

**Tripoli Evangelical School**  
**Grade 12, LS-GS**  
**Chemistry curriculum**

-Reaction kinetics:

Rate of reaction

Factors affecting the rate of reaction

Half life of the reaction

Effect of catalyst, autocatalysis, heterogeneous catalysis (steps in heterogeneous catalysis, surface area effect)

Graphical solution: instantaneous rate, average rate and determining the half life of reaction.

Representing the kinetics evolution of a chemical reaction in a chart where all reactants and products show before, during, at half life and at end of reaction.

-Chemical equilibrium:

Le Chatelier Principle

Homogeneous equilibrium

Problem solving involving  $K_c$

Degree and conversion or yield of chemical equilibrium.

Applying Le Chatelier's Principle in problems involving yield and conversion degree, especially esterification reactions in organic chemistry.

-Aqueous equilibrium:

Water as weak electrolyte.

Ionic product of water,  $pK_w$ .

pH

Weak acids and bases: partial dissociation in water

$pK_a$ ,  $pK_r$

Extensive study of graphical determination of equivalence point of various titration reactions

Titration of strong acids and strong bases

Titration of a weak acid or a weak base using strong ones.

Buffer solution: preparation and properties

Choice of suitable indicators,  $pK_{Hind}/Ind^-$

Extensive numerical applications

-Organic chemistry as described for Grade 11- part 2

Alcohols

Aldehydes and ketones

Carboxylic acids and acid derivatives

Amines

Amino acids\*

Soaps and detergents\*

Medicinal drugs\*

\* Chapters related to Life Science class.

#### i- Alcohols

- Naming rules. Isomerism. Classes of alcohols.
- Common chemical properties.
- Distinctive chemical properties: Oxidation, dehydrogenation reactions.
- Comparative studies based upon distinctive chemical properties.

#### ii- Aldehydes and Ketones

- Naming rules. Isomerism.
- Identification tests for carbonyl compounds.
- Identification tests for aldehydes: Fehling solution, Tollen's reagent and Schiff's reagent.
- Combined problems related to applications in chapters of Alcohols, aldehydes and Ketones.

#### iii- Carboxylic Acids

- Naming rules. Isomerism with esters.
- Carboxylic acids as weak, partial dissociation in water.
- Chemical acidic properties.
- Chemical organic properties.
- Acid derivatives: Anhydrides, Mixed anhydrides, Alkanoyl chlorides and Amides.
- Comparative study related to the properties of acids and acid derivatives.
- Esterification reactions using acid derivatives. Advantages.

#### iv- Amines

- Naming rules. Classes of amines and Isomerism.
- Amines as weak bases, partial dissociation in water.
- Reactions with carboxylic acids.
- Reactions with acid derivatives.

#### v- Amino Acids\*

- Functional groups and naming rules of alpha amino acids.
- Enantiomers and Cram representation.
- Condensation of alpha amino acids to form peptides.
- Hydrolysis of peptides to regenerate amino acids.

#### vi- Soaps and Detergents\*

- Fatty acids, Glycerol and Triglycerides.
- Saponification reaction.
- Hydrolysis of triglycerides to form fatty acids.
- Properties of soaps related to the structure of anion, and principle of detergency.

vii- Medicinal Drugs\*

- Study of the hemi-synthesis of Aspirin and Panadol.
- Direct application related to esterification reactions using acid anhydrides.
- Problem solving.