Unit 6 - Review

Solubility: Table F

Concentration: Molarity (Table T)

Titration/Neutralization: (Table T)

Acids & Bases (Table K, L, M)

Electrolytes need 2 things to be conductive:
1. Charged particles
2. Mobile

ESA

Molarity: $M = \frac{\text{mol solute}}{\text{L solution}}$ (* must convert to L)

Titration: (completely neutralized) $M_A V_A = M_B V_B$

DILUTION: $M_I V_I = M_F V_F$

Arrhenius:

ACID: H^+ is the only (+) ion. $H^+ = H_3O^+$ (hydronium ion)

BASE: ^-OH is the only (-) ion. ^-OH hydroxide ion

$NaCl$ $CaCl_2$ $C_6H_{12}O_6$

Hydronium

$H_3O^+ \longrightarrow H^+ + H_2O$

Dissociation: $CaCl_2 \longrightarrow Ca^{+2}_{(aq)} + 2Cl^-_{(aq)}$

$H_2SO_4 + 2LiOH \longrightarrow H(OH) + Li_2SO_4$

Acid Base water Salt

How many mL of 1.75 M HCl is required to completely neutralize 12.6 mL of 2.4 M NaOH?

$Ca(OH)_2 \longrightarrow Ca^{2+} + 2OH^-$

$M_AV_A = M_BV_B$

$(1.75\,M)(x?) = (4.8\,M)(12.6\,mL)$

pH scale = 1 → 14

(hydronium ion)

pH = 1, $[H^+] = [H_3O^+] = 1 \times 10^{-1}$, 0.1

pH = 2, $[H^+] = [H_3O^+] = 1 \times 10^{-2}$, 0.01] 10

pH = 5, $[H^+] = [H_3O^+] = 1 \times 10^{-5}$, 0.00001] 10 10 10 10 = 10,000

Each step in pH is a factor of 10 change in concentration.

TABLE M

methyl orange	pH	color
	< 3.1	
	3.1 → 4.4	
	> 4.4	

Molarity Ladder

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* Iron II phosphate $Fe_3(PO_4)_2$
* Copper II nitride Cu_3N_2

} These are the building blocks of the entire packet.

- Read the problem
- Review dimensional analysis
- Use Table T
- $1\ L = 1000\ mL = 1000\ cm^3$

$$\text{Molarity} = \frac{\text{moles solute}}{\text{L solution}}$$

2.5 g NaOH in 0.3 L of water. What is the concentration?

IB Material - Further Acid/Base Discussion

Brönsted - Lowry: Acid - proton (H^+) donor

$$NH_3 + \boxed{H_2O} \rightleftharpoons NH_4^+ + OH^-$$

Amphoteric

Base - proton (H^+) acceptor

$$HCl + H_2O \rightleftharpoons \boxed{H_3O^+} + Cl^-$$

Lewis Acid: e^- pair acceptor (BF_3)

Lewis Base: e^- pair donor ($\ddot{N}H_3$)

Anhydrides: Acids and Bases without water. $[2\,HNO_3]$ $\xrightarrow{H_2O}$ N_2O_5

IB Material - Further Acid/Base Discussion

Naming Acids : Bases

* Use the information given in the booklet.

Binary (two) vs. Oxyacids (containing polatomic ions w/ oxygen)

HCl [hydrochloric acid] vs. $HClO_3$ [chloric acid]

* Determine the oxidation state of the chlorine, then use the table to complete the name.

$HClO_3$ $HClO_4$ $HClO_2$ $HClO$