

1. (4 Pts) Calculate the pH of a solution containing 0.20 g of NaOH in 2,000. mL of solution. Molar mass of NaOH = 40.0.

$$\text{NaOH(s)} \rightarrow \text{Na}^+ + \text{OH}^-$$

| | | | |
|------------|--------|-------------------|----------------------------|
| 0.20g NaOH | mol | 1 OH ⁻ | = 0.0025 M OH ⁻ |
| 40.0g | 1 NaOH | 2.000L | |

pOH = -Log 0.0025 = 2.60
pH = 11.40

2. (4 Pts) Calculate the pH of a 3.5×10^{-3} M HNO₃ solution.

pH = -Log 3.5×10^{-3} = 2.46 Strong Acid

3. (4 Pts) The pH of 40.00 mL of a Ba(OH)₂ solution is 10.00. What is the H⁺ ion concentration of this solution?

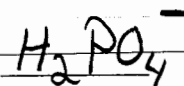
$[\text{H}_3\text{O}^+] = 10^{-\text{pH}} = 10^{-10}$ M

4. (4 Pts) What is the pH of a 0.014 M Ca(OH)₂ solution?

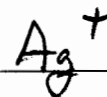
$$\text{Ca(OH)}_2(\text{s}) \xrightarrow{\text{H}_2\text{O}} \text{Ca}^{2+} + 2\text{OH}^-$$

$[\text{OH}^-] = 2 \times 0.014$ pOH = -Log [0.028] = 1.55 pH = 12.45

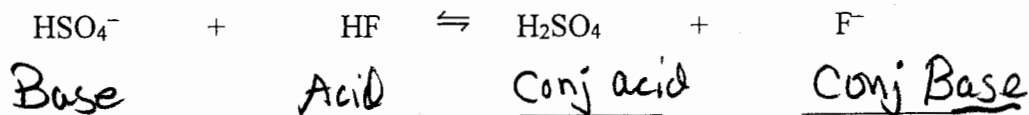
5. (2 Pts) Write the formula for the conjugate base of H₃PO₄



6. (2 Pts) Identify the Lewis acid in the reaction $\text{Ag}^+(\text{aq}) + \text{Cl}^-(\text{aq}) \rightarrow \text{AgCl}(\text{s})$



7. (2 Pts) Identify the conjugate acid-base pairs in the reaction



8. (2 Pts) Which of these acids is stronger, H₃AsO₃ or H₃AsO₄?

9. (2 Pts) Which of these acids is stronger, H₃PO₄ or H₃AsO₄?

10. (3 Pts) Calculate the H⁺ and OH⁻ ion concentrations in a solution with a pH of 3.85.

$[\text{H}^+] = 10^{-\text{pH}} = 10^{-3.85} = 1.41 \times 10^{-4}$

$[\text{OH}^-] = 10^{-\text{pOH}} = 10^{-10.15} = 7.08 \times 10^{-11}$