

Name \_\_\_\_\_

Period \_\_\_\_\_

## 2nd Semester Final Review - Thermochemistry

1. Make the following conversions:

850 calories = \_\_\_\_\_ Calories

440 cal = \_\_\_\_\_ joules

1.8 KJ = \_\_\_\_\_ joules

0.45 kJ = \_\_\_\_\_ cal

35 Cal = \_\_\_\_\_ cal

25 kcal = \_\_\_\_\_ kJ

2. Define the following terms:

exothermic

endothermic

specific heat capacity

Activation energy

Catalyst

3. What is the specific heat capacity of liquid water in terms of calories and joules?

4. How many kJ of heat is absorbed when 1.00 L of water is heated from 18°C to 85°C?

5.  $\text{Mg CO}_3 (\text{s}) \rightarrow \text{MgO} (\text{s}) + \text{CO}_2 (\text{g}) \quad H_{\text{rxn}} = 117.3 \text{ KJ}$

a. Is heat absorbed or released in the rxn?

b. What is  $H_{\text{rxn}}$  for the reverse reaction?

6. When 1 mol KBr(s) decomposes to its elements, 394 KJ of heat is absorbed.

a. Write a balanced thermochemical equation for this reaction.

b. How much heat is released when 10 kg KBr forms from it's elements?

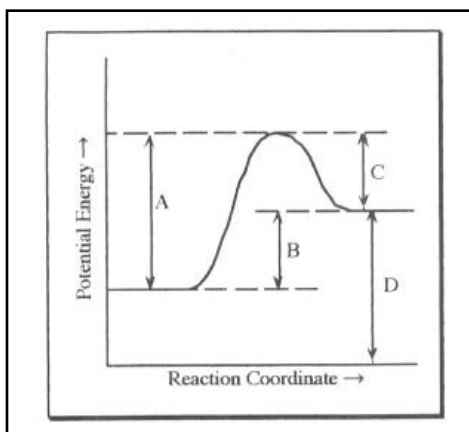
7. 40.0 g of substance has its temp. increased from 25.0 °C to 50.0 °C by addition of 4,067 J of heat. What is the specific heat in J / g °C for the substance?

8. What quantity of heat is needed to raise the temp of 500.0 g of Cu from 20.0 °C to 50.0 °C?  
(Specific heat of Cu = 24.5 J / mol °C)

9. A 195 g aluminum engine part at an initial temperature of 3.00°C absorbs 40.0 KJ of heat. What is the final temperature of the part? Specific heat of Aluminum = 0.21 cal/g °C.

10. Calculate the heat required to cause 10.0 g of H<sub>2</sub>O to go from a -20.0 °C solid to a gas at 110.0 °C.

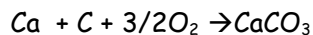
11. How many calories are required to raise the temperature of 125.0 g of water from 20.0°C to 50.0°C?
12. Calculate the heat change in calories when 65.3g of steam at 100°C condenses to water at the same temperature.
13. How much heat is produced when 310.0 g of Cl<sub>2</sub> react according to the following thermochemical equation:  $\text{Si(s)} + 2\text{Cl}_2(\text{g}) \rightarrow \text{SiCl}_2(\text{l}) + 687 \text{ kJ}$  ?



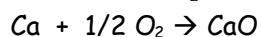
14. Describe what each letter on the graph represents for the forward reaction.
15. Describe what each letter on the graph represents for the reverse reaction.

16. 8,500 calories of heat are absorbed by 31.0 grams of solid water. The initial temperature is -21°C. What is the final temperature of the water, and its state of matter?

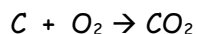
17. Calculate the value of  $\Delta H$  for the reaction  $\text{CaCO}_3 \rightarrow \text{CO}_2 + \text{CaO}$  from the following enthalpy changes:



$$\Delta H = -1206.9 \text{ kJ}$$



$$\Delta H = -635.1 \text{ kJ}$$



$$\Delta H = -393.5 \text{ kJ}$$