Ministry of Higher Education and Scientific Research

Mustansiriyah University

College of Science / Department of Chemistry

Practical Analytical Chemistry

For First Year Students Biology Department

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INTRODUCTION

Concentration of Solutions: The relative amount of solute present in a solution, there are several way of solute present in a solution.

Types of concentrations

- Molarity (M): The number of moles of solute present in one liter of the solution or the number of millimoles of solute present in one milliliter of the solution.

$$\text{Molarity (M)} = \frac{\text{w (g)}}{\text{M.wt}} \times \frac{1000}{\text{V, mL}}$$

- **Normality (N):** The number of equivalents (eq) of solute present in one liter of solution or the number of milli-equivalents (meq) of solute per milliliter of solution.

$$N = \frac{w\ (g)}{eq.wt} \times \frac{1000}{V,\ mL} \quad \text{or} \quad N = \frac{w\ (mg)}{meq.wt} \times \frac{1000}{V,\ mL}$$

- **Molality (m):** The number of moles of solute per kilogram of the solvent.

$$\text{Molality (m)} = \frac{\text{number of moles of solute (mole)}}{\text{kg of solvent}}$$

- **Normality (N):** The number of equivalents (eq) of solute present in one liter of solution or the number of milli-equivalents (meq) of solute per milliliter of solution.

$$N = \frac{w\ (g)}{eq.wt} \times \frac{1000}{V,\ mL} \quad \text{or} \quad N = \frac{w\ (mg)}{meq.wt} \times \frac{1000}{V,\ mL}$$

- **Molality (m):** The number of moles of solute per kilogram of the solvent.

$$\text{Molality (m)} = \frac{\text{number of moles of solute (mole)}}{\text{kg of solvent}}$$

- **Formality (F):** The number of formula weights of solute present per liter of the solution.

$$\text{Formality (F)} = \frac{\text{w (g)}}{\text{Fw}} \text{ X } \frac{1000}{\text{V, mL}}$$

Dilution of Solutions

It can be prepare a diluted solution from another concentrated solution by adding distilled water.

$$N_1 V_1 = N_2 V_2$$

$$\text{Normality}_1 \text{ x Volume}_1 = \text{Normality}_2 \text{ x Volume}_2$$

(Befor dilution) (After dilution)