

**Homework #8**  
**Problems (#56-#60)**

56. [adapted from Raff #8.22]  
Ten grams of a non-volatile solute are added to 5 moles of a solvent whose total volume is  $200 \text{ cm}^3$ . The partial molar enthalpy of fusion of the solvent is  $2,000 \text{ cal mol}^{-1}$ , and its normal freezing point is 280 K. The solvent in the solution freezes at 279.894 K. Calculate the osmotic pressure of the solution at 300 K, assuming that the solution is ideal.
57. E&R<sub>4th</sub> 9.18  
  
*[note: the given solution density ( $997 \text{ kg m}^{-3}$ ) is IRRELEVANT, not needed].*
58. [Adapted from Raff #9.29]  
The solubility product constant  $K_{\text{sp}}$  (expressed in molality reference) for  $\text{BaCl}_2(\text{s})$  is 176.94 at 298.15 K. The measured solubility of  $\text{BaCl}_2(\text{s})$  in water at that temperature is  $370.43 \text{ g (kg}^{-1} \text{ water)}$ . Determine the mean ionic activity coefficient for  $\text{BaCl}_2$  at saturation.
59. E&R<sub>4th</sub> P11.16
60. E&R<sub>4th</sub> P11.4

**FINIS**