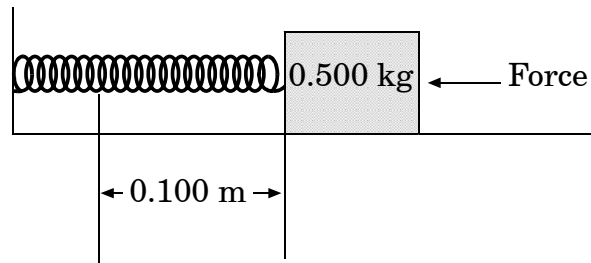


1. A father (100 kg) and his son (50 kg) go on a hike in the mountains. The father takes 60 minutes to climb the mountain, and the son climbs it in 30 minutes. Which statement is true about their potential energies (PE)?
- A The father's potential energy is equal to the son's potential energy because they climb the same height.
  - B The father's potential energy is twice the son's potential energy because his mass is twice the son's mass.
  - C The father's potential energy is half the son's potential energy because he takes half the time.
  - D Their potential energies cannot be related to each other because the path traveled is unknown.
2. A spring is stretched 0.20 m. The spring constant is 8.0 N/m. How much energy is stored in the spring?
- A 0.16 J
  - B 0.32 J
  - C 0.80 J
  - D 1.6 J

3. A spring ( $k = 5.00 \times 10^3 \text{ N/m}$ ) is compressed 0.100 m when a 0.500-kg block resting on a frictionless surface is pushed against the spring as shown in the accompanying diagram.



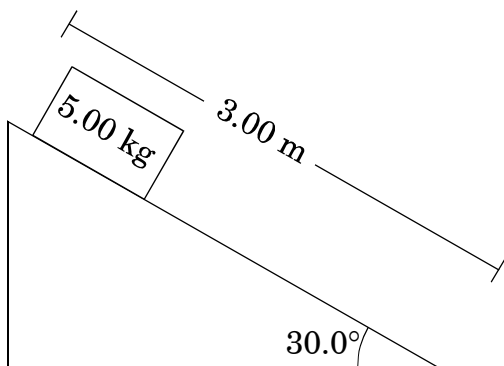
What is the kinetic energy of the block when it is released?

- A 500. J  
B 250. J  
C 50.0 J  
D 25.0 J
- 
4. A single force of 45 N was applied to a 15-kg cart starting at rest until the cart reached a speed of 18 m/s. What was the cart's kinetic energy at the end of the acceleration?
- A 270 J  
B 680 J  
C 2,400 J  
D 4,100 J
5. A 0.500-kg arrow was shot vertically upward with an initial velocity of 55.0 m/s. What was the arrow's kinetic energy after two seconds of flight?
- A 100. J  
B 310. J  
C 420. J  
D 760. J

6. A 0.250-kg ball, initially at rest, is acted on by a net force of 200. N over a distance of 1.00 m. What is the ball's speed after it has traveled 1.00 m?

A 20.0 m/s  
B 28.0 m/s  
C 40.0 m/s  
D 48.0 m/s

7. A 5.00-kg mass starts from rest and slides down a 3.00-m frictionless inclined plane that makes an angle of  $30.0^\circ$  to the horizontal.



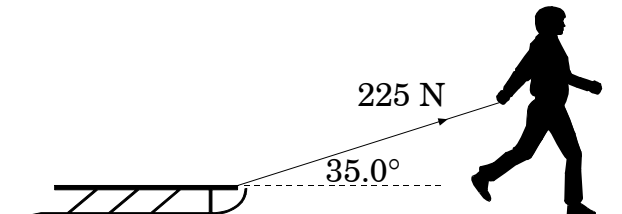
What is the kinetic energy of the mass at the bottom of the incline?

A 73.5 J  
B 110. J  
C 147 J  
D 441 J

8. A 0.15-kg ball is traveling at a speed of 20. m/s. How much work must be done on the ball to stop it?

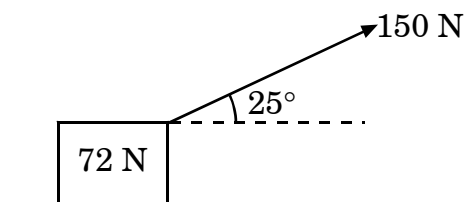
A 60. J  
B 30. J  
C 3.0 J  
D 1.5 J

9. A student pulls a sled across level snow with a force of 225 N with a rope that is  $35.0^\circ$  above the horizontal.



If the sled moved a distance of 65.3 m, how much work did the student accomplish?

- A  $1.80 \times 10^3$  J  
B  $1.20 \times 10^4$  J  
C  $1.47 \times 10^4$  J  
D  $8.43 \times 10^4$  J
- 
10. A box that weighs 72 N is pulled horizontally across the floor by a rope that makes a  $25^\circ$  angle with the floor. A force of 150 N is applied to the rope and the box is moved 12 m.



How much work is done by the 150-N force?

- A 760 J  
B 1,100 J  
C 1,600 J  
D 1,800 J
11. A 650.-kg car traveling at 5.00 m/s was stopped by applying the brakes. How much work did the brakes do when stopping the car?
- A 1,630 J  
B 3,250 J  
C 8,130 J  
D 16,300 J

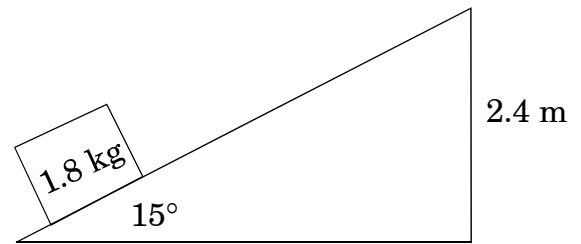
12. A 2.0-kg book falls from a 1.5-m high shelf. What will be the velocity of the book as it hits the floor?

A 5.4 m/s  
B 15 m/s  
C 20. m/s  
D 29 m/s

13. A worker carries a 100-N crate horizontally at a constant speed across a 10-m room. How much work is done against gravity by the worker?

A 0 J  
B 10 J  
C 100 J  
D 1,000 J

14. 50. J of work is used to push a 1.8-kg box up an incline at an angle of  $15^\circ$  to the ground.



The box is pushed from rest at the bottom of the incline to rest at the vertical height of 2.4 m. How much work is done against friction?

A 4.3 J  
B 7.7 J  
C 17 J  
D 46 J

### End of Goal 5 Sample Items

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## Answers to EOC Physics Sample Items

### Goal 5

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**1. Objective 5.01**

Analyze energy of position: Gravitational potential energy. Elastic potential energy.

**Thinking Skill:** Knowledge

**Correct Answer:** B

**2. Objective 5.01**

Analyze energy of position: Gravitational potential energy. Elastic potential energy.

**Thinking Skill:** Applying

**Correct Answer:** A

**3. Objective 5.01**

Analyze energy of position: Gravitational potential energy. Elastic potential energy.

**Thinking Skill:** Analyzing

**Correct Answer:** D

**4. Objective 5.02**

Analyze energy of motion, kinetic energy.

**Thinking Skill:** Applying

**Correct Answer:** C

**5. Objective 5.02**

Analyze energy of motion, kinetic energy.

**Thinking Skill:** Applying

**Correct Answer:** B

**6. Objective 5.04**

Analyze and measure the transfer of mechanical energy through work.

**Thinking Skill:** Applying

**Correct Answer:** C

**7. Objective 5.04**

Analyze and measure the transfer of mechanical energy through work.

**Thinking Skill:** Applying

**Correct Answer:** A

**8. Objective 5.04**

Analyze and measure the transfer of mechanical energy through work.

**Thinking Skill:** Applying

**Correct Answer:** B

**9. Objective 5.04**

Analyze and measure the transfer of mechanical energy through work.

**Thinking Skill:** Applying

**Correct Answer:** B

## Answers to EOC Physics Sample Items

### Goal 5

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**10. Objective 5.04**

Analyze and measure the transfer of mechanical energy through work.

**Thinking Skill:** Applying                      **Correct Answer:** C

**11. Objective 5.04**

Analyze and measure the transfer of mechanical energy through work.

**Thinking Skill:** Applying                      **Correct Answer:** C

**12. Objective 5.04**

Analyze and measure the transfer of mechanical energy through work.

**Thinking Skill:** Applying                      **Correct Answer:** A

**13. Objective 5.04**

Analyze and measure the transfer of mechanical energy through work.

**Thinking Skill:** Applying                      **Correct Answer:** A

**14. Objective 5.04**

Analyze and measure the transfer of mechanical energy through work.

**Thinking Skill:** Applying                      **Correct Answer:** B