Practice Exam – Final

1. A car is traveling with a constant speed when the driver suddenly applies the brakes, giving the car a deceleration of 3.50 m/s^2. The car comes to a stop in a distance of 34.0 m. What was the car's speed when it had traveled 17.0 m from the point where the brakes were applied?
A) 10.9 m/s
B) 14.5 m/s
C) 10.7 m/s
D) 21.0 m/s
E) 15.3 m/s
Answer: A

2. An object is thrown upwards with a speed of 13 m/s. How long does it take to reach a height of 4.0 m above the projection point while descending?
A) 0.42 s
B) 1.2 s
C) 2.3 s
D) 3.1 s
E) 4.2 s
Answer: C

3. Vector $\vec{A}$ = 6.0 m and points 30° south of east. Vector $\vec{B}$ = 4.0 m and points 30° east of south. The resultant vector $\vec{A} + \vec{B}$ is given by
A) 9.7 m at an angle 42° south of east.
B) 1.1 m at an angle 42° south of east.
C) 13.7 m at an angle 42° south of east.
D) 0.7 m at an angle 42° south of east.
E) 4.7 m at an angle 42° south of east.
Answer: A

4. A ball is thrown horizontally with an initial velocity of 20.0 m/s from the edge of a building of a certain height. The ball lands at a horizontal distance of 82.0 m from the base of the building. What is the height of the building?
A) 40.5 m
B) 60.2 m
C) 87.9 m
D) 82.4 m
E) 50.4 m
Answer: D

5. A 4.00-kg block slides down a frictionless inclined plane with an acceleration 3.00

m/s^2. What is the angle of the incline above horizontal?
A) 35.3°
B) 45.2°
C) 17.8°
D) 23.6°
E) 53.7°
Answer: C

6. A 3.00-kg mass rests on the ground. It is attached to a string which goes vertically to and over an ideal pulley. A second mass is attached to the other end of the string and released. The 3.00-kg mass rises 50.0 cm in 1.00 s. How large was the other mass?
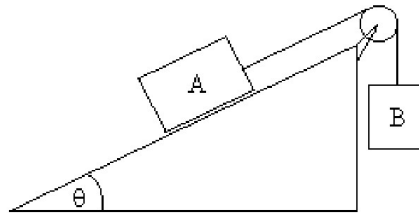A) 3.67 kg
B) 4.29 kg
C) 6.83 kg
D) 7.15 kg
E) 7.34 kg
Answer: A

7.

Two masses are connected by a string which goes over an ideal pulley as shown in **Figure 6-12**. Block A has a mass of 3.0 kg and can slide along a smooth plane inclined 30° to the horizontal. What is the mass of block B if the system is in equilibrium?
A) 1.5 kg
B) 3.0 kg
C) 2.6 kg
D) 3.5 kg
E) 6.0 kg
Answer: A

8. A constant force of 20 N is applied to an object of mass 8.0 kg at an angle of 25° with the horizontal. What is the work done by this force on the object if it causes a displacement of 2.0 m along the horizontal direction?
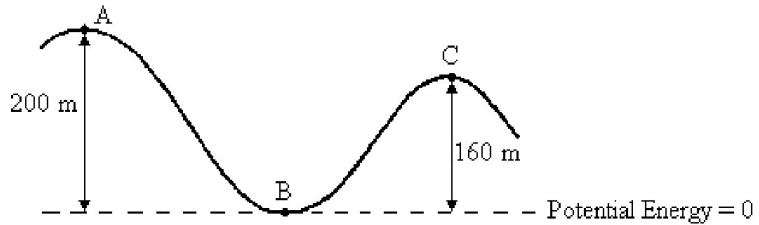A) 40 J
B) 0 J
C) 36 J
D) 17 J
E) 19 J
Answer: C

9.

A roller coaster of mass 80.0 kg is moving with a speed of 20.0 m/s at position A as shown in Figure 8-6. The vertical height at position A above ground level is 200 m. Neglect friction and use $g = 10.0$ m/s^2.

What is the speed of the roller coaster at point B?
A) 66.3 m/s
B) 20.0 m/s
C) 46.9 m/s
D) 17.6 m/s
E) There is not enough information to solve this problem.
Answer: A

10. 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 $g = 10$ m/s^2.
A) 17 cm
B) 42 cm
C) 60 cm
D) 5.7 cm
E) 100 cm
Answer: E

11. A 2.00-g bullet hits and becomes embedded in a 5.00-kg wood block which is hanging from a 1.20-m long string. This causes the block to swing through an arc of 3.50°. What was the speed of the bullet before it hit the block?
A) 16.7 m/s
B) 524 m/s
C) 25.3 m/s
D) 262 m/s
E) 789 m/s
Answer: B

12. A 900-kg car traveling east at 15.0 m/s collides with a 750-kg car traveling north at 20.0 m/s. The cars stick together. What is the speed of the wreckage just after the collision?
A) 6.10 m/s

B) 12.2 m/s
C) 25.0 m/s
D) 35.0 m/s
E) 17.3 m/s
Answer: B

13. Two in-phase loudspeakers that emit sound with the same frequency are placed along a wall and are separated by a distance of 8.00 m. A person is standing 12.0 m away from the wall, equidistant from the loudspeakers. When the person moves 3.00 m parallel to the wall, she experiences destructive interference for the second time. What is the frequency of the sound? The speed of sound in air is 343 m/s.
A) 278 Hz
B) 422 Hz
C) 452 Hz
D) 562 Hz
E) 694 Hz
Answer: A

14. You are driving along a highway at 25.0 m/s when you hear the siren of an emergency vehicle traveling in the opposite direction on the other side of the highway. When the vehicle is approaching you, you hear the frequency of the siren as 2380 Hz, but when it is past you the frequency becomes 1680 Hz. What is the frequency of the siren? The speed of sound in air is 343 m/s.
A) 1850 Hz
B) 2000 Hz
C) 2050 Hz
D) 2010 Hz
E) 1980 Hz
Answer: B