

Aquatic Ecology374

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lab 6



السلام عليكم ورحمة الله وبركاته

# Physico- Chemical Properties of Water

1- **Equivalent weight**: The equivalent weight of a compound can be calculated by dividing the molecular weight by the number of positive or negative electrical charges that result from the dissolution of the compound (acidity or basicity).

1- Equivalent weight:

ex: NaOH

$$\frac{23+16+2}{1} = \frac{\text{molecular weight}}{\text{basicity}}$$

$$= 41$$

3-Normality: The normality of a solution is the gram equivalent weight of a solute per liter of solution. Normality is the only concentration unit that is reaction dependent.

2-Molarity: is the number of moles of solute dissolved in one liter of solution. The units, therefore are **moles per liter**, specifically it's **moles of solute per liter of solution**

**Free Carbon dioxide dissolved in  
water**



## **Theory:**

- ❑ Carbon Dioxide is present in water in the form of a dissolved gas.
- ❑ Surface waters normally contain less than 10 ppm free carbon dioxide, while some ground waters may easily exceed that concentration.
- ❑ Carbon dioxide is readily soluble in water. Over the ordinary temperature range (0-30 C) the solubility is about 200 times that of oxygen.
- ❑ Calcium and magnesium combine with carbon dioxide to form carbonates and bicarbonates.
- ❑ Aquatic plant life depends upon carbon dioxide and bicarbonates in water for growth. Phytoplankton, as well as large rooted plants (macrophytes), utilize carbon dioxide in the photosynthesis of plant materials; starches, sugars, oils, proteins.
- ❑ The carbon in all these materials comes from the carbon dioxide in water.

## Principle

It is the normal practice to distinguish free carbondioxide as the concentration of  $\text{CO}_2 + \text{H}_2\text{CO}_3$ , which is estimated by titrating the sample with standard alkali titrant to pH 8.3

## **Requirement**

Sodium Hydroxide (0.02272 N)

Phenolphthalein indicator

Titration assembly (burette, pipette,

Conical flasks, measuring cylinder,  
stand, clamps etc.)

## Method :

Take 50 ml of water sample in a flask

Add 2 drops of phenolphthalein indicator (if slight pink colour develops then free carbon dioxide is absent)

If the solution remains colourless, titrate with standard alkali titrant to slight pink end point

Note the reading and calculate the free carbon dioxide in milligram per liter.

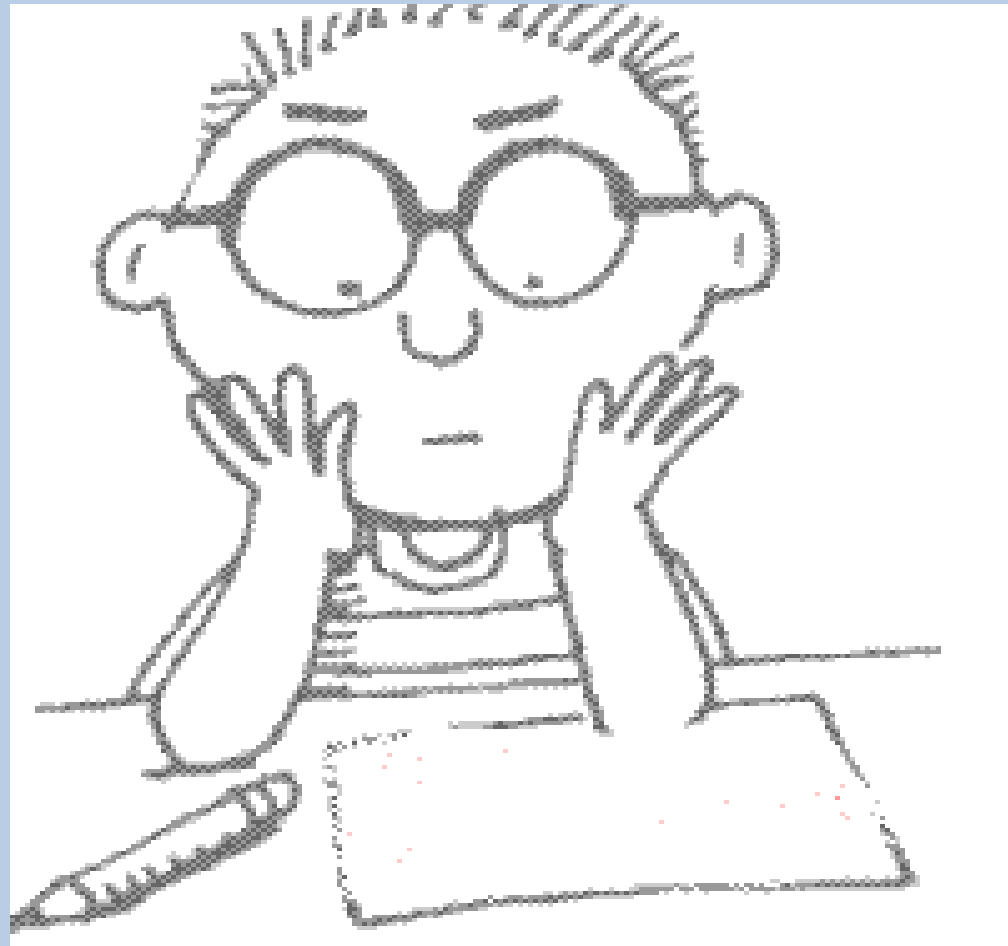
## Observations:

S.No	Initial reading	Final reading	Volume of titrant used(ml)
1.			
2.			
3.			

## Calculations:

$$\text{Free CO}_2 \text{ (mg/l)} = \frac{\text{Volume of titrant} \times 1000}{\text{Volume of sample}}$$

**Results: Expressed as mg/l**





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