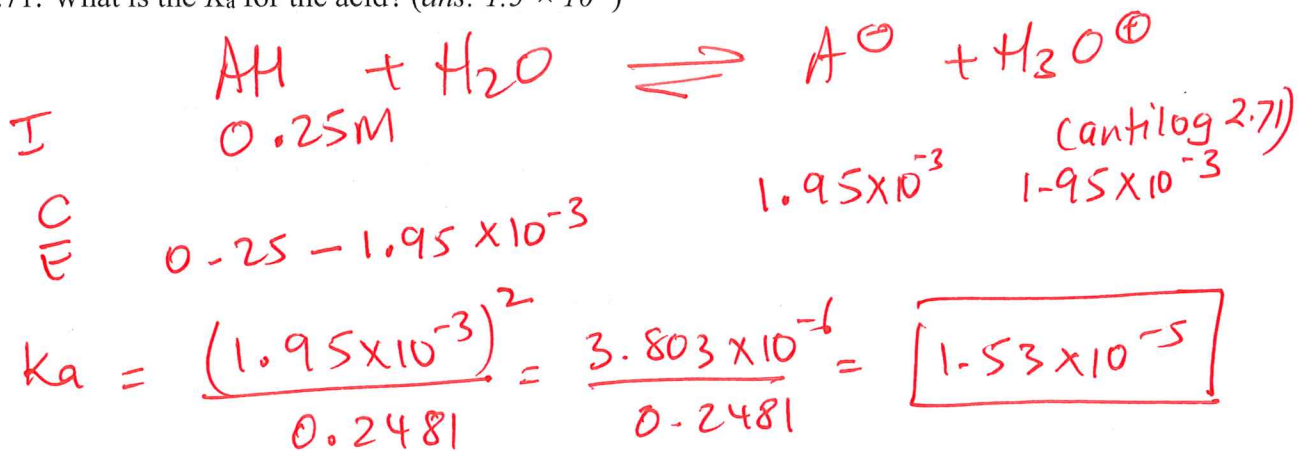


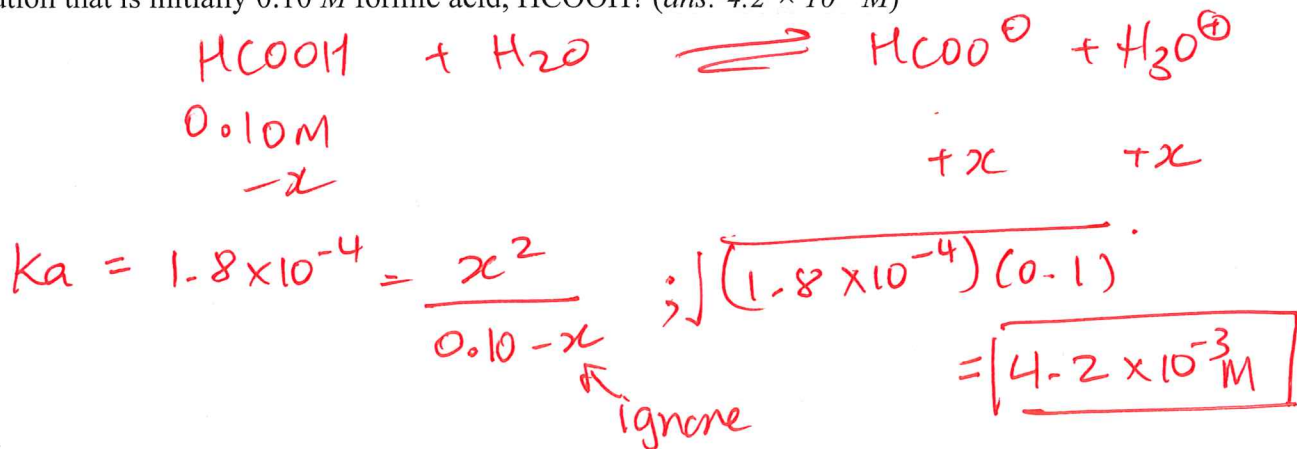
1) Classify the following as acidic, basic or neutral salts:

- a) LiCl b) KNO₃ c) NH₄Cl d) Na₃PO₄
- neutral neutral acidic basic

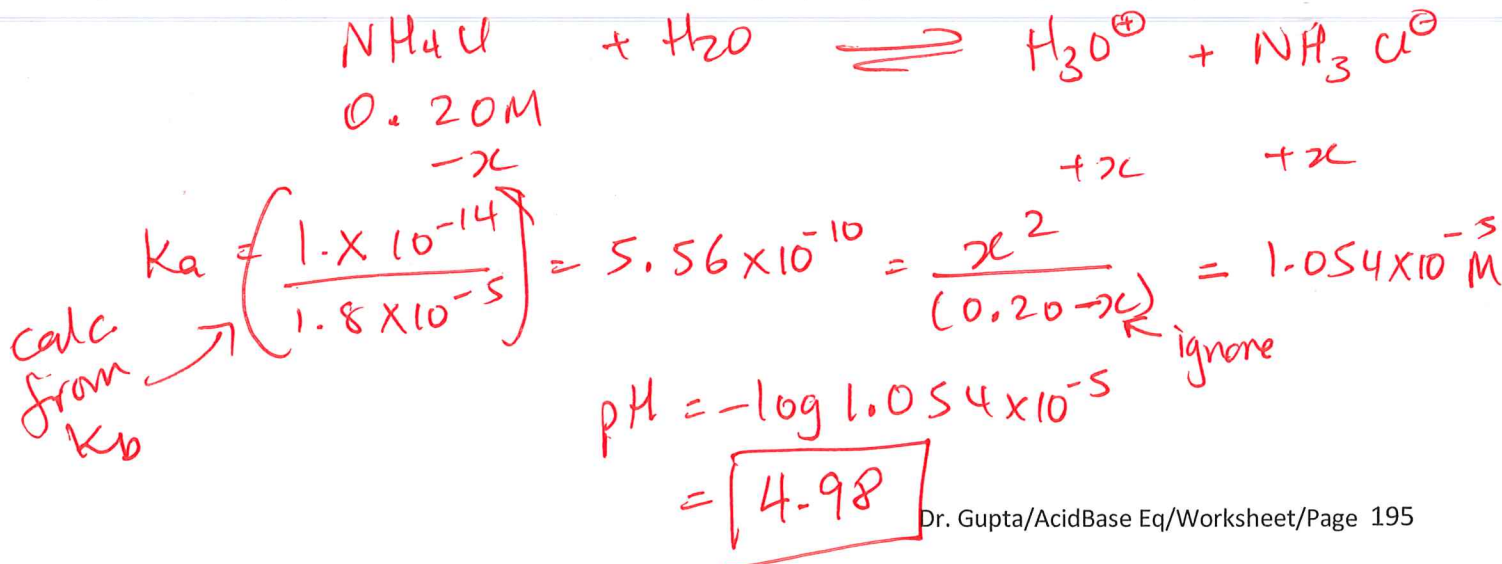
2) Butyric acid is responsible for the odor in rancid butter. A solution of 0.25 M butyric acid has a pH of 2.71. What is the K_a for the acid? (ans: 1.5 × 10⁻⁵)



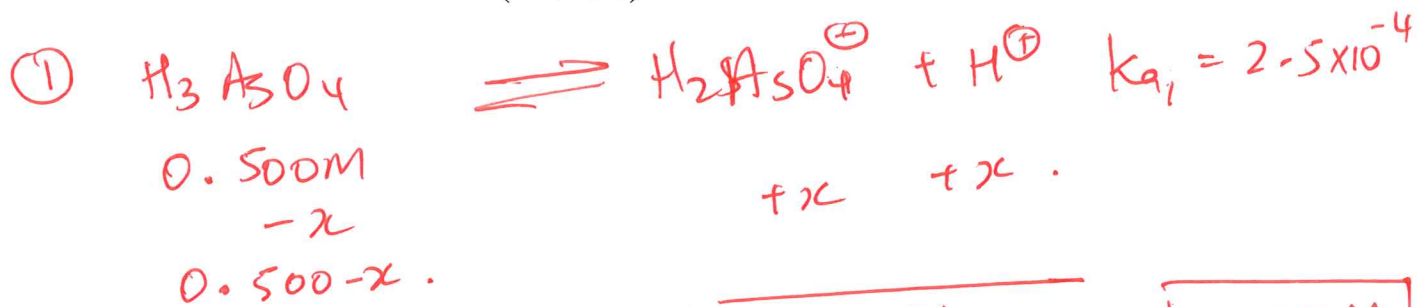
3) Formic acid, which is a component of insect venom, has a K_a = 1.8 × 10⁻⁴. What is the [H₃O⁺] in a solution that is initially 0.10 M formic acid, HCOOH? (ans: 4.2 × 10⁻³ M)



4) What is the pH of a 0.20 M solution of NH₄Cl? [K_b(NH₃) = 1.8 × 10⁻⁵] (ans: 4.98)

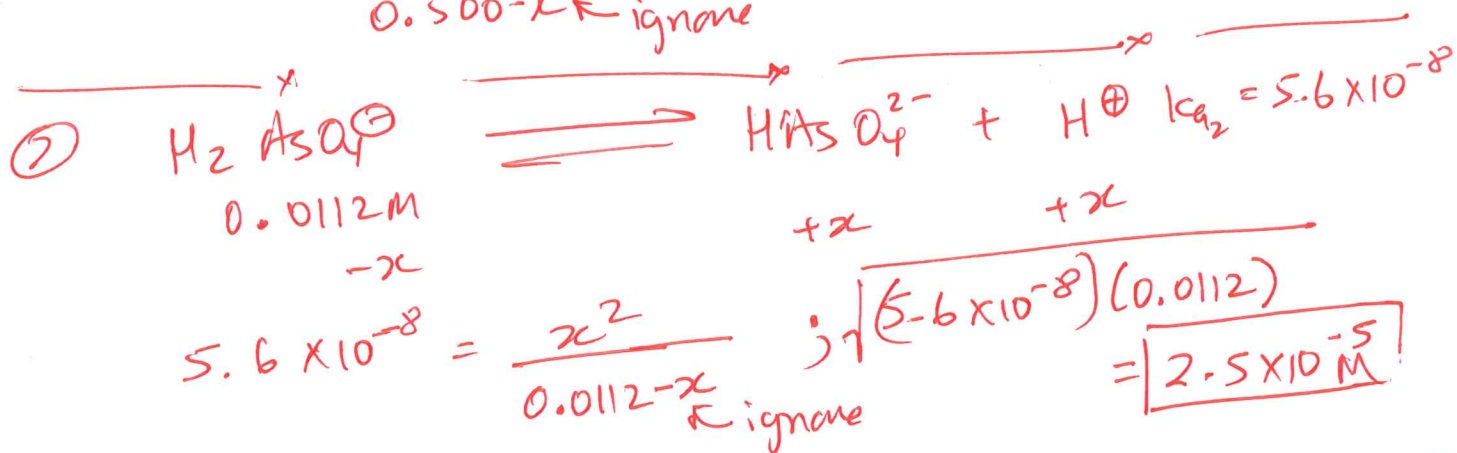


5) Farmers who raise cotton once used arsenic acid, H_3AsO_4 , as a defoliant at harvest time. Arsenic acid is a polyprotic acid with $K_1 = 2.5 \times 10^{-4}$, $K_2 = 5.6 \times 10^{-8}$, and $K_3 = 3 \times 10^{-13}$. What is the pH of a 0.500 M solution of arsenic acid? (ans: 1.96)

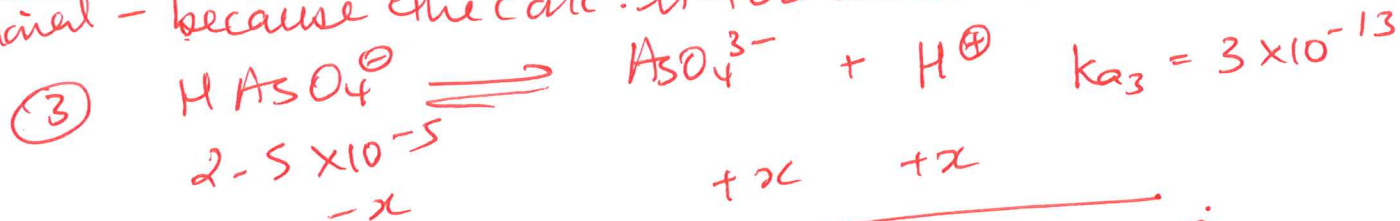


$$2.5 \times 10^{-4} = \frac{x^2}{0.500-x} \quad ; \quad \sqrt{(2.5 \times 10^{-4})(0.5)} = \boxed{0.0112\text{M}}$$

$0.500-x \leftarrow \text{ignore}$



approx - because the conc. is too small now.



$$3 \times 10^{-13} = \frac{x^2}{2.5 \times 10^{-5}-x} \quad ; \quad \sqrt{(3 \times 10^{-13})(2.5 \times 10^{-5})} = \boxed{3 \times 10^{-9}\text{M}}$$

$2.5 \times 10^{-5}-x \leftarrow \text{ignore}$

$$\text{total } [\text{H}_3\text{O}^{\oplus}] = (0.0112) + (2.5 \times 10^{-5}) + (3 \times 10^{-9})$$

$$= 0.011225$$

$$\text{pH} = -\log 0.011225$$

$$= \boxed{1.95}$$