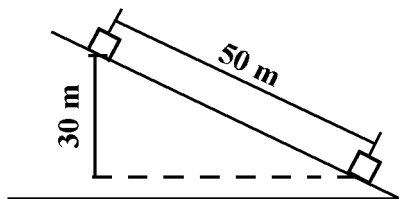1. Base your answer to the following question on the picture below which shows a 3 kg block sliding 50 m down a frictionless inclined plane dropping a distance of 30 m.

What is the kinetic energy of the block at the end of the drop?

1) 90 J

2) 300 J

3) 500 J

4) 900 J

5) 1500 J

2. A 5 kg object slides 100 m down a frictionless inclined plane dropping 45 m. It then slides along a horizontal surface with a coefficient of kinetic friction of 0.75 until it stops. How long does it take to stop after it leaves the inclined plane?

1) 3.0 s

2) 4.0 s

3) 6.0 s

4) 12.0 s

5) 15.0 s

3. Base your answer to the following question on the information below.
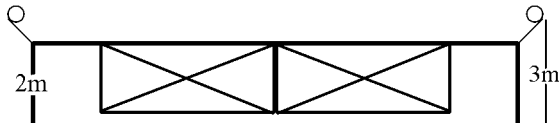
A 4.0 kg block rests at the edge of a platform that is 20 m above level ground. The block is launched horizontally with an initial velocity of 15 m/s.

The object's kinetic energy when it hits the ground is most nearly

1) 450 J

2) 800 J

3) 1050 J

4) 1250 J

5) 2450 J

4. A man standing a certain height above the ground throws a rock straight up with an initial velocity of 10 m/s. A few moments later, the rock hits the ground with a kinetic energy of 450 J. If the man threw this rock horizontally with an initial velocity of 10 m/s at the same height, how much kinetic energy would it have just before it hits the ground?

1) 50 J

2) 100 J

3) 450 J

4) 800 J

5) 950 J

5. A man standing a certain height above the ground throws a rock of mass 1 kg straight up with an initial velocity of 10 m/s. A few moments later, the rock hits the ground with a kinetic energy of 450 J. If the man dropped this rock from rest, how much kinetic energy would it have right before it hits the ground?

1) 100 J

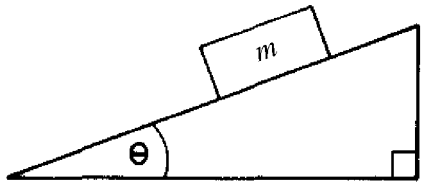2) 200 J

3) 300 J

4) 400 J

5) 500 J

6. Base your answer to the following question on the following information.

   Two balls of different masses are set at a height of 3 m above the ground on a frictionless table. The ball on the left is of mass *2M* and the ball on the right has a mass of *3M*. They both are released simultaneously and slide onto the part of the table 2m above the ground.

   What is the total energy of the system?

   1) $+1Mg$

   2) $+5Mg$

   3) $+10Mg$

   4) $+15Mg$

   5) $+20Mg$

7. Base your answer to the following question on the diagram below. In the diagram, a box of mass *m* is sliding down a frictionless ramp of length *L* with an incline of θ to the horizontal. The mass takes *t* seconds to slide down the ramp.

   If released from rest at the top, the velocity of the block at the bottom of the ramp will be

   1) $gLt\sin\theta$

   2) $\dfrac{gL\sin\theta}{t}$

   3) $\sqrt{gt\sin\theta}$

   4) $\sqrt{2gL\sin\theta}$

   5) $\sqrt{gL\sin\theta}$

8. A crate with mass *m* slides down a frictionless ramp with length *L* and vertical height *h*. The crate's change in kinetic energy from the top to the bottom is equal to:

   1) $\dfrac{mL^2}{2}$

   2) $-\dfrac{mL^2}{2}$

   3) $-mgh$

   4) mgh

   5) Cannot be determined from the information given.

9. A block with a mass of 10 kg slides down a frictionless inclined plane of length 25 m and height 20 m. It's speed at the bottom is most nearly

   1) 15 m/s

   2) 20 m/s

   3) 30 m/s

   4) 37 m/s

   5) 45 m/s

10. An object with a mass of 4 kg is released from rest at the top of a ramp with length 10 m that makes an angle of 30° with the horizontal. The coefficient of kinetic friction between the block and the ramp is 0.4. The speed the block will have when it has traveled 5 m down the ramp is most nearly

   1) 3.9 m/s

   2) 5.6 m/s

   3) 7 m/s

   4) 7.9 m/s

   5) 10.4 m/s

11. An object is falling from a height of *h* in a vacuum and reaches a final velocity of *v*. When the object has fallen a distance of *h*/2, its velocity is

1) $\frac{v}{\sqrt{2}}$

2) $\frac{v}{2}$

3) $\frac{v}{4}$

4) $v\sqrt{2}$

5) $4v$

12. Base your answer to the following question on the following situation.

An object weighing 10 N swings at the end of a rope that is 0.72 m long as a simple pendulum. At the bottom of the of the swing, the tension in the string is 12 N.

What is the maximum height above its lowest point that the object reaches?

1) 0.036 m

2) 0.060 m

3) 0.072 m

4) 0.144 m

5) 0.360 m

13. Units of energy include which of the following?

      I. Newton-meter
      II. Ampere-volt
      III. Volt-coulomb

1) I only.

2) I and II only.

3) I and III only.

4) II and III only.

5) I, II, and III.

14. A student throws a stone upward at an angle of 30°. Which statement best describes the stone at the highest point that it reaches?

1) Its acceleration is zero.

2) Its acceleration is at a maximum.

3) Its potential energy is at a minimum.

4) Its kinetic energy is at a minimum.

5) Its potential and kinetic energies are equal

15. Units of energy include which of the following?

      I. Joule
      II. Ampere-volt per second
      III. Volt-coulomb

1) I only.

2) I and II only.

3) I and III only.

4) II and III only.

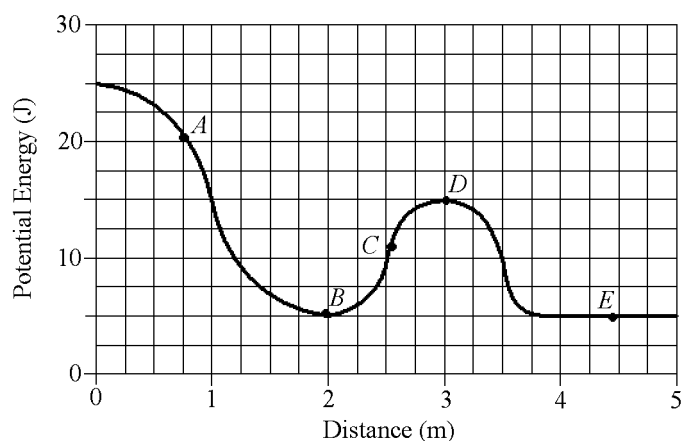5) I, II, and III.

16. Tarzan of mass m_1 swings from a height of *h* on a vine. When potential energy is at its minimum, he picks up Jane (mass m_2). What height will the Tarzan-Jane system reach when its potential energy reaches a maximum?

1) $(m_1 + m_2)h$

2) $(m_1 h)/(m_1 + m_2)$

3) $(m_1 + m_2)/(2hm_2)$

4) $(m_1 + m_2)/(2hm_1)$

5) $2hm_1$

17. Tarzan (90 kg) carries Jane (55 kg) with one arm while swinging on a vine. They began at a height of 15 m. If Tarzan drops Jane when their kinetic energy is a maximum, how high will Tarzan swing?

    1) 20 m

    2) 24 m

    3) 27 m

    4) 31 m

    5) 35 m

Base your answers to questions **18** through **22** on the diagram below which shows a frictionless track.

18. At which point would an object at rest be in unstable equilibrium?

    1) A

    2) B

    3) C

    4) D

    5) E

19. At which point is an object at rest in stable equilibrium?

    1) A

    2) B

    3) C

    4) D

    5) E

20. If an object is released at the beginning of the track, which of the following is true at point E?

    1) It is in static equilibrium

    2) It is losing kinetic energy

    3) It is in dynamic equilibrium

    4) There is a net force acting on the object

    5) Its kinetic energy is 25 J

21. Which of the following best describes the motion of an object as it approaches point B, if it was released from rest at the beginning of the track?

    1) It is losing potential energy only.

    2) It is gaining kinetic energy only.

    3) It is gaining potential energy and gaining kinetic energy

    4) It is losing potential energy and gaining kinetic energy

    5) It is gaining heat energy, gaining kinetic energy, and losing potential energy

22. If an object of mass 5 kg is released from rest at the beginning of the track, what is its velocity at point D?

    1) 1 m/s

    2) 1.4 m/s

    3) 2 m/s

    4) 2.2 m/s

    5) 3 m/s

Answer Key
Elastic Potential Energy MC Questions [Mar 28, 2011]

1. 4

2. 2

3. 4

4. 3

5. 4

6. 4

7. 4

8. 4

9. 2

10. 1

11. 1

12. 3

13. 3

14. 4

15. 3

16. 2

17. 2

18. 4

19. 2

20. 3

21. 4

22. 3

Name _____   Class _____   Date _____

1. _____

2. _____

3. _____

4. _____

5. _____

6. _____

7. _____

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9. _____

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11. _____

12. _____

13. _____

14. _____

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16. _____

17. _____

18. _____

19. _____

20. _____

21. _____

22. _____