CHM 112 **Chapter 10, Liquids and Solids Extra Credit** **Name _____**

1. Draw the Lewis Structure for each molecule. Identify the type of intermolecular forces in each species. Circle the member of the pair with the corresponding property.

(A) Lowest boiling point: CCl_4 or CF_4

(B) Highest vapor pressure: CH_3CH_2OH or CH_3CH_2Cl

(C) Greatest Viscosity: $(CH_3)_2NH$ or $(CH_3)_3N$

(D) Largest ΔH_{vap}: LiCl or HCl

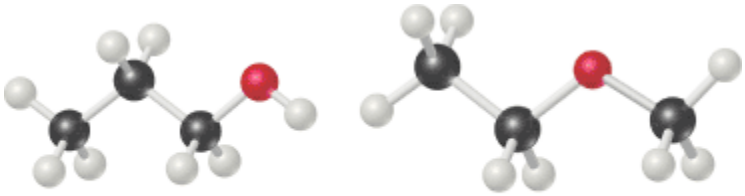
2. List the following molecules in order of increasing surface tension

a) $HOCH_2CH_2OH$, $CH_3CH_2CH_2CH_2CH_3$, CH_2CH_2OH

3. Which has the highest boiling point?

b) $CH_3CH_2NH_2$, CH_3CH_2-O-CH_2CH_3, $HOCH_2CH_2CH_2CH_2OH$

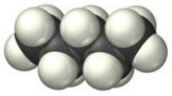
4. The following molecules have the same molecular formula (C_3H_8O), yet they have different normal boiling points, as shown. Explain the difference in the boiling points



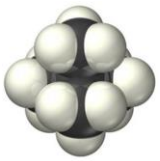
(a) Propanol
97.2°C

(b) Ethyl methyl ether
10.8°C

5. Which of the following molecules will have the higher viscosity and why?



***n*-Pentane**
molar mass = 72.15 g/mol



Neopentane
molar mass = 72.15 g/mol

6. What intermolecular forces are responsible for the following differences?

a) Xe is a liquid at atmospheric pressure and 120 K while Ar is a gas under the same conditions.

b) CH_3OH boils at 65 °C while CH_3SH boils at 6 °C.

c) H_2O has a much higher boiling point than H_2S

7. The vapor pressure of 1-propanol is 10.0 torr at 14.7 °C. Calculate the vapor pressure at 65.8 °C.
Given: Heat of vaporization of 1-propanol = 47.2 kJ/mol

8. The heat of vaporization of water is 40.7 kJ/mol. At what Temperature is the Vapor Pressure 145 Torr?

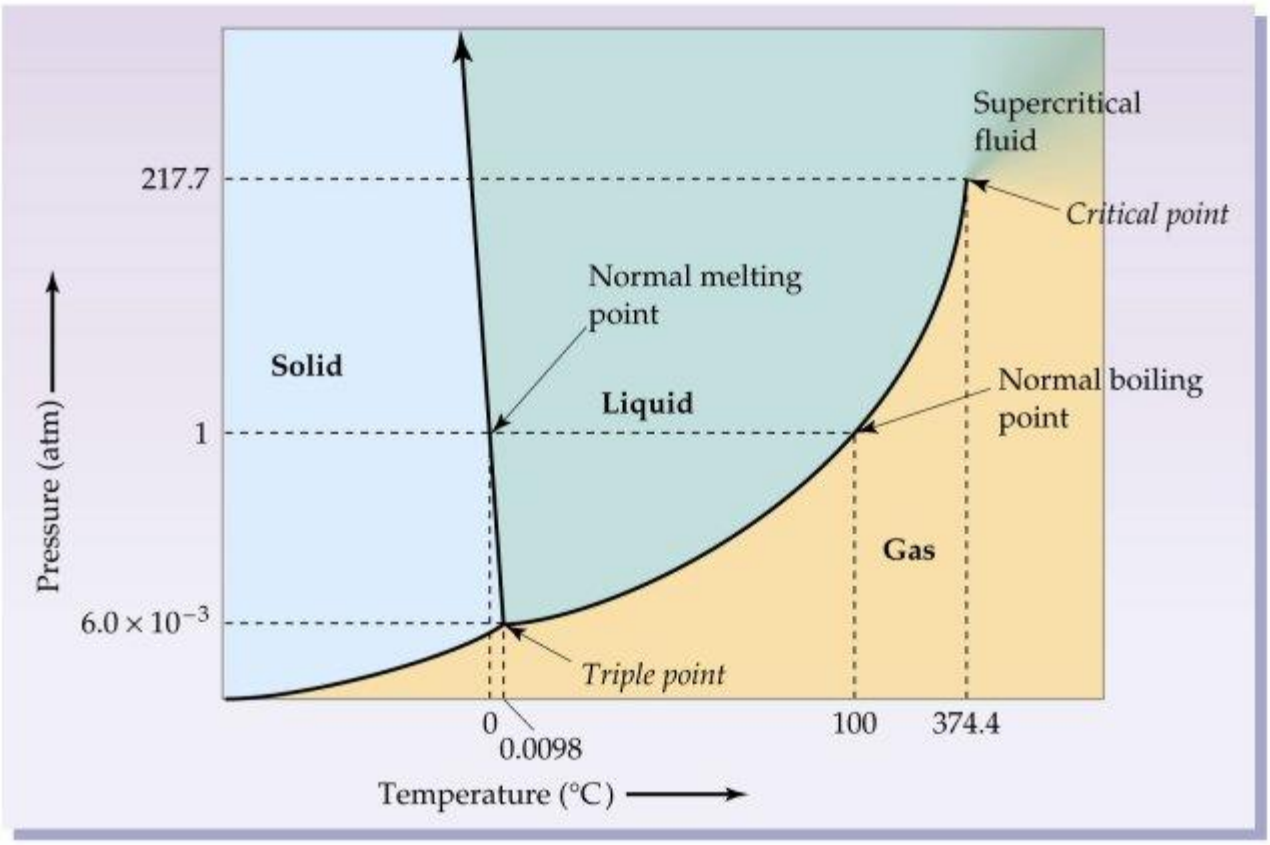
9. How much heat would be released during the condensation of 55.00 g of Acetone (C_3H_6O). The molar heat of vaporization for acetone is 30.3 kJ/mol.

10. How much heat is released when 10.0 g of Steam (water vapor) at 105.0 ˚C is cooled to liquid water at 25.0 ˚C? Look up the relevant constants.

11. Sketch the phase diagram for oxygen using the following data:

Triple point, 54.3 K and 1.14 torr; critical point, 154.6 K and 37828 torr; normal melting point, -218.4 °C; and normal boiling point, -182.9 °C. Does oxygen melt under an applied Pressure as water does?

12. Look at the phase diagram of water below. What phase changes occur in each of the following cases?



a) Water at -20.0 ˚C at 1 atm is heated to 200 ˚C at a constant pressure.

b) Water at 0 ˚C originally is compressed from a pressure of 1.0×10^{-3} atm to 200. atm constant Temperature ?

13. Indicate the type of crystal (molecular, metallic, ionic, or covalent-network) would each of the following compounds form on solidification. Would each have a high or low melting point?

a) $SrCO_3$ b) W c) SiO_2 d) Xe e) benzene f) I_2

14. Give an example of each kind of solid and state how the solid is bonded and the consequential relative melting point .

	Molecular	Ionic	Atomic (noble gas)	Atomic (Metallic)	Network Covalent
Example					
Bonding?					
Relative Melting Point					