Physics
Conservation of Energy, Form: $\boxed{\text{A}}$

Name: ________________
Date: ________________
Period: ________________
Primary Peer Reviewer: ________________

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Section 1. Multiple Corect Multiple Choice

For Each queston, chose TWO answers.

1. What kinds of energy are included in mechanical energy? (CHOOSE TWO)
   (a) Chemical Energy
   (b) Kinetic Energy
   (c) Potential Energy
   (d) Light

2. When a roller coaster cart falls towards the ground, what happens to its kinetic and potential energy? (CHOOSE TWO)
   (a) kinetic energy increases.
   (b) kinetic energy decreases.
   (c) kinetic energy remains constant.
   (d) potential energy increases.
   (e) potential energy decreases.
   (f) potential energy remains constant

3. Airplane A has a gravitational potential energy of 2×10^7 J and a kinetic energy of 4×10^7 J. Airplane B is traveling at the same height, but has double the mass and is traveling 3 times faster. What are the kinetic and gravitational potential energies of Aiplane B? (CHOOSE TWO)
   (a) $U_g = 2 \times 10^7$ J
   (b) $U_g = 4 \times 10^7$ J
   (c) $U_g = 6 \times 10^7$ J
   (d) $K = 1.8 \times 10^8$ J
   (e) $K = 4 \times 10^7$ J
   (f) $K = 8 \times 10^7$ J
   (g) $K = 1.2 \times 10^8$ J
   (h) $K = 3.6 \times 10^8$ J

Section 2. Free Response

4. Calvin and his stuffed tiger, Hobbes, roll down a 45 m-tall hill in a wagon. The combined mass of Calvin, Hobbes, and the wagon is 35 kg.

   (a) What is the potential energy of the wagon and its passengers at the top of the hill?

   

   (b) What is the final velocity of the wagon at the bottom of the hill? (Assume friction is negligible.)

5. The space probe Deep Space 1, was launched on October 24, 1998. It was the first space probe to use an ion engine, that only generates a weak force of 0.056 N, but requires very little fuel. The probe has a mass of 474 kg. The engine ran for a long time, causing the probe to move a distance of 2 billion meters. Assume that the mass of the probe does not change, and no other forces act on the probe. What is the final speed of the probe?

Answer Key for Exam $\boxed{\text{A}}$

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