rest. Neglect friction and use $g = 10 \text{ m/s}^2$. What is the kinetic energy of the bead at point B?

- A) 0 J
- B) 2.0×10^{-2} J
- C) 16×10^{-3} J
- D) 0.40 J
- E) There is not enough information to solve this problem.

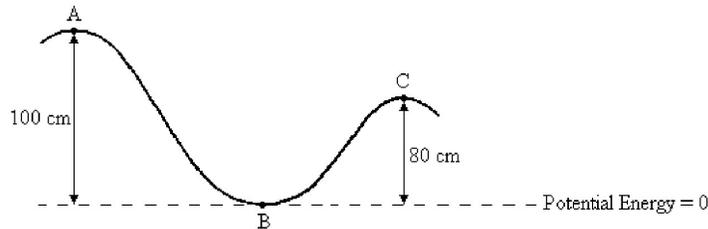


Fig. 2

9. An object moving along a horizontal surface approaches the bottom of a ramp. At the very bottom of the ramp, point A, its speed is 40 m/s. The object goes up the ramp and reverses direction at point B. What is the height of point B above point A? The angle of inclination is 30° . Neglect friction and use $g = 10 \text{ m/s}^2$.

- A) 50 m
- B) 60 m
- C) 70 m
- D) 80 m
- E) 90 m

10. An object with a mass of 10.0 kg is at rest at the top of a frictionless inclined plane of height 8.00 m and an angle of inclination 30.0° with the horizontal. The object is released from this position and it stops at a distance d from the bottom of the inclined plane along a horizontal surface, as shown in Figure 3. The coefficient of kinetic friction for the horizontal surface is 0.400 and $g = 10.0 \text{ m/s}^2$. At what horizontal distance from the bottom of the inclined plane will this object stop?

- A) 5.00 m
- B) 10.0 m
- C) 15.0 m
- D) 20.0 m
- E) 25.0 m

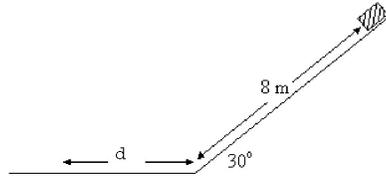


Fig. 3

11. 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) 1.40 Ns
- C) 5.60 Ns
- D) 4.90 Ns
- E) 7.00 Ns

12. In an ELASTIC collision between two perfectly rigid objects:

- A) the kinetic energy of each object is conserved.
- B) the momentum of the system is conserved but the kinetic energy of the system is not conserved.
- C) both the momentum and the kinetic energy of the system are conserved.
- D) the kinetic energy of the system is conserved, but the momentum of the system is not conserved.

13. An object with a mass of 10 kg is moving along a horizontal surface. At a certain point it has 40 J of kinetic energy. If the coefficient of friction between the object and the surface is 0.40, how far will the object go beyond that point before coming to a stop?

Use $g = 10 \text{ m/s}^2$.

- A) 17 cm
- B) 42 cm
- C) 60 cm
- D) 5.7 cm
- E) 100 cm

14. A 2.0-kg cart, moving with a velocity of 6.0 m/s, hits a stationary cart of mass 2.0 kg. The collision is completely inelastic (the two carts stick together after the collision). Calculate the velocity of the system after the collision.

- A) 3.0 m/s
- B) 2.5 m/s
- C) 2.0 m/s
- D) 4.2 m/s