**Quiz 10**

# Directions: Answer each of the following questions. Be sure to use complete sentences where appropriate. For full credit be sure to show all of your work. Where appropriate answers should be boxed for clarity, written to the correct number of significant figures, and, include the proper units.

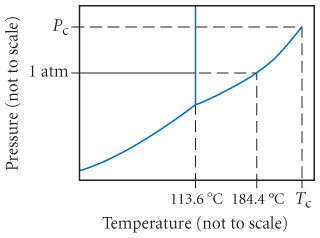
1. Is today’s lab a wet lab or a dry lab (1 point)? \_\_\_\_\_wet\_\_\_\_\_
2. Substance A has a smaller heat of vaporization than substance B. Which of the two substances will undergo a larger change in vapor pressure for a given change in temperature (2 points)?

Substance A

1. The dipole moment of CH2F2 (1.93 Debye) is larger than that of CH2Cl2 (1.60 Debye), yet the boiling point of CH2Cl2 (40 °C) is much higher than that of CH2F2 (-52 °C). Why (4 points)?

The substance with the higher boiling point will be that which has the largest sum of intermolecular forces. In this case, the greater dispersion forces of CH2Cl2 add to the dipole-dipole interactions to give stronger intermolecular forces between the CH2Cl2 molecules compared to those of CH2F2 molecules. Also, the molar mass of CH2Cl2 is higher than that of CH2F2 so it requires more energy to vaporize.

1. Consider the phase diagram for iodine show below and answer each of the following questions (4 points):



* 1. What is the normal boiling point for iodine? \_\_\_\_\_184.4 °C\_\_\_\_\_
  2. What is the melting point for iodine at 1 atm? \_\_\_\_\_113.6 °C\_\_\_\_\_
  3. What phase is present at room temperature and normal atmospheric pressure? solid\_\_\_\_\_
  4. What phase is present at 186 °C and 1.0 atm? \_\_\_\_\_gas\_\_\_\_\_

1. An XRD analysis (λ = 154 pm) of a sample of copper has peaks at 2θ = 24.64° (n = 1), 50.54° (n = 2), and 79.62° (n =3). What is the distance (d) between layers of Cu atoms that could produce this diffraction pattern (9 points)?

d = 361 pm is the distance between Cu atoms that produced three peaks.