

\* While I prefer you turn in a hard copy of the worksheet, I will accept scanned copies sent to my email address, joensj@fiu.edu

Section: (circle one)      M,W,F

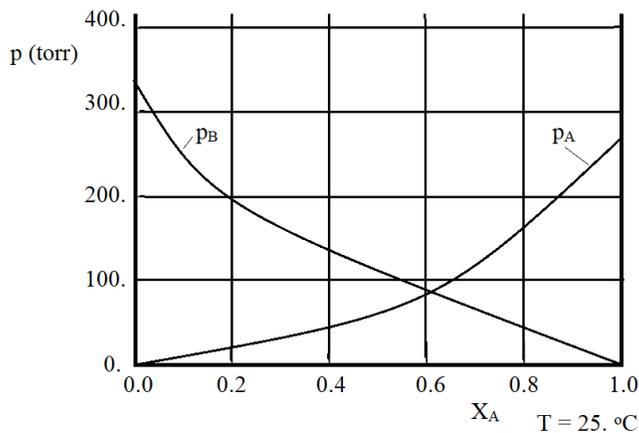
Tu,Tr

For problems involving calculations you must show your work for credit.

1) Which of the following statements is correct?

- a) The solubility of a solid in a liquid usually increases when temperature increases
- b) The solubility of a gas in a liquid usually increases when temperature increases
- c) The solubility of a gas in a liquid usually decreases when temperature increases
- d) Both a and b
- e) Both a and c

2) A diagram showing pressure vs mol fraction A for a solution of two volatile liquids, A and B, is given below. The diagram is for  $T = 25. \text{ }^\circ\text{C}$ .



a) Do A and B form an ideal solution (yes / no and a brief explanation)?

b) What are  $p_A^\circ$  and  $p_B^\circ$ , the vapor pressure of pure A and pure B, at  $T = 25. \text{ }^\circ\text{C}$ ?

$$p_A^\circ = \underline{\hspace{2cm}} \qquad p_B^\circ = \underline{\hspace{2cm}}$$

c) What is  $p_B$ , the partial pressure of B, when  $X_B = 0.80$ ?

$$p_B = \underline{\hspace{2cm}}$$

3) The normal freezing point and freezing point depression constant for cyclohexane ( $C_6H_{12}$ , MW = 84.16 g/mol) are  $T_f^\circ = 6.7\text{ }^\circ\text{C}$  and  $K_f = 20.8\text{ kg}\cdot^\circ\text{C/mol}$ . How many grams of naphthalene ( $C_{10}H_8$ , MW = 128.18 g/mol) must be added to 1000.0 g of cyclohexane to form a solution with a melting point  $T_f = 0.0\text{ }^\circ\text{C}$ ?

4) A solution is formed by dissolving 4.7 mg of a pure protein in water. The protein is nonvolatile and nonionizing. The final volume of the solution is  $V = 1.00\text{ mL}$ . The osmotic pressure of the solution relative to pure water, measured at  $T = 37.\text{ }^\circ\text{C}$ , is  $\Pi = 8.1\text{ torr}$ . Based on this information, find the molecular weight of the protein.