Chem. 111
100 POINTS   NAME _____ _____
                                              LAST   FIRST

EXAM 3

Show all your work. Your answers must have the correct number of significant figures and units. Correct spelling must be used.

(*5 pts.*) 1. Write the total and net ionic equations for the following: (Make sure the equations are balanced and all states are shown.

Molecular Equation: $Zn(OH)_2$ + H_2CO_3 -->

Total
ionic_____

Net
ionic_____

/5

(11 pts.) 2. An aqueous solution containing 10.50 g of a compound in 100.0 ml of solution has an osmotic pressure of 0.0187 atm. at 25°C. What is the molecular weight of the compound?

ANSWER_____

/11 points

3. (*22 pts.*) 250 ml of .700 M silver nitrate solution is added to .500 L of 0.600 M calcium hydroxide (molar mass silver nitrate = 169.8677 g/mol,
molar mass calcium hydroxide = 74.0927 g/ mol)

    a. Write the balanced equation

    b. Write the total ionic equation

    c. Write the net-ionic equation

    d. Calculate the mass of precipitate formed

ANSWER_____

    e. Calculate the molar concentration of <u>all</u> the ions remaining in solution after the reaction has taken place.
More room on next page.

Continue setup for problem 3

[Calcium ion] =_____

[silver ion] =_____

[hydroxide ion] =_____

[nitrate ion] =_____

/22 points

(*20pts.*) 4. What is the boiling point of a 25.20% (m/v) KNO_3 solution ? (Kf of water $= 1.86$ ^{0}C/molal) (Kb of water $= .52$ ^{0}C/molal) (molar mass potassium nitrate $= 101.10324$ g/mole)
  The density of the solution is 1.09 g/ml
What is the molarity of the solution?

Answer_____

What is the molality of the solution?

Answer_____

What is the boiling point of the solution?

Answer_____

/20 points

(*15 pts.*) 5. Methanol, CH_3OH and ethanol, C_2H_5OH , form an ideal solution. The vapor pressure of pure ethanol is 56 torr. If a solution prepared from 90.0 g of methanol and 120.0 g of ethanol boils at an external pressure of 0.11 atm, what is the vapor pressure of pure methanol?

ANSWER_____

/15 points

(*11 pts.*) 6. Draw a diagram that shows a negative deviation from Raoult's law for a mixture of substances A and B. In your diagram label the lines of what an ideal solution would be like and label the negative   deviations from those lines. Label the axes correctly. Label the points at which you would have pure A and pure B. Make sure you clearly and briefly define any symbols that you use.
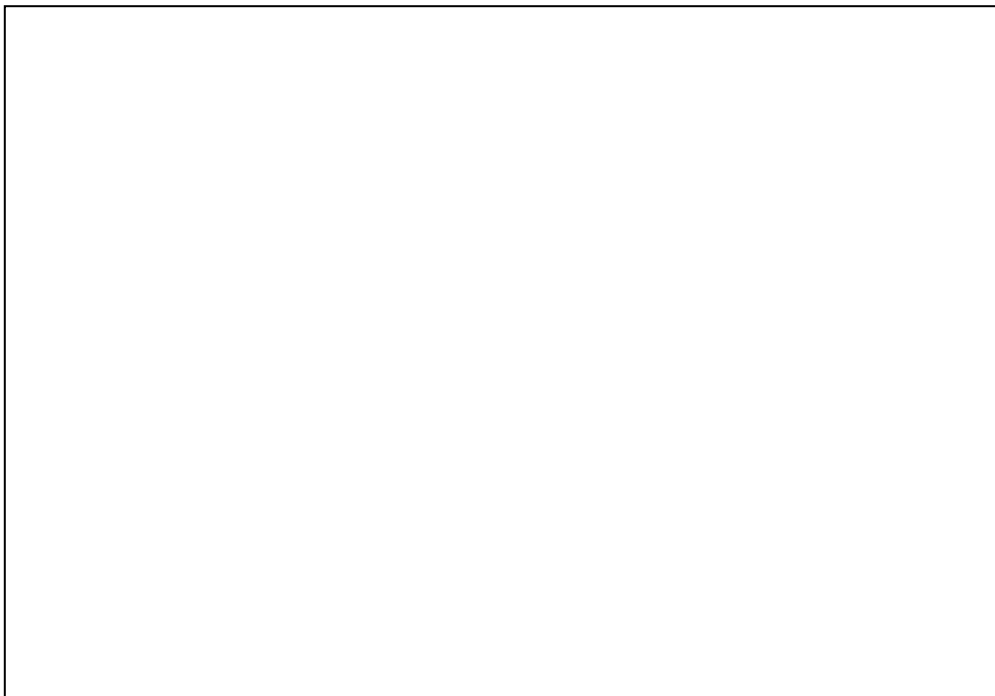
Is the real mixture of A and B more volatile or less volatile than an ideal solution of A and B?_____

From looking at your diagram, which substance is more volatile, A or B?_____ Explain how you know.

From the diagram you drew, which intermolecular bonds are stronger, the bond between A and B or the bond between A and A. Briefly explain

Answer:_____ Explanation: