

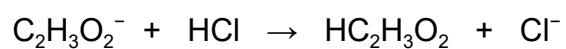
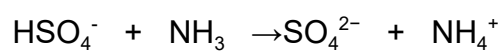
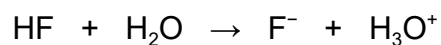
Acid-Base Warm-ups.notebook

1. Acid-Base Definitions

1. Give the definition of acids and bases according to:
 - a. Arrhenius
 - b. Lowry-Bronsted
 - c. Lewis
2. Identify lowry-bronsted the acids and bases in the following reaction:
$$\text{HBr} + \text{H}_2\text{O} \rightleftharpoons \text{H}_3\text{O}^+ + \text{Br}^-$$
3. Is PCl_3 a lewis acid or base?

2. Conjugate pairs

Identify the acid, base, conjugate acid and conjugate base



3. Conjugate Pairs

1. Determine the conjugate acid:

- CO_3^{2-}
- PO_4^{3-}
- NO_3^-
- I^-
- $\text{C}_2\text{H}_3\text{O}_2^-$

2. Determine the conjugate base:

- OH^-
- H_3O^+
- NH_4^+
- H_2NO_3^+
- HNO_3

4. Kw

- 10.0g of calcium hydroxide is dissolved in 400mL of water. Write the dissociation equation and calculate both the $[\text{H}_3\text{O}^+]$ and $[\text{OH}^-]$. (hint, use Kw)
- Calculate: $\log 1000$
- What do you think the log of 500 would be?

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5. pH, pOH, Kw

5g of calcium hydroxide is dissolved in 1L of water. Determine the pH.

6. pH, pOH, Kw

10g of H_2SO_4 is dissolved in 2L of water. Determine the pOH.

7. Neutralization Review

5.0mL of an unknown HCl solution is neutralized with 20mL of a 0.1mol/L NaOH solution. Determine the concentration of the acid.

8. Acid-Base Reactions

Complete the Acid-Base reaction:



Determine which side is favoured.

9. Strength vs Concentration

Can you have a concentrated weak acid? Why/Why not?

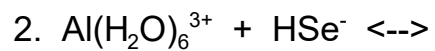
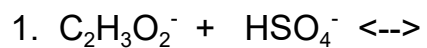
10. Ka Calculations

A 0.25 mol/L solution of some acid HA has a K_a value of 3.0×10^{-8} . Find the H_3O^+ concentration

Extension: What would be the pH of the solution?

11. Acid-Base Reactions

Complete the reaction and state which side is favoured.



12. Ka, Kb, pH, pOH

The pH of a 0.25 mol/L solution of NH_3 is 8.5. Using this, calculate the value of Kb for the base.

13. K_a , K_b , pH, pOH

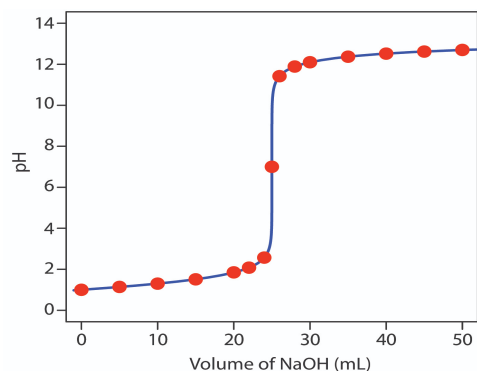
Calculate the pH of a 0.5 mol/L solution of NH_3 if $K_b = 1.77 \times 10^{-5}$

14. Titrations

A 1.5g sample of an unknown acid " H_2A " is titrated with 0.5mol/L NaOH. It takes 22.15mL of the base to neutralize the acid. Determine the molar mass of the acid.

15. Titration Curves

10mL of an unknown H_2SO_4 solution is titrated with a 0.15mol/L NaOH solution. Use the resulting titration curve below to determine the $[\text{H}_2\text{SO}_4]$



Why could phenolphthalein be used as indicator for this titration?

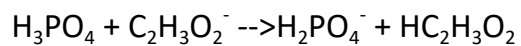
16. K_a , K_b , pH, pOH

A 0.20 M solution of the weak base HPO_4^{2-} has a pH of 9.00. Find K_b

17. Lewis Acids, Conjugates

1. Draw the lewis structure for S^{2-} , is it an acid or base?

2. Determine the acid, base and their conjugates:



3. Find the conjugate acid of: HSO_4^-

4. Find the conjugate base of: HSO_4^-