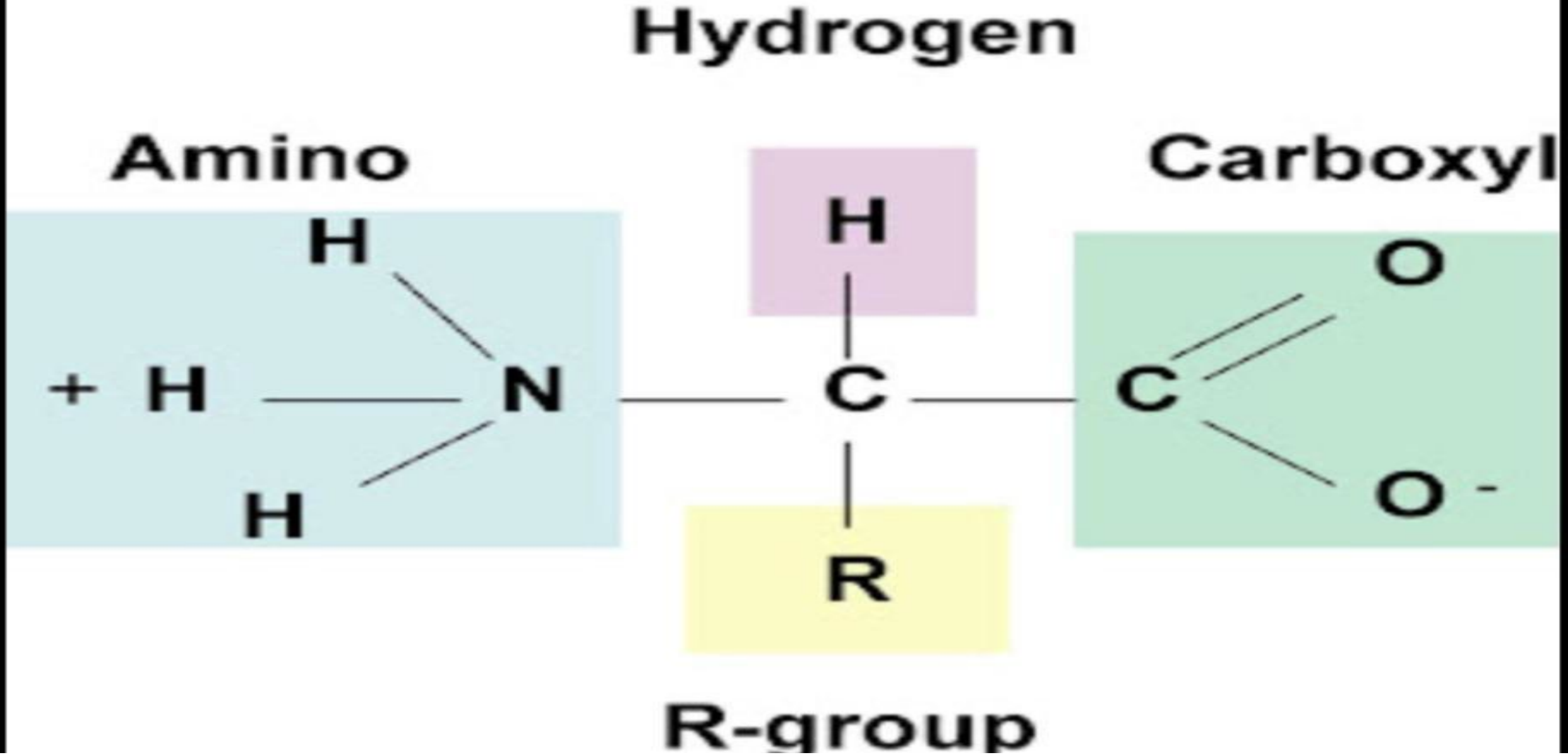
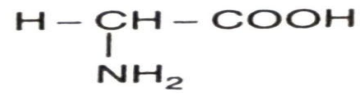
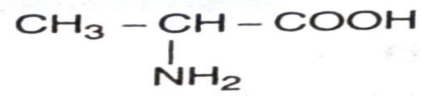
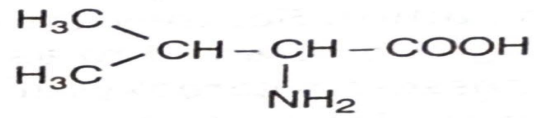
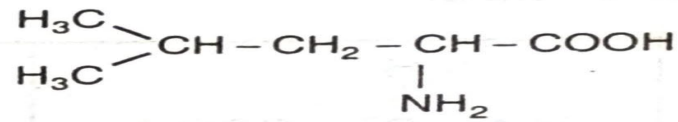
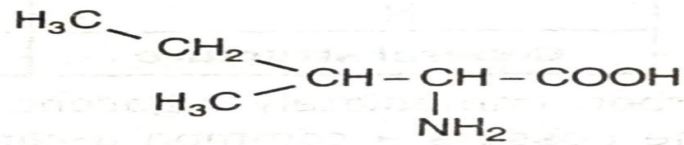
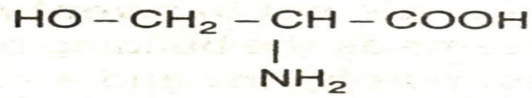
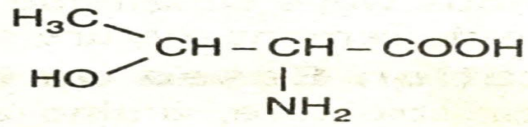
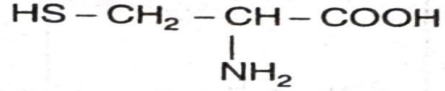
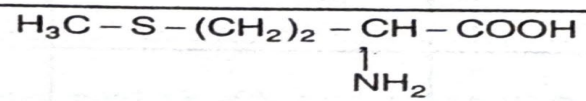
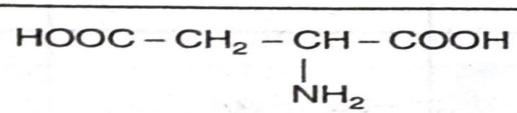
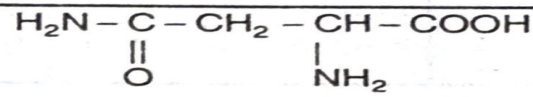
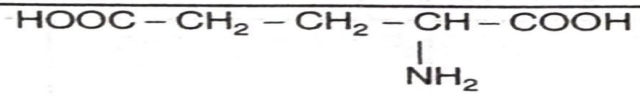
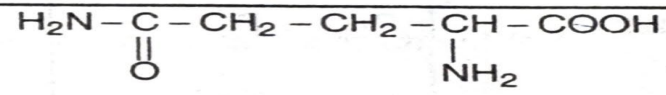
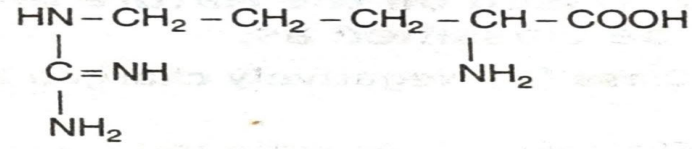
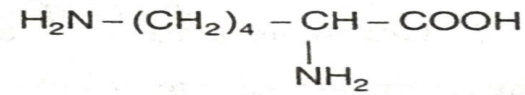
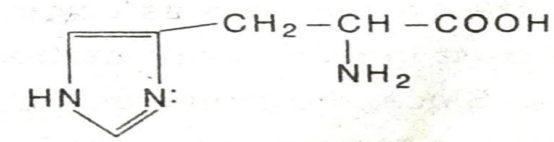
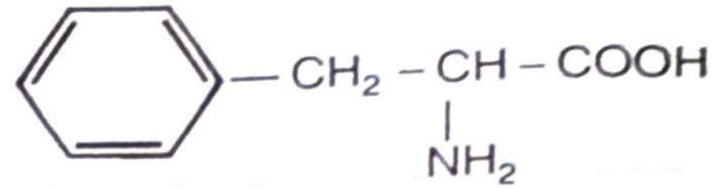
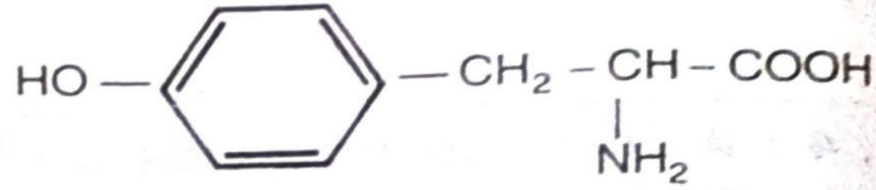
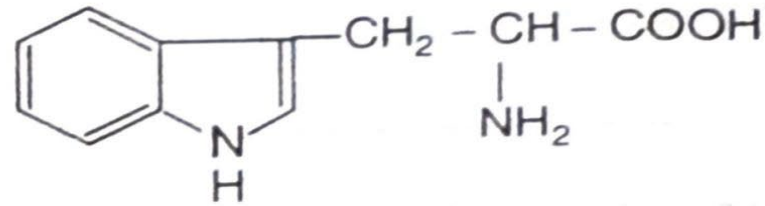
Amino Acid Structure



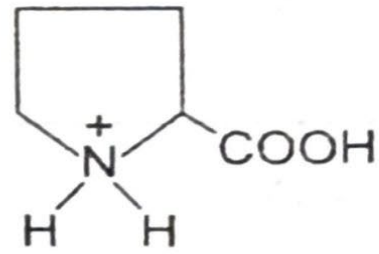
Amino Acid	Symbol	Structure
Cl. 1 : Amino Acids with Aliphatic R-Groups		
Glycine	Gly - G	
Alanine	Ala - A	
Valine	Val - V	
Leucine	Leu - L	
Isoleucine	Ile - I	
Cl. 2 : Non-Aromatic Amino Acids with Hydroxyl R-Groups		
Serine	Ser - S	
Threonine	Thr - T	

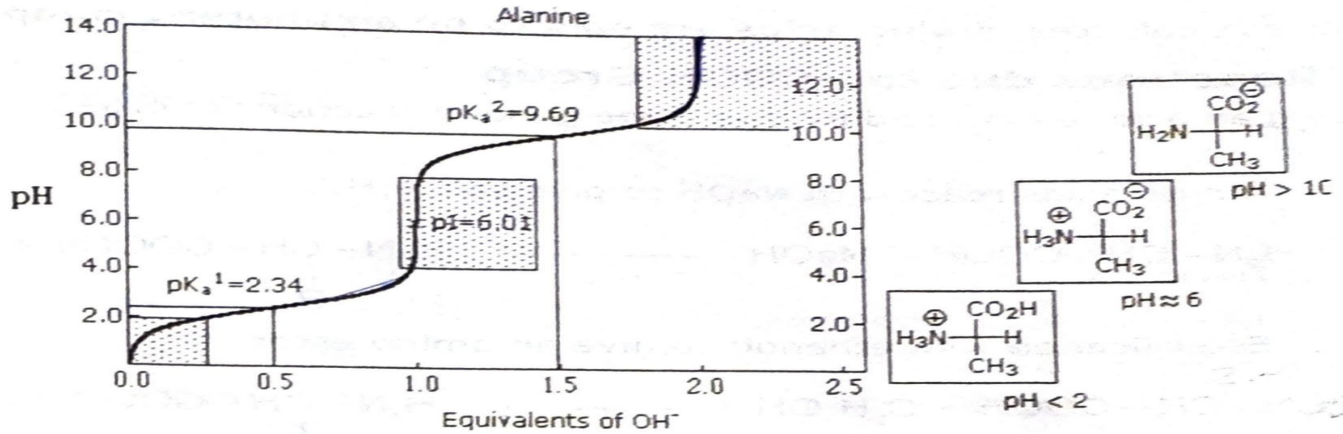
Cl. 3 : Amino Acids with Sulfur-Containing R-Groups		
Cysteine	Cys - C	
Methionine	Met-M	
Cl. 4 : Acidic Amino Acids and their Amides		
Aspartic Acid	Asp - D	
Asparagine	Asn - N	
Glutamic Acid	Glu - E	
Glutamine	Gln - Q	
Cl. 5 : Basic Amino Acids		
Arginine	Arg - R	
Lysine	Lys - K	
Histidine	His - H	

Cl. 6 : Amino Acids with Aromatic Rings

Phenylalanine	Phe - F	
Tyrosine	Tyr - Y	
Tryptophan	Trp - W	

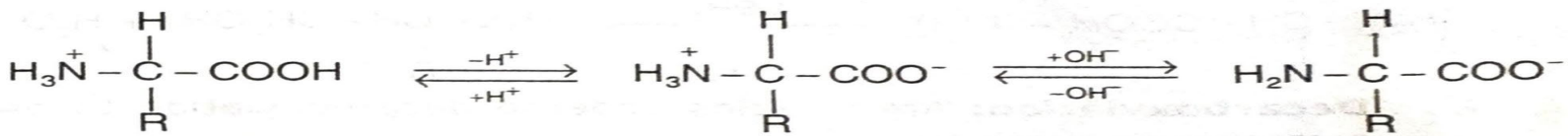
Cl. 7 : Imino Acids

Proline	Pro - P	



The graph shows that pK of carboxylic group is 2.34 and that of amino group is 9.69. Therefore pI should be 6.01.

2.34
34



Cation of low pH (acidic pH) Net charge is +1

Zwitter ion at isoelectric pH Net charge is zero

Anion at high pH (alkaline) Net charge −1

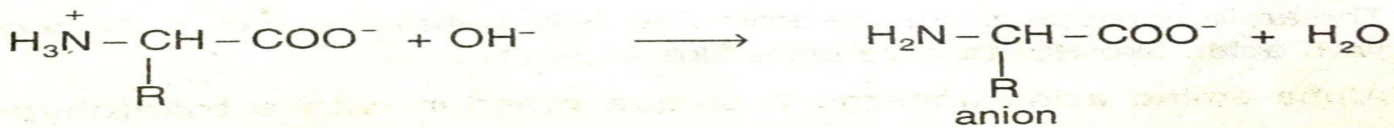
1. If acid is added to Zwitter ion, a cation is resulted.

Zwitter ion

Cation

Zwitter ion served as a proton acceptor. This indicates the basic property of the amino acid.

2. If a base in added to Zwitter ion, anion in resulted



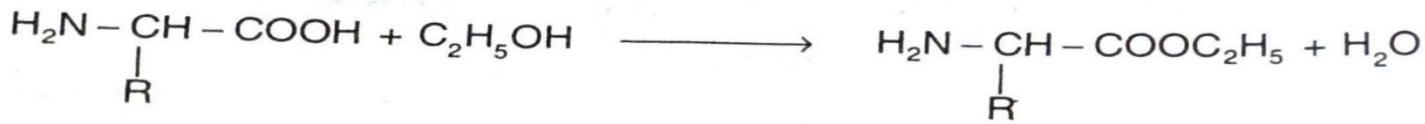
anion

3.3.4 Reactions due to –COOH Group

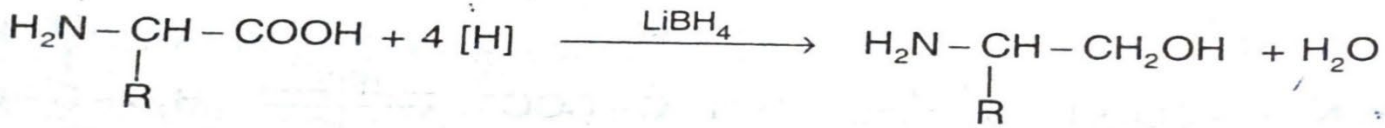
Being an acid, amino acid follows some general reactions of organic acids. They are:

1. Amino acids react with NaOH to give salt + H_2O.

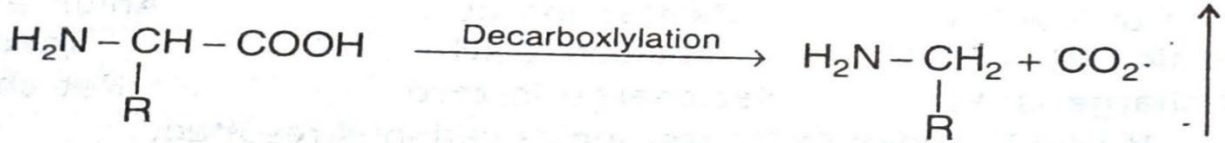
2. Esterification with ethanol; to give an amino ester



3. Amino acids can be reduced to amino alcohol; in presence of pot agent like lithium borohydride or lithium aluminium hydride.



4. **Decarboxylation:** Amino acids undergo decarboxylation to produce corresponding amines.



Some biologically important amines like histamine from histidine; tyramine rom tyrosine and γ-amino butyric acid (GABA) from glutamate are produced by decarboxylation process.

5. Some

$$\text{Amino acids} + NH_3 \longrightarrow \text{Amides}$$

$$\text{Aspartic acid} + NH_3 \longrightarrow \text{Asparagine}$$

$$\text{Glutamic acid} + NH_3 \longrightarrow \text{Glutamine}$$

This reaction is important in the transport of NH_3 in the body.