1) If you push twice as hard against a stationary brick wall, the amount of work you do
A) doubles.
B) is cut in half.
C) remains constant but non-zero.
D) remains constant at zero.
Answer: D

2) A 50-N object was lifted 2.0 m vertically and is being held there. How much work is being done in holding the box in this position?
A) more than 100 J
B) 100 J
C) less than 100 J, but more than 0 J
D) 0 J
Answer: D

3) Does the centripetal force acting on an object do work on the object?
A) Yes, since a force acts and the object moves, and work is force times distance.
B) Yes, since it takes energy to turn an object.
C) No, because the object has constant speed.
D) No, because the force and the displacement of the object are perpendicular.
Answer: D

4) You throw a ball straight up. Compare the sign of the work done by gravity while the ball goes up with the sign of the work done by gravity while it goes down.
A) Work is + on the way up and + on the way down.
B) Work is + on the way up and - on the way down.
C) Work is - on the way up and + on the way down.
D) Work is - on the way up and - on the way down.
Answer: C

5) A 10-kg mass is moving with a speed of 5.0 m/s. How much work is required to stop the mass?
A) 50 J
B) 75 J
C) 100 J
D) 125 J
Answer: D

6) An object is released from rest a height \( h \) above the ground. A second object with four times the mass of the first if released from the same height. The potential energy of the second object compared to the first is
A) one-fourth as much.
B) one-half as much.
C) twice as much.
D) four times as much.
Answer: C

7) You lift a 10-N physics book up in the air a distance of 1.0 m, at a constant velocity of 0.50 m/s. What is the work done by the weight of the book?
A) +10 J
B) -10 J
C) +5.0 J
D) -5.0 J
Answer: B

8) A 4.00-kg box of fruit slides 8.0 m down a ramp, inclined at 30.0 degrees from the horizontal. If the box slides at a constant velocity of 5.00 m/s, what is the work done by the weight of the box?
A) 157 J
B) -157 J + 78.4 J
C) 78.4 J
D) -78.4 J
Answer: A

9) A horizontal force of 200 N is applied to move a 55-kg cart (initially at rest) across a 10 m level surface. What is the final kinetic energy of the cart?
A) 1000 J
B) 2000 J
C) 2700 J
D) 4000 J
Answer: B

10) An object slides down a frictionless inclined plane. At the bottom, it has a speed of 9.80 m/s. What is the vertical height of the plane?
A) 19.6 m
B) 9.80 m
C) 4.90 m
D) 2.45 m
Answer: C

11) A projectile of mass \( m \) leaves the ground with a kinetic energy of 220 J. At the highest point in its trajectory, its kinetic energy is 120 J. To what vertical height, relative to its launch point, did it rise?
A) \( \frac{220}{mg} \) meters
B) \( \frac{120}{mg} \) meters
C) \( \frac{100}{mg} \) meters
D) Impossible to determine without knowing the angle of launch
Answer: C

12) A roller coaster starts with a speed of 5.0 m/s at a point 45 m above the bottom of a dip (See The Fig.) Neglect friction, what will be the speed of the roller coaster at the top of the next slope, which is 30 m above the bottom of the dip?
A) 12 m/s
B) 14 m/s
C) 16 m/s
D) 18 m/s
Answer: D

13) The kinetic friction force between a 60.0-kg object and a horizontal surface is 50.0 N. If the initial speed of the object is 25.0 m/s, what distance will it slide before coming to a stop?
A) 15.0 m
B) 30.0 m
C) 375 m
D) 750 m
Answer: C

14) An 800-N box is pushed up an inclined plane. The plane is 4.0 m long and rises 2.0 m. It requires 3200 J of work to get the box to the top of the plane. What was the magnitude of the average friction force on the box?
A) 0 N
B) non-zero, but less than 400 N
C) 400 N
D) greater than 400 N
Answer: C

15) A 2.0-kg mass is released from rest at the top of a plane inclined at 20 degrees above horizontal. The coefficient of kinetic friction between the mass and the plane is 0.20. What will be the speed of the mass after sliding 4.0 m along the plane?
A) 2.2 m/s
B) 3.0 m/s
C) 3.5 m/s
D) 5.2 m/s
Answer: C