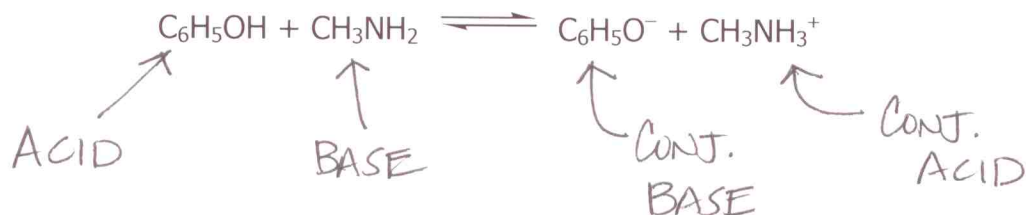


## Quiz #2

Chemistry, 7<sup>th</sup> ed., Zumdahl & Zumdahl, sections 14.1-14.5 & 14.7

Unless otherwise specified, each question is worth 4 points.

1. For the following reaction, identify the acid, the base, the conjugate acid and the conjugate base:



2. The soft drink *Dr. Pepper* has an  $\text{H}^+$  concentration of  $1.2 \times 10^{-3}$  mol/L. Calculate the pH, pOH, and  $[\text{OH}^-]$  for this beverage.

$$\text{pH} = -\log [\text{H}^+] = -\log (1.2 \times 10^{-3}) = \boxed{2.92}$$

$$\text{pH} + \text{pOH} = 14.00 \quad ; \quad \text{pOH} = \boxed{11.08}$$

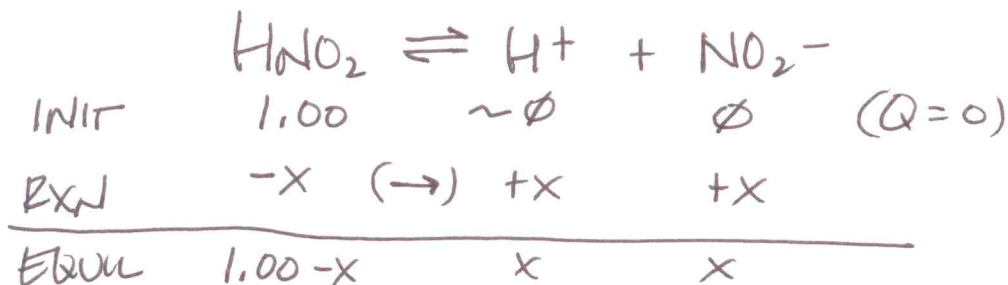
$$[\text{OH}^-] = 10^{-\text{pOH}} = 10^{-11.08} = \boxed{8.3 \times 10^{-12} \frac{\text{mol}}{\text{L}}}$$

3. What are the major species present in 1 M solutions of each of the following acids?



Unless otherwise specified, each question is worth 4 points.

4. Calculate the pH of a 1.00 M solution of  $\text{HNO}_2$  at  $25^\circ\text{C}$ ;  $K_a = 4.0 \times 10^{-4}$ .



$$K_a = 4.0 \times 10^{-4} = \frac{x^2}{1.00 - x} \approx \frac{x^2}{1.00} ; \quad x = 2.0 \times 10^{-2} = [\text{H}^+]$$

5. Write out the stepwise  $K_a$  reactions for the diprotic acid  $\text{H}_2\text{CO}_3$ .

$$\text{pH} = -\log(2.0 \times 10^{-2}) = \boxed{1.70}$$

