1. Calculate the value of m± in 5.0 × 10–4 molal solutions of (a) KCl, (b) Ca(NO3)2, and (c) ZnSO4. Assume complete dissociation.

2. Calculate γ±, and a± for a 0.0325 m solution of K4Fe(CN)6 at 298 K.

3. Chloroacetic acid has a dissociation constant of Ka = 1.38 × 10–3. (a) Calculate the degree of dissociation for a 0.0825 m solution of this acid using the Debye–Hückel limiting law. (b) Calculate the degree of dissociation for a 0.0825 m solution of this acid that is also 0.022 m in KCl using the Debye-Hückel limiting law.

4. The principal ions of human blood plasma and their molar concentrations are mNa+ = 0.14 m, mCl− = 0.10 m, mHCO3− = 0.025 m. Calculate the ionic strength of blood plasma.

5. Express a± in terms of a+ and a– for (a) Li2CO3, (b) CaCl2, (c) Na3PO4, and (d) K4Fe(CN)6. Assume complete dissociation.

6. Express γ± in terms of γ+ and γ– for (a) SrSO4, (b) MgBr2, (c) K3PO4, and (d) Ca(NO3)2. Assume complete dissociation.

7. Using the Debye-Hückel limiting law, calculate the value of γ± in 5.0 × 10-3 m solutions of (a) KCl, (b) Ca(NO3)2, and (c) ZnSO4. Assume complete dissociation.

8. Calculate I, γ±, and a± for a 0.0250 m solution of K2SO4 at 298 K. Assume complete dissociation. How confident are you that your calculated results will agree with experimental results?

9. Calculate the ionic strength of each of the solutions in 0.0500 m solutions of (a) Ca(NO3)2, (b) NaOH, (c) MgSO4, and (d) AlCl3.