Heating Curve Calculations WS#1

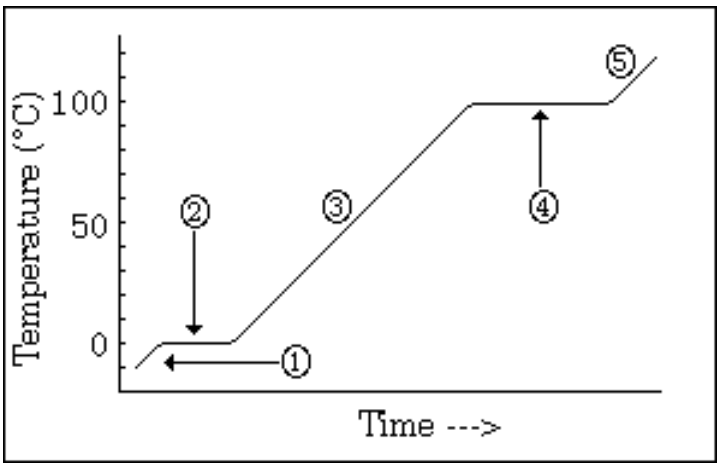
Specific heat of ice = **Heat of fusion** =

Specific heat of water = **Heat of vaporization** = **Specific heat of gas** =

Directions: Please do these problems on a separate sheet of paper and glue into your notebook underneath this handout. You may do #13 on this worksheet. Please do each problem in the following format:

Question #	Area of heating curve to use:	All your work, including equations and units	Your final answer **in a box**

For #1-6 use the following diagram:



1) What is happening to the average kinetic energy of the molecules in the sample during section 2?

2) As a substance goes through section (2), what happens to the distance between the particles?

3) What is the name of the process happening during section (4)?

4) What would be the name of the process happening during section (4) if time were going the other way?

5) What is the melting point of this substance?

6) At what temperature would this sample finish boiling?

7) You have a sample of H_2O with a mass of 23 grams at a temperature of -46°C. How many joules of heat energy are necessary to carry out each step?
   a. Heat the ice from -46°C to 0°C
   b. Melt the ice
   c. Heat the water from 0°C to 100°C
   d. Boil the water
   e. Heat the steam from 100°C to 109°C
   f. What is the TOTAL energy needed to heat the water from -46°C to 109°C?

8) How much energy is required to convert 100 grams of water at 20°C completely to steam at 100°C?

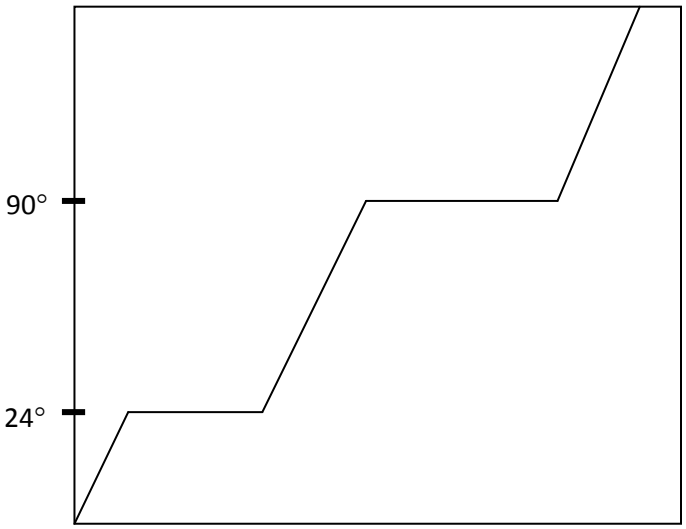
9) What is the heat **lost** when you cool 125 g of water into ice at -3 °C?

10) Determine the heat required to convert 51 g of ice at -20.3 °C to water at 0 °C

11) Determine the energy released when converting 250 g of steam at 100 °C to ice at -43 °C

12) What is the energy absorbed when you melt 75 g of ice at -5 °C to steam at 150 °C

Use the following graph to answer #13-17:



13) Label the graph with which areas are solid, liquid, and gas. Label where melting and boiling happen.

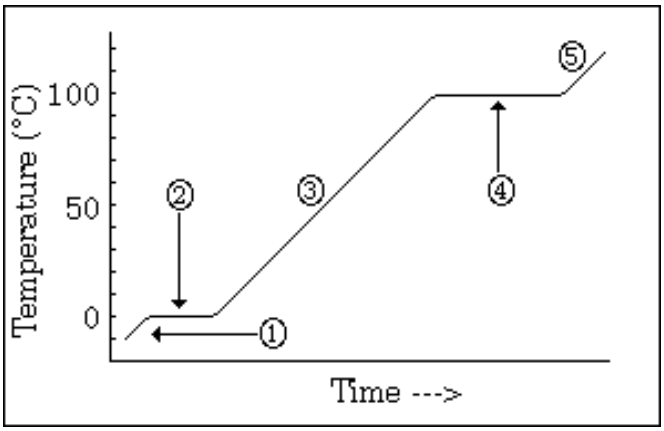
14) What is the melting temperature?

15) What is the boiling temperature?

16) If you had 15 grams of this substance, and the heat of fusion is 3.76 J/g, how many J of energy does it take to melt your sample?

17) If you have 15 g of this substance, and the specific heat of the liquid is 7.2 J/g°C, how many joules does it take to heat it up from 25°C to 85°C?

Use the following graph to answer # 18 - 21



18) What is happening to the average kinetic energy of the molecules in the sample during section 2?

19) As a substance goes through section (2), what happens to the distance between the particles?

20) What is the name of the process happening during section (4)?

21) What would be the name of the process happening during section (4) if time were going the other way?

22) What is the melting point of this substance?

23) At what temperature would this sample finish boiling?

24) When this substance is melting, the temperature of the ice-water mixture remains constant because:

a. Heat is not being absorbed
b. The ice is colder that the water
c. Heat energy is being converted to potential energy
d. Heat energy is being converted to kinetic energy

25) The temperature at which a substance in the liquid state freezes is the same as the temperature at which the substance

a. Melts
b. Sublimes
c. Boils
d. Condenses

26) Is this curve showing an endothermic or an exothermic process?