

Name: _____ Student ID: _____
CHEM 161 PAL Fall 2026

Worksheet # 6: % Ionization

1. Draw all the protonation states of aspartate ($pK_{a1} = 1.88$, $pK_{a2} = 3.65$, $pK_{a3} = 9.60$) and determine the overall charge of each structure.
2. Which form of aspartate is the dominate form at the following pH values? Draw the structure.
 - a. pH = 1.00
 - b. pH = 7.00
 - c. pH = 14.00
3. Calculate the percentage of zwitterionic aspartate present at pH = 3.00. Show your work.

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4. Draw all the protonation states of lysine ($pK_{a1} = 2.18$, $pK_{a2} = 8.95$, $pK_{a3} = 10.53$) and determine the overall charge of each structure.

5. Which form of lysine is the dominate form at the following pH values? Draw the structure.
 - a. pH = 1.00

 - b. pH = 7.00

 - c. pH = 14.00

6. Calculate the percentage of lysine with an overall charge of +1 present at pH = 6.00
Show your work.