

Atomic Energy Central School, Indore

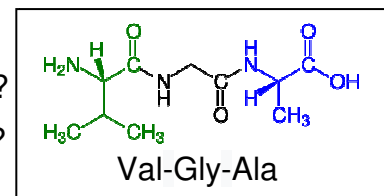
Class XII Chemistry

BIOMOLECULES

Worksheet 2/3

Questions

1. Write the name of linkage joining two amino acids.
2. An α helix is a structural feature of (choose one option)
 - a) sucrose
 - b) proteins
 - c) Nucleotides
 - d) starch
3. What type of bonding provides stability to α -helix structure of protein?
4. How many peptide linkages are present in the tripeptide Val-Gly-Ala?
5. Define the following with an example:
 - a) Denatured Protein
 - b) Primary structure of proteins
 - c) Secondary structure of proteins
6. Amino acids show amphoteric behavior. Why?
7. Amino acids may be acidic, alkaline or neutral. How does this happen?
Name one of each type.
8. An optically active amino acid (A) can exist in three forms depending on the pH of the medium. If the molecular formula of (A) is $C_3H_7NO_2$, write:
 - (i) Structure of compound (A) in aqueous medium.
 - (ii) In which medium will the cationic form of A exist?
 - (iii) In alkaline medium, towards which electrode will the compound (A) migrate in electric field?
9. What are essential and non-essential amino acids? Give examples
10. What is the difference between fibrous protein and globular protein?



Answers

1. Peptide linkage
2. b) proteins
3. H- bonding
4. Two
5. a) Denaturation of protein : When a protein in its native form, is subjected to physical change like change in temperature or chemical change like change in pH, the hydrogen bonds are disturbed. Due to this, globules unfold and helix get uncoiled and protein loses its biological activity.
b) Primary structure: The sequence of amino acids in a protein is called the primary structure of that protein.

c) The secondary structure of a protein is formed by hydrogen bonding in the polypeptide chain. These bonds cause the chain to fold and coil in two different conformations known as the α -helix or β -pleated sheets.

6. In aqueous solution, the carboxyl group of an amino acid can lose a proton and the amino group can accept a proton to give a dipolar ion known as zwitter ion. Therefore, in zwitter ionic form, the amino acid can act both as an acid and as a base. Thus, amino acids show amphoteric behaviour.

7. Amino acids can be broadly classified into three classes i.e. acidic, alkaline and neutral amino acids depending on the number of —NH_2 group and —COOH group.

Acidic amino acids: Those α -amino acids such as aspartic acid, asparagine and glutamic acid which contain two —COOH groups and one —NH_2 group are called acidic amino acids.

Alkaline or Basic amino acids : Those α -amino acids such as lysine, arginine and histidine which contain two —NH_2 groups and one —COOH group, are called basic amino acids.

Neutral amino acids: Those α -amino acids such as glycine, alanine, valine etc. which contain one —NH_2 and one —COOH group, are called neutral amino acids.

8. (i) $^+\text{NH}_3\text{CH}_2\text{COO}^-$

(ii) In acidic medium

(iii) Towards the anode

9. Essential amino acids: Amino acids which the body cannot synthesize are called essential amino acids. Therefore they must be supplied in diet.

Example : Valine, leucine etc.

Non-essential amino acids: Amino acids which the body can synthesize are called non-essential amino acids. Therefore, they may or may not be present in diet.

Example : Glycine, alanine etc.

10.

Globular Proteins	Fibrous Proteins
1. Globular proteins have almost spheroidal shape due to folding of the polypeptide chain.	1. Polypeptide chains of fibrous proteins consist of thread like molecules which tend to lie side by side to form fibres.
2. Globular proteins are soluble in water.	2. Fibrous proteins are insoluble in water.
3. Globular proteins are sensitive to small changes of temperature and pH. Therefore they undergo denaturation on heating or on treatment with acids/bases	3. Fibrous proteins are stable to moderate changes of temperature and pH.
4. They possess biological activity that's why they act as enzymes.	4. They do not have any biological activity but serve as chief structural material of animal tissues.
Example: Maltase, invertase etc., hormones (insulin) antibodies, transport agents (haemoglobin), etc.	Example: Keratin in skin, hair, nails and wool, collagen in tendons, fibroin in silk etc.