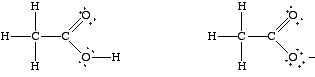
**Week 2:**

**Titration of Acetic acid By Soduim hydroxide**

Acetic acid is a monoprotic acid, with one acidic hydrogen atom. 

A weak acid is a compound that partially ionizes in aqueous solution producing

hydronium (H3O+) ions. The general equation for the dissociation of any weak acid

can be written as:

**HA (aq) + H2O (*l*) A- (aq) + H3O+ (aq) (1)**

The addition of a strong base results in a neutralization reaction in which hydroxide ions (OH-) react with hydronium to produce water:

**H3O+ (aq) + OH- (aq) 2 H2O (*l*) (2)**

As hydronium is consumed in the neutralization reaction, the equilibrium in equation 1 is shifted to the right according to Le Chatelier’s Principle.

Neu tralization process can be written as the sum of equations (1) and (2):

**HA (aq) + OH- (aq) A- (aq) + H2O (*l*) (3)**

The concentration of the unknown solution can be determined by measuring the volume of titrant added to reach the equivalence point. The equivalence point occurs when all of the acid has been neutralized by the base. And it will

be determined by using an indicator that changes color at the equivalence point

**procedure:**

1-Pipette aliquot(10 ml) of acetic acid solution into 250mL conical flask..

2-Add 2-3 drops of phenolphthalein solution.

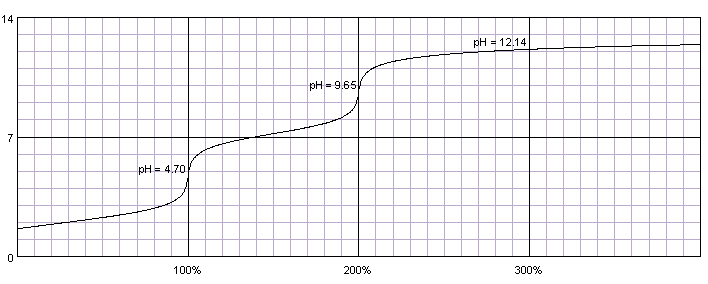
3-Titrate with NaOH solution till the first color change.

4-Calculate the concentration of Acetic Acid solution.

**Titration of phosphoric acid with sodium hydroxide**

Phosphoric acid is relatively weak, with pKa1=2.15, pKa2=7.20 and pKa3=12.35.

That means titration curve contains only two inflection points and phosphoric acid can be titrated either as a monoprotic acid or as a diprotic acid. In the first case acid has to be titrated against indicator changing color around pH 4.7 (for example [methyl orange](http://www.titrations.info/acid-base-titration-indicators-preparation#methyl-orange)) in the second case - against indicator changing color around pH 9.6(for example phenolphthalein).



**reaction**

Depending on the indicator used reaction taking place is either:

H3PO4 + NaOH → NaH2PO4 + H2O

Or

H3PO4 + 2NaOH → Na2HPO4 +2H2O

The procedure:

* Pipette aliquot of phosphoric acid solution(10ml) into 250 mL conical flask.
* Add 2 drops of methyl orange or 2 drops of phenollphthalein solution
* Titrate with NaOH solution till the first color change.
* Calculate the concentration of phosphoric acid solution.