Problems:

1. Consider the following dipeptide. Perform the following:
   a. draw a titration curve for the dipeptide showing all important equivalence and halfway points
   b. give the charge of the dipeptide at each equivalence and halfway point

2. Using the same dipeptide found in problem #1, perform the following:
   a. draw the structure of the dipeptide at each equivalence point
   b. Indicate what the predominant structure will be at each halfway point

3. Using the same dipeptide found in problem #1, draw the structure at physiological pH (7.4). Explain why you chose the structure you chose.

4. Rank the following titrations from the endpoint with the lowest pH to the endpoint with the highest pH:
   - 2.0 M \( \text{C}_5\text{H}_5\text{N} \) titrated with 1.0 M HCl
   - 1.0 M \( \text{NH}_2\text{Cl} \) titrated with 2.0 M NaOH
   - 2.0 M NaClO titrated with 1.0 M HCl
   - 1.0 M HNO\(_2\) titrated with 2.0 M NaOH
   - 2.0 M NaHCOO titrated with 1.0 M HCl

5. Consider 0.10 M solutions of the following substances:
   \( \text{Ba(OH)}_2, \text{KNO}_3, \text{CH}_3\text{NH}_3\text{I}, \text{HCN}, \text{C}_5\text{H}_5\text{N}, \text{NaCN}, \text{HNO}_3 \)
   Rank from lowest pH to highest pH.
6. What will the pH of a solution be when 0.5447 L of NaOH (pH = 14.436) is added to 0.357 L of 2.01 M ascorbic acid (H$_2$C$_6$H$_6$O$_6$)?