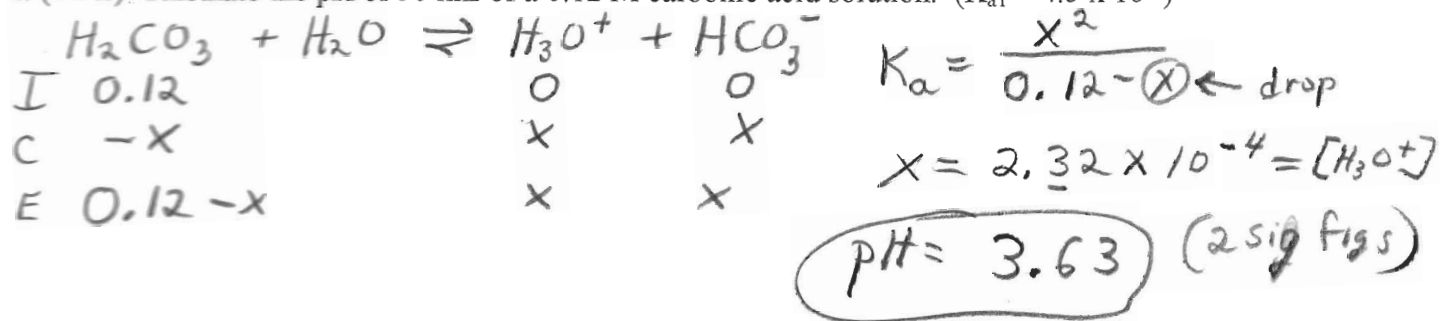
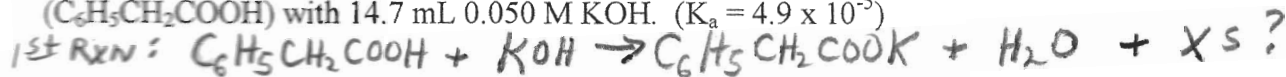


SHOW ALL WORK TO RECEIVE CREDIT.

1. (6 Pts) Calculate the pH of 50 mL of a 0.12 M carbonic acid solution. ($K_{a1} = 4.5 \times 10^{-7}$)



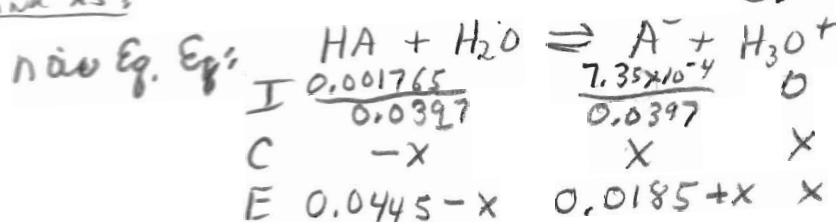
2. (8 Pts) Calculate the pH of a solution prepared by combining 25.00 mL of 0.10 M phenylacetic acid ($C_6H_5CH_2COOH$) with 14.7 mL 0.050 M KOH. ($K_a = 4.9 \times 10^{-5}$)



Find moles HA: $\frac{25.00 \text{ mL HA}}{1000 \text{ mL HA}} \times 0.10 \text{ mol HA} = 0.0025 \text{ mol HA}$

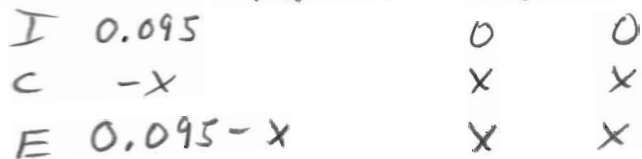
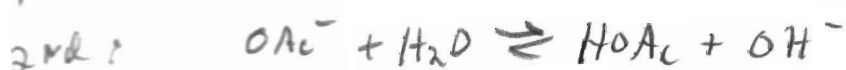
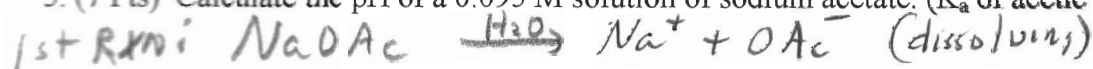
Find moles OH^- : $\frac{14.7 \text{ mL KOH}}{1000 \text{ mL KOH}} \times 0.050 \text{ mol KOH} = 7.35 \times 10^{-4} \text{ mol } OH^- = \text{moles SALT formed}$

Find Xs:



0.001765 mol Xs HA

3. (7 Pts) Calculate the pH of a 0.095 M solution of sodium acetate. (K_a of acetic acid = 1.8×10^{-5})



$K_b = 5.56 \times 10^{-10}$ ($K_a K_b = K_w$)

$K_b = \frac{x^2}{0.095 - x}$

$x = 7.26 \times 10^{-6} = [OH^-]$
 $\text{pOH} = 5.14$ ($\text{pH} = 8.86$)

4. (4 Pts) Rank the following acids from weakest to strongest.

formic acid $pK_a = 3.74$

hydrofluoric acid $pK_a = 3.17$

hypochlorous acid $pK_a = 7.54$

phenol $pK_a = 10$

phenol < hypochlorous acid < formic acid < HF