

Chemistry 236 -- Practice Quiz 7
October 22, 2003 — Freezing Point Depression

Questions 1-3 concern the precipitation of $\text{Mg}(\text{OH})_2(\text{s})$ when solutions of MgCl_2 and NaOH are mixed. Assume that volumes are additive.

- 150 mL of 0.12 M MgCl_2 is mixed with 50 mL 0.84 M NaOH . Which ions remain in solution in significant concentration at the end of the reaction?
 - Mg^{2+} , Cl^- , OH^-
 - Mg^{2+} , Cl^- , Na^+
 - OH^- , Cl^- , Na^+
 - Mg^{2+} , Na^+ , OH^-
 - All four ions remain in significant concentration.
- What is the concentration of the non-spectator ion remaining in solution?
 - 0.006 M
 - 0.024 M
 - 0.030 M
 - 0.12 M
 - none of these
- Using the simplest theory (*i.e.*, ignoring activity coefficients), predict the freezing point of the resulting solution. Assume molality = molarity for this dilute solution. ($k_f = 1.855^\circ\text{C}$)
 - -0.78°C
 - -0.95°C
 - -1.28°C
 - -3.90°C
 - none of these
- An aqueous solution of a weak monoprotic acid having a concentration of 0.15 m° yields a freezing point depression of 0.37 K. What is the equilibrium constant K_m for this acid?
- An aqueous solution of ZnSO_4 is 0.063 m° in concentration and exhibits a freezing point depression of 0.150 K. What are the values of i and a_A for this solution?