

Name: _____

Period: _____

Seat#: _____

Directions: Show all work. Box final answers.

- 1) What is the vapor pressure of an aqueous solution that has a solute mole fraction of 0.1000? The vapor pressure of water is 25.756 mmHg at 25 °C. 23.18 mmHg
- 2) The vapor pressure of an aqueous solution is found to be 24.90 mmHg at 25 °C. What is the mole fraction of solute in this solution? The vapor pressure of water is 25.756 mm Hg at 25 °C. 0.03324
- 3) How many grams of nonvolatile compound B (molar mass= 97.80 g/mol) would need to be added to 250.0 g of water to produce a solution with a vapor pressure of 23.756 torr? The vapor pressure of water at this temperature is 42.362 torr. 1063 g - Comment: *this is a completely ridiculous amount to dissolve in 250.0 g of water, but oh well, just solve it!* ☺
- 4) At 29.6 °C, pure water has a vapor pressure of 31.1 torr. A solution is prepared by adding 86.8 g of "Y", a nonvolatile non-electrolyte to 350. g of water. The vapor pressure of the resulting solution is 28.6 torr. Calculate the molar mass of Y. 51.1 g/mol
- 5) The vapor pressure of pure water is 23.8 mmHg at 25.0 °C. What is the vapor pressure of 2.50 molal C₆H₁₂O₆ 22.8 mmHg

- 6) How many grams of testosterone, $C_{19}H_{28}O_2$, a nonvolatile, nonelectrolyte (MW = 288.4 g/mol), must be added to 207.8 grams of benzene to reduce the vapor pressure to 71.41 mm Hg? (Benzene = C_6H_6 = 78.12 g/mol. The vapor pressure of benzene is 73.03 mm Hg at 25.0 °C.) 17.4 g
- 7) At 25.0 °C, the vapor pressure of benzene (C_6H_6) is 0.1252 atm. When 10.00 g of an unknown non-volatile substance is dissolved in 100.0 g of benzene, the vapor pressure of the solution at 25.0 °C is 0.1199 atm. Calculate the mole fraction of solute in the solution, assuming no dissociation by the solute. 0.04233
- 8) What is the vapor pressure at 25.0 °C of a solution composed of 42.71 g of naphthalene (a non-volatile compound, 128 g/mol) and 40.65 g of ethanol (46.02 g/mol). (The vapor pressure of pure ethanol at 25.0 °C is 96 torr.) 70. torr
- 9) A nonvolatile organic compound Z was used to make up a solution. Solution A contains 5.00 g of Z dissolved in 100. g of water and has a vapor pressure of 754.5 mmHg at the normal boiling point of water. Calculate the molar mass of Z. 124 g/mol
- 10) What is the molality of an aqueous solution of urea, $CO(NH_2)_2$, if the vapor pressure above the solution is 22.83 mmHg at 25 °C? Assume that urea is non-volatile. The vapor pressure of pure water is 23.77 mmHg at 25 °C 2.31 m