

UNIT 11 GROUP PRACTICE

NAMES _____

KEY _____

Answer Key: SHOW ALL WORK for questions 16-19.

1. D

2. A

3. D

4. D

5. B

6. C

7. D

8. B

9. B

10. C

11. D

12. C

13. A

14. A

15. C

16. $Q = mc_p \Delta T$
 $2500 = m(4.18)(35) \rightarrow m = \boxed{17.1 \text{ g}}$

17. $Q = mH_f$
 $= (65.6 \text{ g})(24.7 \text{ J/g}) \rightarrow Q = \boxed{1620.3 \text{ J}}$

18. $\Delta H = \sum P - \sum R$
 $\Delta H = [2(-393.5) + 3(-285.8)] - [-277.7 + 3(0)] \rightarrow \Delta H = \boxed{-1366.7 \text{ kJ}}$
 ~~$\Delta H = \boxed{-1366.7 \text{ kJ}}$~~

19. $A = Q = m c_p \Delta T = (325)(2.06)(15) = \boxed{10,042.5 \text{ J}}$
 $B = Q = mH_f = (325)(334) = \boxed{108,550 \text{ J}}$
 $C = Q = m c_p \Delta T = (325)(4.18)(95) = \boxed{129,057.5 \text{ J}}$
 Total = +247,650 J Circle one: Endothermic or Exothermic

20. A. Triple point B. point F
 C. point E D. point G
 E. ~22,100 kPa F. 31.0°C
 G. 518 kPa H. -56.6°C

I. Temp needs to \downarrow decrease. Pressure needs to \uparrow increase.
 J. liquid is more denser.
 \downarrow
solid floats

Unit 11 Group Practice

(3pts)

- Which of the following is true when a sample of water is heated gently below the boiling point?
 - The average velocity of the particles increases.
 - The temperature increases.
 - The total heat energy of the sample increases.
 - All of the answers are correct.
- If the same amount of energy is absorbed by equal masses of the following materials, which one will have the smallest temperature change? (Specific heats are given in parenthesis with units of J/g⁰C). Think about specific heat and how it relates to temperature change.

a. Ca (0.653)	b. Mg (0.250)	c. Fe (0.451)	d. Zn (0.380)
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- The heat of fusion is _____.
 - the energy required to boil a liquid into a vapor with an increase in temperature.
 - the energy required to melt a solid into a liquid with an increase in temperature.
 - the energy required to boil a liquid into a vapor at constant temperature.
 - the energy required to melt a solid into a liquid at constant temperature.
- When the temperature of a sample increases, this indicates that _____.
 - no energy change is occurring, but the molecules are slowing down in the sample.
 - no energy change is occurring, but the molecules are speeding up in the sample.
 - cold is leaving the sample.
 - heat energy is entering the sample.
- A 75 mL sample of ice water and a 150 mL sample of ice water will have the same _____.

a. mass	b. temperature	c. heat and temperature	d. heat
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- The energy required to change one gram of a substance from a *liquid to a vapor* is the _____.

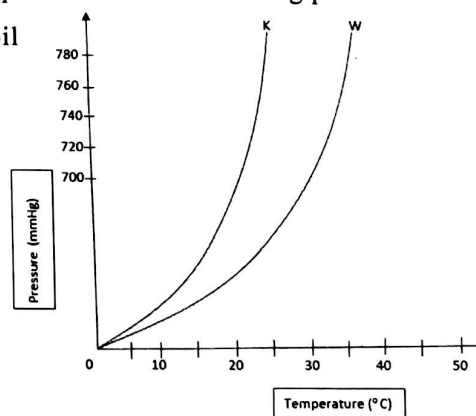
a. specific heat	b. heat of fusion	c. heat of vaporization	d. heat energy
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- Which contains more heat, a 5 ounce glass of ice water or a 500 ounce jug of ice water?

a. not enough information given	b. both are the same	c. 5 ounce glass	d. 500 ounce jug
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- Which of the following shows a decrease in entropy?

a. $H_2O(s) \rightarrow H_2O(g)$	b. $H_2O(g) \rightarrow H_2O(l)$	c. $CO_2(s) \rightarrow CO_2(g)$	d. $NaCl(s) \rightarrow Na^+(aq) + Cl^-(aq)$
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- Melting point is the same as the _____.

a. sublimation point	b. freezing point	c. condensation point	d. boiling point
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- Based on the diagram on the right, at what temperature does substance W boil at standard pressure?

a. 25 °C	b. 30 °C	c. 35 °C	d. 40 °C
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- Water is sometimes used as a heat storage medium because it requires a great deal of heat to change the temperature of water. This is best explained by _____.

a. its low specific heat	b. its high heat of fusion
c. its high heat of vaporization	d. its high specific heat
- Which of the following states of matter has the greatest distance between particles?

a. solids	b. liquids	c. gases	d. all states
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- During boiling, the temperature of a liquid _____. Think about the heating curve.

a. remains constant	b. increases	c. decreases	d. approaches the standard boiling point
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14. When the molecules at the surface of a liquid at room temperature have enough energy to overcome the intermolecular forces and escape as a gas, we call this _____.

- a. evaporation b. boiling c. vaporization d. condensing

15. Ice cubes get smaller and smaller if left in the freezer for a long period of time. This is an example of _____.

- a. freezing b. melting c. sublimation d. deposition

Solve the following problems. Show all work! (5 pts)

16. What is the mass of liquid water present if 2500 J were released when the temperature decreased by 35°C?

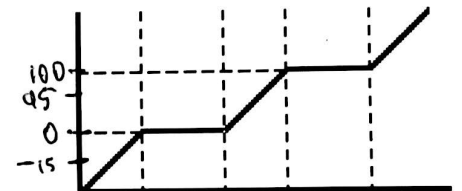
17. How much heat is needed to melt 65.6 g of lead? (H_f for lead = 24.7 J/g)

18. Calculate the ΔH or change in enthalpy for the following reaction. Use the $\Delta H_{\text{formation}}$ given for each compound from your notes.
 $\text{C}_2\text{H}_5\text{OH}(\text{l}) + 3\text{O}_2(\text{g}) \rightarrow 2\text{CO}_2(\text{g}) + 3\text{H}_2\text{O}(\text{l})$

19. Calculate the heat change for 325 g of water that is heated from -15°C to 95°C?

Is it endothermic or exothermic? (15pts) You should know the MP and BP for water.

- $H_f = 334 \text{ J/g}$ $C_{\text{solid}} = 2.06 \text{ J/g}^\circ\text{C}$
 $H_v = 2260 \text{ J/g}$ $C_{\text{liquid}} = 4.18 \text{ J/g}^\circ\text{C}$
 $C_{\text{gas}} = 2.02 \text{ J/g}^\circ\text{C}$



- A:
B:
C:

- A =
B =
C =
Total =

20. Use the phase diagrams to answer the following questions: (2pts)

- Point O on the diagrams represents the _____.
- At which point do only solid and liquid states exist in equilibrium? _____
- At which point would a liquid be boiling? _____
- At which point would sublimation occur? _____
- What is the critical pressure for water (give a number and unit)? _____
- What is the critical temperature for CO_2 (give a number and unit)? _____
- What is the triple point pressure for CO_2 (give a number and unit)? _____
- What is the triple point temperature for CO_2 (give a number and unit)? _____
- For water, what changes (increase or decrease) in temperature and pressure would be necessary to go from point D, vapor, to point C, liquid? Temp needs to _____ and Pressure needs to _____.
- What does the negative slope of water's melting line imply? _____.

