

Conservation of Energy Quiz

Short Answer

1. What form of energy is stored in any stretched or compressed object?
2. Is kinetic energy a vector quantity or a scalar quantity?
3. Describe the relationship between kinetic energy and gravitational potential energy during the free fall of a pencil from a desk.
4. A pocket watch contains a long, spiral piece of metal which is coiled tightly as the watch is wound. What form of potential energy is involved in winding a pocket watch?
5. An object is lowered into a deep hole in the ground. How does the potential energy of the object change?
6. A ski jumper has 1.2×10^4 J of potential energy at the top of the ski jump. The friction on the jump slope is small, but not negligible. What can you conclude about the ski jumper's kinetic energy at the bottom of the jump? Explain your answer.

Problem

7. A bobsled zips down an ice track, starting from rest at the top of a hill with a vertical height of 170 m. Disregarding friction, what is the velocity of the bobsled at the bottom of the hill? ($g = 9.81 \text{ m/s}^2$)

8. A pendulum with a mass of 4.0 kg is released from a height of 2.9 cm above the height of its resting position. How fast will the pendulum be moving when it passes through the lowest point of its swing?

Essay

9. Critique the following statement:

“If one drops a book, that book obviously loses energy when it reaches the floor. Therefore, the law of conservation of energy is incorrect.”

10. Why is the first hill of a roller coaster generally the highest?