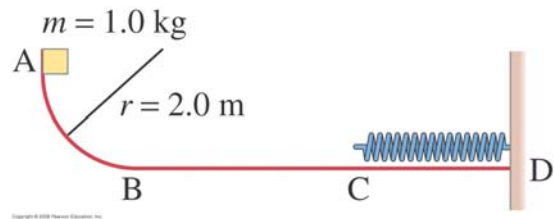


Lecture examples (Ch 8)

1. (8-36). Consider the track shown in Fig. 8-37. The section AB is one quadrant of a circle of radius 2.0 m and is frictionless. B to C is a horizontal span 3.0 m long with a coefficient of kinetic friction $\mu_k = 0.25$. The section CD under the spring is frictionless. A block of mass 1.0 kg is released from rest at A. After sliding on the track, it compresses the spring by 0.20 m. Determine: (a) the velocity of the block at point B; (b) the thermal energy produced as the block slides from B to C; (c) the velocity of the block at point C; (d) the stiffness constant k for the spring.



2. Two identical balls are thrown from the top of a building with the same speed. Ball 1 is thrown horizontally, while ball 2 is thrown at an angle θ above the horizontal. Neglecting air resistance, which ball will have the greatest speed when hitting the ground below?

- A) Ball 1
- B) Ball 2
- C) Both balls reach the ground with the same speed.
- D) Cannot be determined without knowing the height of the building.
- E) Cannot be determined without knowing the time each ball is in the air.

3. Two inclined planes A and B have the same height but different angles of inclination with the horizontal. Inclined plane A has a steeper angle of inclination than inclined plane B. An object is released at rest from the top of each of the inclined planes. How does the speed of the object at the bottom of inclined plane A compare with that of the speed at the bottom of inclined plane B? Ignore friction.

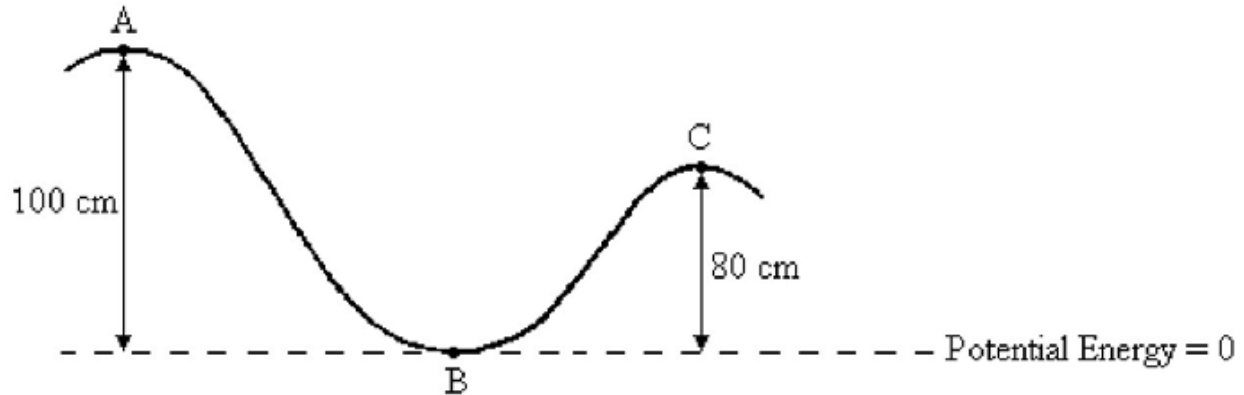
- A) The speed of the object at the base of inclined plane A would be greater than the speed of the object at the base on inclined plane B.
- B) The speed of the object at the base of inclined plane B would be greater than the speed of the object at the base on inclined plane A.
- C) The speed of the object is the same for both inclined planes.
- D) There is not enough information to answer the question.

4. A lightweight object and a very heavy object are sliding with equal speeds along a level frictionless surface. They both slide up the same frictionless hill. Which rises to a greater height?

- A) The heavy object, because it has greater kinetic energy.
- B) The light object, because it has smaller kinetic energy.
- C) The lightweight object, because it weighs less.
- D) The heavy object, because it weighs more.
- E) They both slide to the same height.

5. A 2.0 g bead slides along a wire, as shown in the figure below. At point A, the bead is at rest. Neglect friction.

- (a) What is the potential energy of the bead at point A?
- (b) What is the kinetic energy of the bead at point B?
- (c) What is the speed of the bead at point B?
- (d) What is the speed of the bead at point C?



6. A simple pendulum of length 2.00 m is made with a mass of 2.00 kg. The mass has a speed of 3.00 m/s when the pendulum is 30.0° above its lowest position.

- (a) What is the maximum angle away from the lowest position the pendulum will reach?
- (b) What is the speed of the mass when the pendulum is 45° above its lowest position?

7. How do the escape velocities for two rockets, the first weighing 20 N and the second weighing 20,000 N compare?

- A) The escape velocity for the lighter rocket is smaller than that for the heavier rocket.
- B) The escape velocity for the lighter rocket is the same as that for the heavier rocket.
- C) The escape velocity for the lighter rocket is greater than that for the heavier rocket.
- D) It is impossible to compare the two escape velocities.