Some polyprotic problems that were on the extra problems for Week 12.

Chemistry 116 - Fall 2021
Dr. Audrey Dell Hammerich
Discussion Worksheet - Week 13

6. Arsenic acid (H_3AsO_4) is a triprotic acid.

a) Write out its stepwise ionization in water and associate the proper K_a with each step. List the formulas of all Brønsted-Lowry acids appearing in your stepwise ionization from weakest to strongest.

b) Write out the ionization in water of the conjugate base for each of the acids of part a) and associate the proper K_b with each step. List the formulas of all Brønsted-Lowry bases appearing from weakest to strongest.

c) Associate each K_a with the proper K_b so that $K_aK_b = K_w$.

7. Give the concentration of all species present (H_3O^+, OH^-, H_2A, HA^-, and A^{2-}) in a 0.40 M solution of a diprotic acid (H_2A) with the two acid ionization constants of $K_{a1} = 5.9 \times 10^{-2}$ and $K_{a2} = 6.4 \times 10^{-5}$.

$[H_3O^+] = [HA^-] = 0.13,\ [H_2A] = 0.27,\ [OH^-] = 8.0 \times 10^{-14},\ [A^{2-}] = 6.4 \times 10^{-5}\ \text{M}$