Name_____Period_____

Exam Review Worksheet

CALORIMETRY

1) Define these terms:
   a. Heat = *flow of thermal energy from higher temp to lower temp*
   b. Temperature = *measure of the average kinetic energy of a sample*
   c. The Law of Conservation of Energy = *Energy is neither created nor destroyed only transferred.*
   d. Specific Heat = *energy required to raise the temp of 1 gram of substance by 1ºC*
   e. Heat of Fusion = *energy required to melt 1 mole of solid*
   f. Heat of Vaporization = *energy required to boil 1 mole of liquid*
   g. Endothermic = *gain of heat energy*
   h. Exothermic = *loss of heat energy*

2) A student performs an experiment in which 45.0 grams of metal is heated to 80.0ºC. the metal is transferred to a cup of water. The water gains 9000 kJ of energy as the metal cools to 40ºC.
   a. Is the process endothermic or exothermic for the water? *endothermic*
   b. Is the process endothermic or exothermic for the metal? *exothermic*
   c. Determine the specific heat of the metal. *.05 J/gºC*

3) If you did a calorimetry experiment in which you put a cube of iron metal that is very hot into a cup of room temperature water; the _____*water*_____ would get warmer; and the ___*metal*___ would get cooler as heat flows from ___*higher temp*_____ to ___*lower temp*_____.

4) The larger the value of _*specific heat*__ of a substance, the more heat it requires to even get warmer; meaning to raise the temperature 1°C. Conversely, it also means it will gives off more energy when the same substance cools 1°C compared to other substances with lower __*specific heat*__ values. The lower the _*specific heat*_ value of a substance means that it will not require much energy to heat and lose much energy to cool. Water has a very high _*specific heat*__ values compared to many substances. It takes a longer amount of time (and more heat) for water to start feeling warm as opposed to the metal pan it is being boiled in.

5) A 100 g chunk of metal with a specific heat of 0.24 J/g°C is heated from 20°C to 40°C. What is the total energy change, or heat gained, of the chunk of metal (write all units)? *Q = 100g • .24J/gºC•20ºC*

6) A 50 g metal cube *loses* 1350 J (and is expressed as -1350 J) as it is *cooled* from 150°C to 120°C. What is the specific heat of this metal substance (write all units)? *-1350 J = 50 g C -30ºC…solve for C*

7) When you want to know the amount of energy change (or heat gained or lost) when a substance CHANGES PHASES (and not only changing temperatures…getting warmer or cooler), you must use heat of __Fusion__ (ΔH_f) or heat of __*Vaporization*___ (ΔH_v) values.

8) ΔH_f is the heat gained (when going from solid to liquid or melting) or lost (when going from liquid to solid or freezing) of one *MOLE* of a particular substance.

9) ΔH_v is the heat gained (when going from liquid to gas or boiling) or lost (when going from gas to liquid or condensenation) of one *MOLE* of a particular substance.

10) Write the equation you would use to figure out the heat released or absorbed when changing phases from solid to liquid or vice versa.__q = n ΔH_f _____

11) Write the equation you would use to figure out the heat released or absorbed when changing phases from liquid to gas or vice versa. q = n ΔH_v _____

12) You melt 72 g of ice. The ΔH_f value of water is about 6 kJ/mol. How much heat is released/absorbed?

72 g | 1 mol | 6 kJ = 24 kJ
| 18 g | 1 mol

13) You condense 3.6 g of steam. The ΔH_v value of water is about 41 kJ/mol. How much heat is released/absorbed? Is heat released or absorbed?

3.6 g | 1 mol | 41 kJ = 8.2 kJ
| 18 g | 1 mol

ACID-BASE TITRATION

14) An acid releases ____H^+_____ ions when put in solution (in water).

15) A base releases _____OH^-_____ ions when put in solution (in water).

16) Strong acids release _all of __H^+__ ions; weak acids release some all of __H^+__ ions.