

### Answer Key

Complete the following examples using the appropriate formula below. Be sure to show all work!

Formulas: Kinetic Energy =  $\frac{mv^2}{2}$

Potential energy =  $mgh$

1. You serve a volleyball with a mass of 2.1 kg. The ball leaves your hand with a speed of 30m/s. The ball has Kinetic energy. Calculate it.

Formula:  $KE = \frac{mv^2}{2}$

Final Answer = 945.0 J

Substitution:  $KE = \frac{2.1 \text{ kg} \times (30\text{m/s})^2}{2}$

2. A baby carriage is sitting at the top of a hill that is 21 m high. The carriage with the baby weighs 12 kg. The carriage has Potential energy. Calculate it.

Formula:  $PE = mgh$

Substitution:  $PE = 12\text{kg} \times 9.8\text{m/s}^2 \times 21 \text{ m}$  Final Answer: 2469.6 J

3. A car is traveling with a velocity of 40 m/s and has a mass of 1120 Kg. The car has Kinetic energy. Calculate it.

Formula:  $KE = \frac{mv^2}{2}$

Final Answer = 896,000.0 J

Substitution:  $KE = \frac{1120 \text{ kg} \times (40\text{m/s})^2}{2}$

4. A cinder block is sitting on a platform 20 m high. It weighs 79 kg. The block has Potential energy. Calculate it.

Formula:  $PE = mgh$

Substitution:  $PE = 79\text{kg} \times 9.8\text{m/s}^2 \times 20 \text{ m}$  Final Answer: 15,484.0 J

5. There is a bell at the top of a tower that is 45 m high. The bell weighs 190 kg. The bell has Potential energy. Calculate it.

Formula:  $PE = mgh$

Substitution:  $PE = 190\text{kg} \times 9.8\text{m/s}^2 \times 45 \text{ m}$

Final Answer: 83,790.0 J

6. A roller coaster is at the top of a 72 m hill and weighs 966 kg. The coaster (at this moment) has Potential energy. Calculate it.

Formula:  $PE = mgh$

Substitution:  $PE = 966\text{kg} \times 9.8\text{m/s}^2 \times 72 \text{ m}$

Final Answer: 681,609.6 J