Name _____ Date _____ Class _____

17.3 HEAT IN CHANGES OF STATE

Section Review

Objectives

- Classify, by type, the enthalpy changes that occur during melting, freezing, boiling, and condensing
- Calculate the enthalpy changes that occur during melting, freezing, boiling, and condensing
- Explain what thermochemical changes can occur when a solution forms

Vocabulary

- molar heat of fusion
- molar heat of solidification
- molar heat of vaporization
- molar heat of condensation
- molar heat of solution

Part A Completion

Use this completion exercise to check your understanding of the concepts and terms that are introduced in this section. Each blank can be completed with a term, short phrase, or number.

The heat absorbed by 1 mole of a substance in melting from a solid to a liquid at a constant temperature is called the ___1___. The heat lost when 1 mole of a liquid solidifies at a constant temperature is called the ___2___. The quantity of heat absorbed by a melting solid is ___3___ to the quantity of heat lost when the liquid solidifies. The heat of fusion for methanol is ___4___.

When liquids absorb heat at their boiling points, they become vapors. The amount of heat necessary to vaporize one mole of a given liquid is called its ___5___. ___6___ is the exact opposite of vaporization. The amount of heat released when one mole of vapor condenses is called its ___7___.

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____
7. _____

Name _____ Date _____ Class _____

Part B True-False

Classify each of these statements as always true, AT; sometimes true, ST; or never true, NT.

_____ **8.** $\Delta H_{fus} = -\Delta H_{solid}$

_____ **9.** Melting and vaporization are exothermic processes.

_____ **10.** In order to convert 1 mole of $H_2O(l)$ to 1 mol of $H_2O(g)$, 40.7 kJ must be supplied.

_____ **11.** When ice melts, the temperature of the ice increases until the entire sample becomes liquid.

_____ **12.** When ammonium nitrate dissolves in water, the solution gets cold. This is an example of an exothermic reaction.

Part C Matching

Match each description in Column B to the correct term in Column A.

Column A	Column B
_____ **13.** molar heat of fusion	**a.** the heat absorbed by 1 mole of a substance in melting from a solid to a liquid
_____ **14.** molar heat of solidification	**b.** the amount of heat necessary to vaporize 1 mole of a liquid
_____ **15.** molar heat of vaporization	**c.** $= -\Delta H_{cond}$
_____ **16.** ΔH_{vap}	**d.** the heat change caused by dissolution of 1 mole of substance
_____ **17.** molar heat of solution	**e.** the heat lost when 1 mole of a liquid solidifies at a constant temperature

Part D Questions and Problems

Answer the following in the space provided.

18. State whether the following physical and chemical changes are endothermic or exothermic.

a. melting _____ **d.** fusion _____

b. vaporization _____ **e.** freezing _____

c. condensation _____ **f.** combustion _____

19. How much heat is absorbed when 28.3 g of $H_2O(s)$ at 0°C is converted to liquid at 0°C?

20. How much heat is absorbed when 5.53 mol of NH_4NO_3 solid is dissolved in water? (ΔH_{soln} = 25.7 kJ/mol)