CHE 101 - Homework - Ch 9b

p. 294-301 **Phase Transitions** Score: _____/60

Name: _____ Date: _____

[10 pt] 1. On a separate sheet of paper, sketch the heating curve of **Acetic Acid** in the space below. Place heat added on the x-axis and Temperature on the y-axis. Label the following items:
   (a) Units
   (b) Boiling point
   (c) Melting point
   (d) Where Acetic Acid is a solid
   (e) Where Acetic Acid is a liquid
   (f) Where Acetic Acid is a gas
   (g) Where solid and liquid can coexist
   (h) Where liquid and gas can coexist
   (i) Correctly label the y-axis with the values for the freezing point and boiling point of Acetic Acid.

[3 pt] 2. Which state of water has the most energy (s)olid, (l)iquid, or (g)as.
Explain.

[6 pt] 3. Define each of the following terms (phase transitions):

   (a) Evaporation or Vaporization

   (b) Condensation

   (c) Melting

   (d) Freezing

   (e) Sublimation

   (f) Deposition

[5 pt] 4. What phase transition is best described by the following statements:

   (a) An open bottle of perfume. 4(a) _____

   (b) A cold rainy day suddenly turns into sleet then into snow. 4(b) _____

   (c) On a hot day, the sides of your beer can have water droplets form on it. 4(c) _____

   (d) Ice cubes left in the freezer long enough eventually disappear. 4(d) _____

   (e) Solid to Gas 4(e) _____

   (f) Gas to Solid 4(f) _____

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[4 pt] 5. When heating a substance, sometimes the heat added results in an increase in temperature and sometimes it results in a phase change. Explain what is happening to the molecules when:. Also include which mathematical equation is used to describe each.

(a) The temperature increases?

(b) The state changes?

[4 pt] 6. How many calories are required to change 725.0 g of ice at 0.0 ℃ to steam at 6. _____ 100. ℃. Show work to support your answer.

[4 pt] 7. Define Vapor Pressure. What **TWO** properties is Vapor Pressure independent of and what **TWO** properties is Vapor Pressure dependent on.

[4 pt] 8. What is meant by the term **Dynamic Equilibrium** when used in the context of liquid/vapor equilibrium. What is Dynamic and what is in equilibrium? Sketch a picture illustrating this concept.

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[2 pt] 9. If equal amounts of water is placed in (A) a 100 mL sealed flask and in (B) a 250 mL sealed flask which will have the highest vapor pressure. Explain. 9. _____

[2 pt] 10. If in the above example more water is added to flask (B), which flask will have the highest vapor pressure? Explain. 10. _____

[2 pt] 11. What is the relationship between Boiling Point, Vapor Pressure, and Atmospheric Pressure.

[3 pt] 12. The temperature of a beaker of boiling water on a hot-plate reads 100 °C. What can one conclude is the pressure of the atmosphere (in Torr or mmHg). Explain. 12. _____

[3 pt] 13. The temperature of a beaker of boiling ethanol on a hot-plate reads 60 °C. What can one conclude is the pressure of the atmosphere (in Torr or mmHg). Explain. 13. _____

[3 pt] 14. A mixture of solution A and solution B is placed in a closed container. The boiling point of solution A is 70 °C and solution B is 23 °C. Which substance will have the largest number of molecules in the vapor above the liquid at any given temperature. Explain. 14. _____

[5 pt] 15. Order the following molecules from lowest vapor pressure to highest vapor pressure (ex A < B < C etc). Draw lewis structures and assign IMF's to all molecules. Explain.

(a) CH_4 (b) CH_3Cl (c) H_2O (d) CH_3OH