Period Review W.S

1-10 Matching A) 1000; B) 4.184; C) temperature; D) heat; E) calorie; F) Joule; G) Newton; H) specific heat; I) thermometer; J) manometer; K) calorimeter; L) endothermic; M) exothermic

1. ____ The total kinetic energy of the particles in a sample of matter.
2. ____ Instrument used to measure temperature.
3. ____ A reaction that absorbs energy.
4. ____ The SI unit for energy.
5. ____ The average kinetic energy of the particles in a sample of matter.
6. ____ The amount of heat needed to raise the temperature of one gram of a substance 1 °C.
7. ____ Instrument used to measure the gain or loss of heat.
8. ____ The number of joules in a calorie.
9. ____ The amount of heat needed to raise the temperature of one gram of water 1 °C.
10. ____ The number of calories in a Calorie.

1-13
16, 17

11. Calculate the specific heat of a 75.0 g object that loses 341 J of heat as its temperature goes from 75.0 °C to 63.0 °C. $c = \frac{-341\ J}{(75_g)(63-75^\circ C)} = .379\ \frac{J}{g^\circ C}$

12. The specific heat of Al is 0.902 J/g°C. How much heat is lost by a 25.0 g piece of Al when its temperature goes from 75.0 °C to 25.0 °C?
heat = $(25_g)(.902\ J/g^\circ C)(25-75^\circ C) = -1128\ J$

13. Lead has a specific heat of 0.128 J/g°C. How much heat is needed to raise the temperature of a 150.0 g piece of lead 25.0 °C to 100.0 °C?
heat = $(150_g)(.128\ J/g^\circ C)(100-25^\circ C) = 1440\ J$

14. A chemical reaction takes place inside a calorimeter which contains 75.0 grams of water. The temperature of the water rises from 21.0 °C to 23.0 °C. Calculate the heat given off by the reaction. heat rxn = $-(75_g)(4.184)(23-21^\circ C) = -628\ J$

15. A chemical reaction takes place inside a calorimeter which contains 100.0 grams of water. The temperature of the water goes from 25.0 °C to 23.0 °C. Calculate the heat absorbed by the reaction. heat rxn = $-(100_g)(4.184)(23-25^\circ C) = 837\ J$

16. 5.00 g of a substance at a temperature of 100. °C is placed in a calorimeter holding 75.0 g of water at 20.0 °C. The temperature of the water rises to 22.0 °C. What is the specific heat of the substance? $(5_g)c(22-100^\circ C) = -(75_g)(4.184)(22-20^\circ C)$
$c = 1.61\ J/g^\circ C$

17. A 10.0 gram piece of metal is heated to 100.°C. It is placed in a calorimeter containing 75.0 grams of water at 25.0 °C. The final temperature of the metal and water is 27.0 °C. What is the specific heat of the metal?

$(10_g)c(27-100^\circ C) = -(75_g)(4.184)(27-25^\circ C)$

$c = .860\ J/g^\circ C$

$m_s \Delta T = -m_w \Delta T$
substance water

Name_____ Date_____ Period_____

Enthalpy Stoichiometry Worksheet

1. How much heat will be released when 6.44 g of sulfur reacts with excess O_2 according to the following equation?

   $2\ S + 3\ O_2 \rightarrow 2\ SO_3$ $\quad\quad \Delta H = -791.4\ kJ$

$$6.44\ g\ S \left| \frac{1\ mol\ S}{32\ g} \right| \frac{-791.4\ kJ}{2\ mol\ S} = -159\ kJ$$

2. How much heat will be released when 4.72 g of carbon reacts with excess O_2 according to the following equation?

   $C + O_2 \rightarrow CO_2$ $\quad\quad \Delta H = -393.5\ kJ$

$$4.72\ g\ C \left| \frac{1\ mol\ C}{12.01\ g} \right| \frac{-393.5\ kJ}{1\ mol\ C} = -155\ kJ$$

3. How much heat will be absorbed when 38.2 g of bromine reacts with excess H_2 according to the following equation?

   $H_2 + Br_2 \rightarrow 2\ HBr$ $\quad\quad \Delta H = 72.80\ kJ$

$$38.2\ g\ Br_2 \left| \frac{1\ mol\ Br_2}{160\ g\ Br_2} \right| \frac{72.8\ kJ}{1\ mol\ Br_2} = 17.4\ kJ$$

4. How much heat will be released when 1.48 g of chlorine reacts with excess phosphorus according to the following equation?

   $2\ P + 5\ Cl_2 \rightarrow 2\ PCl_5$ $\quad\quad \Delta H = -886\ kJ$

$$1.48\ g\ Cl_2 \left| \frac{1\ mol\ Cl_2}{70.9\ g\ Cl_2} \right| \frac{-886\ kJ}{5\ mol\ Cl_2} = -3.70\ kJ$$

5. How much heat will be released when 4.77 g of ethanol (C_2H_5OH) reacts with excess O_2 according to the following equation?

   $C_2H_5OH + 3\ O_2 \rightarrow 2\ CO_2 + 3\ H_2O$ $\quad\quad \Delta H = -1366.7\ kJ$

$$4.77\ g\ C_2H_5OH \left| \frac{1\ mol}{46.07\ g} \right| \frac{-1366.7\ kJ}{1\ mol\ C_2H_5OH} = -142\ kJ$$