

Be sure to show all work, use the correct number of significant figures, circle final answers and use correct units in all problems.

1. Fill in the blanks using the following species: (1 point each)



- a. Which species will have no appreciable intermolecular forces? _____
- b. Which species will exhibit hydrogen bonding in the liquid state? _____
- c. Which species will have the highest melting point? _____
- d. Which has the lowest normal boiling point? _____
- e. Will species has a solvent and solute? _____
2. The molar enthalpy of vaporization for 2-pentanol is 46.26 kJ/mol at 71.0 °C, and the density is 0.9884 g/cm³. How much energy is required to evaporate 2.25 L of 2-pentanol? (5 points)
3. A quantity (161 mmol, where 1 mmol = 10⁻³ mol) of a nonvolatile solute is dissolved in 0.101 kg of benzene (C₆H₆). The vapor pressure of pure benzene at 27 °C is 115.8 mm Hg. Find the mole fraction of the solute and the vapor pressure of the solution at 27 °C. (5 points)
4. Which will generate the higher osmotic pressure at 298 K: 1 L of a 0.250 M cesium sulfate solution or 1 L of a 0.220 M phosphoric acid? Explain your reasoning, calculate the osmotic pressure for both solutions and assume 100% dissociation into ions. (5 points)