

Name: _____

Date: _____

- [3 pt] 1. How many grams of NaCl must you dissolve in 550.0 mL of water to prepare a 5.00 M NaCl solution. Show work to support your answer. _____
- [4 pt] 2. Calculate the mass percent of the following solutions. Show work to support your answer.
- (a) 10.0 g of NaBr + 100.0 g of H₂O 2(a) _____
- (b) 1.20 g of K₂SO₄ + 20.0 g of H₂O 2(b) _____
- [3 pt] 3. Calculate the mass-volume percent of a solution made by dissolving 42.0 g of CH₃OH (methanol) in C₂H₅OH (ethanol) to make a 100. mL solution. Show work to support your answer. 3. _____
- [3 pt] 4. What is the volume percent of 20.0 mL of methanol dissolved in water to a final volume of 70.0 mL. Show work to support your answer. 4. _____
- [4 pt] 5. How many grams of H₂SO₄ are in 240 mL of 18 M H₂SO₄. Show work to support your answer. 5. _____

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[4 pt] 6. What is the molarity of a solution prepared by diluting 115.0 mL of 1.5 M NaOH to a final volume of 950.0 mL? Show work to support your answer. 6. _____

[4 pt] 7. What volume of 2.50 M NaCl is required to prepare 500.0 mL of a 0.100 M NaCl? Show work to support your answer. 7. _____

[4 pt] 8. How many mL of water should you add to 35.00 mL of a 2.50 M solution of AgNO_3 to produce a 0.100 M solution of AgNO_3 ? Show work to support your answer. 8. _____

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- [4 pt] 9. Define the term "Colligative Property". What property(s) is it independent of, and what property(s) is it dependent on?
- [4 pt] 10. For each of the 4 colligative properties write a proportionality indicating what happens to each property as the # moles increases. (ex. As caffeine content of Jays coffee increases, so does the speed at which he talks: \uparrow caffeine \propto \uparrow speed of talking).
- [4 pt] 11. Does solution (A) 2.25 molal solution of NaCl in water or solution (B) 1.5 molal 11. _____ solution of NaCl in water show the greater freezing point depression? (which solutions freezing point will change the most.) Explain.
- [4 pt] 12. Does solution (A) 2.5 molal solution of NaCl in water or (B) 2.5 molal solution 12. _____ of KNO₃ in water show the greater freezing point depression? (which solutions freezing point will change the most.) Explain.
- [4 pt] 13. Which has the higher osmotic pressure, solution (A) containing 100.0 g of urea 13. _____ (NH₂CONH₂) in 1.0 kg of water, or a solution (B) containing 100.0 g of glucose (C₆H₁₂O₆) in 1.0 kg of water. Explain.

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[4 pt] 14. Explain in terms of vapor pressure why the boiling point of a solution containing a nonvolatile solute is higher than that of a pure solvent. (Hint: See figure 14.8)

[6 pt] 15. Calculate the following for a solution containing 1.68 g of naphthalene ($C_{10}H_8$) in 58.4 g of benzene (C_6H_6). Show work to support your answers.

(a) Molality. 15(a) _____

(b) Freezing point. 15(b) _____

(c) Boiling point. 15(c) _____

16. **Challenge Question:** The freezing point of a solution of 5.00 g of an unknown 16. _____ compound dissolved in 75.0 g of acetic acid is $13.2^\circ C$. Calculate the molar mass of the compound. Show work to support your answer.