

NAME:

HONORS CHEMISTRY

SECTION:

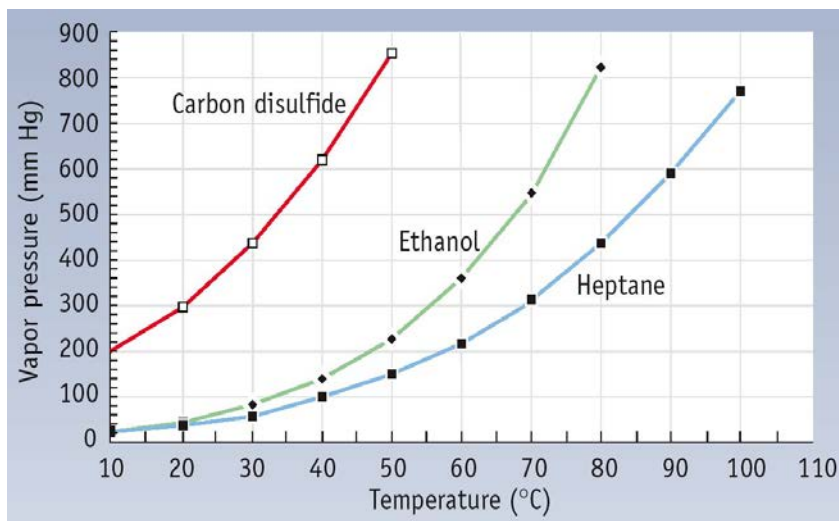
Vapor Pressure Curves and Phase Diagrams

Part A – Vapor Pressure

1. Denver is located exactly one mile above sea level, which means the normal atmospheric pressure is less than 1 atm. As a result, does water boil at a lower temperature or a higher temperature in Denver?  
\_\_\_\_\_
2. Explain your response above.

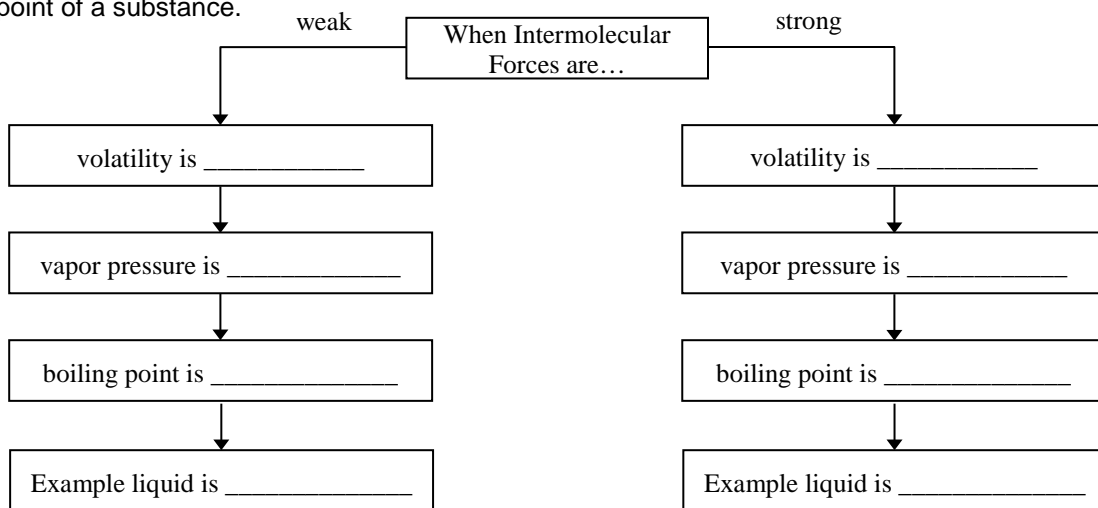
3. Use the graph of vapor pressures vs. temperatures to respond to the questions below.

- a) What is the vapor pressure of carbon disulfide at 30°C? \_\_\_\_\_
- b) What is the boiling point of ethanol when the external pressure is 200 mm Hg? \_\_\_\_\_
- c) What is the normal boiling point of carbon disulfide? \_\_\_\_\_
- d) What is the vapor pressure of heptane at 70°C?  
\_\_\_\_\_
- e) What is the temperature if the vapor pressure of heptane is 450 mm Hg?  
\_\_\_\_\_
- f) Which substance in the graph has the weakest intermolecular forces? Explain!



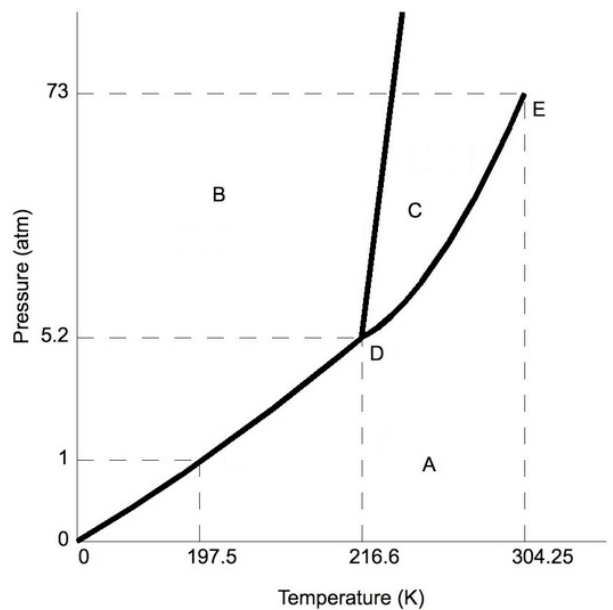
Part B – Intermolecular Forces

4. Fill in the diagram (with **high** or **low**) to show how intermolecular forces influence the volatility, vapor pressure, and boiling point of a substance.



**Part C – Generic Phase Diagram.** - Answer the questions below in relation to the following generic phase diagram.

5. Which section represents the solid phase? \_\_\_\_\_
6. What section represents the liquid phase? \_\_\_\_\_
7. What section represents the gas phase? \_\_\_\_\_
8. What letter represents the triple point? \_\_\_\_\_  
 In your own words, what is the definition of a triple point?



9. Remember that “normal” refers to normal pressure of 1 atm. What is this substance’s normal melting point?  
 \_\_\_\_\_
10. What is this substance’s normal boiling point? \_\_\_\_\_
11. Above what temperature is it impossible to liquefy this substance, no matter what the pressure? \_\_\_\_\_
12. At what temperature and pressure do all three phases coexist? \_\_\_\_\_
13. At a constant temperature, what would you do to cause this substance to change from the liquid phase to the solid phase?
14. Under what conditions could this substance sublime? \_\_\_\_\_

**Part D – Phase Diagram for Water**

15. What is the normal freezing point of water? \_\_\_\_\_
16. What is the normal boiling point of water? \_\_\_\_\_
17. What is the critical temperature and pressure of water?  
 \_\_\_\_\_ and \_\_\_\_\_
18. Use the capital letters (A,B,C, & D) to respond to the following:
  - a) Which line segment represents melting? \_\_\_\_\_
  - b) Which line segment represents deposition? \_\_\_\_\_
  - c) Which line segment represents evaporation? \_\_\_\_\_
  - d) Which line segment represents sublimation? \_\_\_\_\_
19. Identify the likely state of matter at each of the following conditions:
  - a) 80°C and 0.0008 atm: \_\_\_\_\_
  - b) 50°C and 100 atm: \_\_\_\_\_
  - c) -100°C and 1.0 atm: \_\_\_\_\_

