

Chemistry (Part 2)

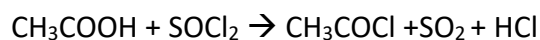
Chapter 13. Carboxylic acids

Short Questions

Q1. What are Fatty acids? How acid chlorides are made by them?

The aliphatic mono carboxylic acids are commonly called fatty acids, because higher members of this series such as palmitic acid, stearic acid etc. are obtained by the hydrolysis of fats and oils.

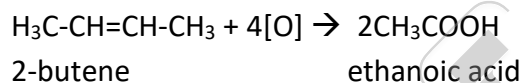
Formation of acid chlorides: Acid chlorides can be made by reacting mono carboxylic acids with phosphorous penta chloride or with thionyl chloride as follows.



Q2. How carboxylic acids can be obtained from Alkene?

Oxidative cleavage of alkenes

Alkenes when heated with alkaline KMnO_4 are cleaved at the double bond to form Carboxylic acids.



Q3. Why do mostly carboxylic acids exist as dimmers?

In pure carboxylic acids Hydrogen bonding can occur between two molecules of acid to produce a dimer. This immediately doubles the size of the molecule and so increases Vander Waals dispersion forces between one of these dimmers and its neighbors, resulting in a high boiling point.

Q4. Differentiate between acidic and basic amino acids.

Acidic amino acid

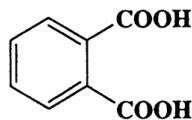
1. The amino acids which contain two carboxyl groups are called acidic amino acids.
2. For example, Glutamic acid and Aspartic acid.

Basic amino acid

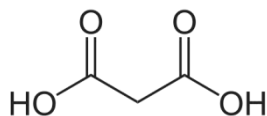
1. The amino acids which contain two amino groups are called basic amino acids.
2. For example, Lysine and Histidine.

Q5. Write structural formulae of Phthalic acid and Malonic acid .

Phthalic acid



Malonic acid



Q6. Prepare ethane from acetic acid by reduction.

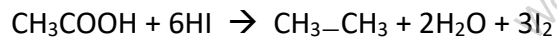
Acetic acid on reduction with HI and red phosphorus give ethane.



Q7. Write reactions of acetic acid with:

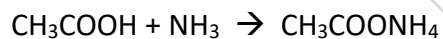
HI/red phosphorus:

Acetic acid on reduction with HI and red phosphorus give ethane.



NH₃/ heat :

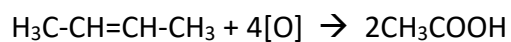
Acetic acid react with ammonia to form ammonium salts which on heating produce acid amides



Q8. How carboxylic acids are prepared by oxidative cleavage of alkenes?

Oxidative cleavage of alkenes

Alkenes when heated with alkaline KMnO₄ are cleaved at the double bond to form Carboxylic acids.



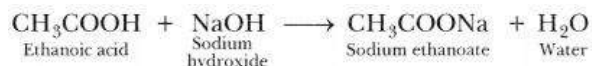
2-butene

ethanoic acid

Q9. How will you convert acetic acid in to methane and acetic anhydride?

Acetic acid to Methane:

Acetic acid is treated with sodium hydroxide to form sodium acetate and water.

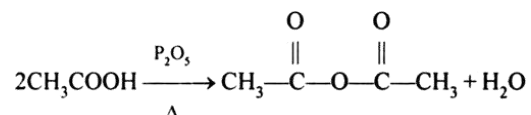


Then, sodium ethanoate is heated with sodalime to get methane.



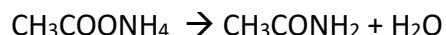
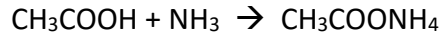
Acetic acid to acetic anhydride:

Acetic acid dehydrates on heating strongly in the presence of phosphorus pentoxide.



Q10. How will you convert acetic acid in to acetamide?

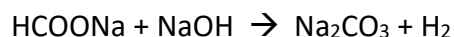
Acetic acid react with ammonia to form ammonium salts which on heating produce acetamide



Q11. What happens when following c  ated?

Sodium formate and sodalime:

Sodium formate on heating with sodalime give hydrogen.



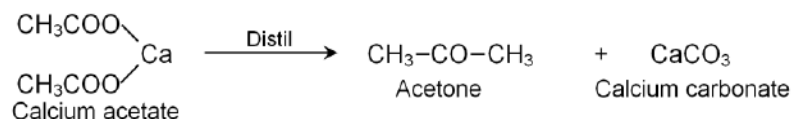
Ammonium acetate:

On heating Ammonium acetate, it will give acetamide.



Q12. What happens when following compounds are heated?

Calcium acetate: Calcium acetate on heating undergoes dry distillation.



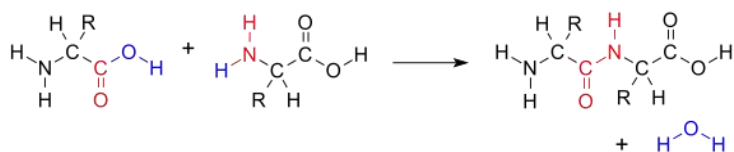
Ammonium acetate:

On heating Ammonium acetate, it will give acetamide.



Q13. What is peptide bond? Write formula of a dipeptide?

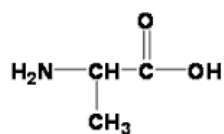
The chemical bond formed between amino acids, constituting the primary **linkage** in all protein structures. In a **peptide** bond, the carboxyl group (COOH) of one amino acid bonds with the amino group (NH₂) of another, forming the sequence CONH and releasing water (H₂O).



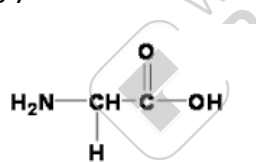
Q14. Define neutral amino acid with example.

Since an **amino acid** has both an amine and **acid** group which have been neutralized in the zwitterion, the **amino acid** is **neutral** unless there is an extra **acid** or base on the side chain. If neither is present then the whole **amino acid** is **neutral**. eg. glycine, alanine, valine etc.

Q15. Write formulae of glycine and alanine.



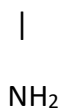
alanine



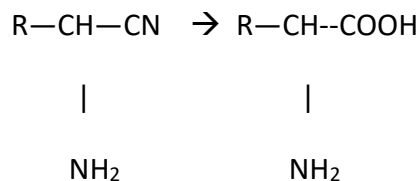
glycine

Q16. How amino acid is prepared by Strecker's synthesis?

When hydrogen cyanide is added to an aldehyde in the presence of ammonia α -amino acid is obtained: $\text{RCHO} + \text{HCN} + \text{NH}_3 \rightarrow \text{R}-\text{CH}(\text{NH}_2)-\text{COOH} + \text{H}_2\text{O}$



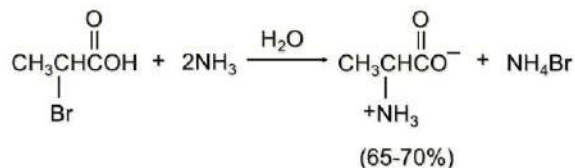
α -amino nitrile on acid hydrolysis yields an α -amino acid.



Q17. How carboxylic acids can be converted in to α -amino acid?

Amino acids can be synthesized by the reaction of α -bromo acid with ammonia.

*Synthesis of Amino Acids
From α -Halo Carboxylic Acids*



Q18. What is difference between essential and non essential amino acids?

Essential amino acid

1. The amino acids which our body can't prepare are called essential amino acids.
2. These we have to take in to our diet for proper health and growth.

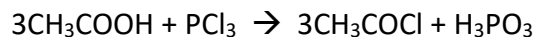
Non essential amino acids

1. The amino acids which our body can prepare are called non essential amino acids.
2. These are not required in diet.

Q19. How acetic acid reacts with:

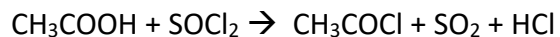
PCl₃:

Acetic acid reacts with phosphorus trichloride to give acid halide.



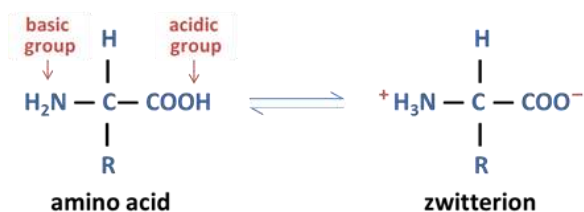
SOCl₂:

Acetic acid reacts with thionyl chloride to give acid halide.



Q20. Define Zwitter ion or internal salt.

Zwitterion, also known as inner salt or dipolar ion, is an ion with a positive and a negative electrical charge at different locations within a molecule. In the formation of zwitter ion, the proton goes from carboxyl group to amino group.



Q21. What is meant by glacial acetic acid?

The pure, **anhydrous acetic acid**, forming ice-like crystals at temperatures below 16.7°C, is called **glacial acetic acid**. (CH₃COOH).