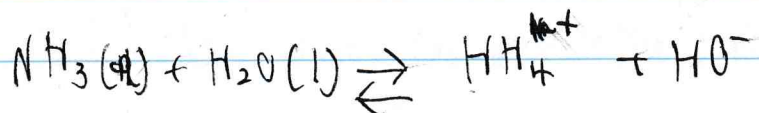


Lecture 2 Problems

Problem 1

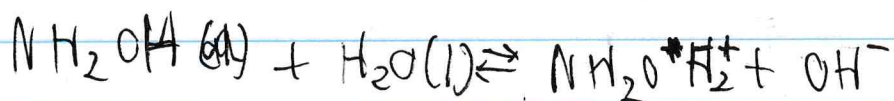
(a) Begin by writing the dissociation equation:



Then

$$1.8 \cdot 10^{-5} = \frac{x^2}{(0.3 - x)} \Rightarrow x = 0.0023 \\ = [\text{OH}^-] \Rightarrow \text{pH} = 11.36$$

(b) Again, write the dissociation equation



$$1.1 \cdot 10^{-8} = \frac{x^2}{(0.54 - x)} \Rightarrow x = 7.7 \cdot 10^{-5} \Rightarrow \text{pH} = 9.89$$

Problem 2

(a): Reactant 1 is the base and Product 1 is the conjugate acid.
Reactant 2 is the acid and Product 2 is the conjugate base.

(b): Same as (a)

(c): Reactant 1 is an acid and Product 1 is its conjugate base.
Reactant 2 is a base and Product 2 is its conjugate acid.

Problem 3

$$K_a = \frac{[AA^-][H_3O^+]}{[AA]} = ? = \frac{(1.12 \cdot 10^{-2})^2}{0.5} = 2.6 \cdot 10^{-4}$$

$$1.95 = -\log([H_3O^+]) \Rightarrow 1.12 \cdot 10^{-2}$$