CHM151 Bring Back Quiz #10 25 Pts Name: _____

Write brief explanations for your answers when possible and put your answers on Green Scantron.
Due at time of Final Exam.

1. In general, which of the following types of solids would be the most soluble in carbon disulfide, CS_2?
   A) ionic
   B) polar molecular
   C) nonpolar molecular
   D) network covalent
   E) metallic

2. Which of the following pure liquids is the best solvent for sodium fluoride?
   A) $BCl_3(l)$
   B) $CCl_4(l)$
   C) $PCl_5(l)$
   D) $C_2Cl_6(l)$
   E) $HCl(l)$

3. Which of the following compounds is <u>least</u> soluble in water?
   A) $CH_3CH_2CH_2F$
   B) $CH_3CH_2CH_2NH_2$
   C) $CH_3CH(OH)CH_3$
   D) CH_3CH_2COOH
   E) $CH_3CH_2NHCH_3$

4. Which of the following sets of conditions favors maximum solubility of an ionic solute in water?
   A) The magnitude of the lattice energy should be large, and the enthalpy of hydration of the ions should be large.
   B) The magnitude of the lattice energy should be large, and the enthalpy of hydration of the ions should be small.
   C) The magnitude of the lattice energy should be small, and the enthalpy of hydration of the ions should be large.
   D) The magnitude of the lattice energy should be small, and the enthalpy of hydration of the ions should be small.
   E) The enthalpy of hydration of the cation should be equal to the enthalpy of hydration of the anion, regardless of the magnitude of the lattice energy.

5. How does the solubility of a gas in a solvent depend on pressure and temperature?
   A) Increasing the partial pressure of the gas while decreasing the temperature increases the solubility of the gas.
   B) Increasing the partial pressure of the gas while increasing the temperature increases the solubility of the gas.
   C) Decreasing the partial pressure of the gas while decreasing the temperature increases the solubility of the gas.
   D) Decreasing the partial pressure of the gas while increasing the temperature increases the solubility of the gas.
   E) Gas solubility is unaffected by pressure or temperature.

6. Which of the following is <u>not</u> a colligative property?
   A) freezing-point lowering
   B) boiling-point elevation
   C) solute solubility
   D) osmotic pressure
   E) vapor-pressure lowering

7. As the number of solute particles in a given volume of solution increases,
   A) the freezing point will increase and the vapor pressure will increase.
   B) the freezing point will decrease and the vapor pressure will decrease.
   C) the boiling point will increase and the vapor pressure will increase.
   D) the boiling point will decrease and the vapor pressure will decrease.
   E) the osmotic pressure will decrease and the lattice energy will increase.

8. What is the mass percent of an aqueous sodium hydroxide solution in which the molarity of NaOH is 4.37 *M*? The density of the solution is 1.1655 g/mL.
   A) 68.9%
   B) 5.09%
   C) 15.0%
   D) 1.53%
   E) 0.267%

9. How many moles of urea (60. g/mol) must be dissolved in 56.9 g of water to give a 1.7 *m* solution?
   A) 1.1×10^3 mol
   B) 1.0×10^2 mol
   C) 1.7 mol
   D) 0.097 mol
   E) 0.0017 mol

10. What is the mole fraction of urea, $CO(NH_2)_2$, in a solution prepared by dissolving 5.6 g of urea in 33.7 g of methanol, CH_3OH?
    A) 0.081
    B) 0.92
    C) 0.14
    D) 0.86
    E) 0.24

11. The fact that the boiling point of a pure solvent is lower than the boiling point of a solution of the same solvent is a direct consequence of the
    A) vapor pressure of the solution being higher than the vapor pressure of the pure solvent.
    B) vapor pressure of the solution being lower than the vapor pressure of the pure solvent.
    C) osmotic pressure of the solvent being higher than the osmotic pressure of the solution.
    D) osmotic pressure of the solvent being lower than the osmotic pressure of the solution.
    E) freezing-point depression of the solution.

12. What is the freezing point of a 0.18 *m* solution of glucose, $C_6H_{12}O_6$, in water? (K_f for water is 1.858°C/*m*.)
    A) 0.33°C
    B) 0.17°C
    C) –0.17°C
    D) –0.33°C
    E) –0.67°C

13. Substance A has a greater molar mass than substance B. If 50 g of substance A are dissolved in 250 g of water in one beaker, and 50 g of substance B are dissolved in 250 g of water in another beaker, then
    A) the solution of A will freeze at a lower temperature than the solution of B.
    B) the solution of A will have a higher osmotic pressure than the solution of B.
    C) the two solutions will have the same vapor pressure.
    D) the boiling point of solution A will be lower than the boiling point of solution B.
    E) the vapor pressure of solution A will be lower than the vapor pressure of solution B.

14. A cucumber is placed in a concentrated salt solution. What is most likely to happen?
    A) Water will flow from the cucumber to the solution.
    B) Water will flow from the solution to the cucumber.
    C) Salt will flow into the cucumber.
    D) Salt will precipitate out.
    E) No change will occur.

15. Which of the following solutions would have the highest osmotic pressure?
    A) 0.2 *M* KCl
    B) 0.2 *M* $MgBr_2$
    C) 0.3 *M* CH_3COOH
    D) 0.3 *M* $C_6H_{12}O_6$
    E) 0.3 *M* $C_{12}H_{22}O_{11}$

16. Which of the following solutes, dissolved in 1.0 kg of water, creates a solution that freezes at the lowest temperature?
    A) 0.0015 mol of sucrose, $C_{12}H_{22}O_{11}$
    B) 0.0030 mol of ethanol, C_2H_5OH
    C) 0.0030 mol of methanol, CH_3OH
    D) 0.0015 mol of H_2SO_4
    E) 0.0015 mol of H_2SO_3