/35

AP Chemistry – Energy and Thermodynamics – 30

Name _____Per ___

1. What is the kinetic energy of a 95 kg motorcycle rider on a 400. kg motorcycle moving at 12 m/s?

2. By what factor does the kinetic energy change if the speed is decreased to 6 m/s?

3. Where does the kinetic energy go when the rider brakes to a stop?

4. A watt is a measure of power which is equal to a conversion of 1 Joule of energy per second. Calculate the number of Joules in 1 kilowatt-hour.

5. A 7.5 kg bowling ball is at the top of a 100. m high tower on Earth. Calculate its potential energy.

6. Calculate the electrostatic energy of two electrons that are 5.0×10^{-8} m apart. Is it repulsive or attractive?

7. Under what conditions will the quantities *q* and *w* be negative?

8. For the following processes, calculate the change in internal energy of the system, and determine whether the process is endothermic or exothermic:

(a) A balloon is heated by adding 900 J of heat. It expands, doing 422 J of work on the atmosphere.

(b) A 50 g sample of water is cooled from $30^{\circ C}$ to $15^{\circ C}$, thereby losing approximately 3140 J of heat.

(c) A chemical reaction releases 8.65 kJ of heat and does no work on the surroundings.

9. A system releases heat to its surroundings and has work done on it by the surroundings. (a) Sketch a box to represent the system, and use arrows to represent the heat and work transferred.

(b) Is it possible for ΔE to be positive for this process? Explain.

(c) Is it possible for ΔE to be negative for this process? Explain.

10. Indicate which of the following (if any) is independent of the path by which a change occurs:

(a) the change in potential energy when a book is transferred from table to shelf

(b) the heat evolved when a cube of sugar is oxidized to CO_2 and H_2O

(c) the work accomplished in burning a liter of gasoline