Question bank with answers

Class : First p.u.c Sub: Biology

Chapter :9, Biomolecules

I. One mark questions

1. What are biomolecules?

Ans. All the carbon compounds present in living tissues are called biomolecules.

2. What are amino acids?

Ans. Amino acids are organic compounds containing an amino group and acidic group.

3. Whether the ash of dry tissue contain Inorganic elements or organic compounds

Ans. Ash of dry tissue contains inorganic elements.

4. What are saturated fatty acids?

Ans. Fatty acids without double bonds are called saturated fatty acids.

5. What unsaturated fatty acids?

Ans. Fatty acids with one or more double bonds are called unsaturated fatty acids.

6. Lipids are esters, why?

Ans. Because lipids are formed by glycerol and fatty acids.

7. What is a nucleoside?

Ans. When a nitrogen base is linked to a pentose sugar, the molecule formed is called a nucleoside.

8. How a nucleotide is formed?

Ans. A nucleotide is formed by the joining of a nucleoside with phosphate group.

9. What are primary metabolites?

Ans. In living organisms the organic compounds having identifiable functions are called primary metabolites.

10. Proteins, nucleic acids, polysaccharides and lipids are called biomacromolecules. Why?

Ans. Because they have high molecular weight in the range of ten thousand Daltons and above.

11. Among proteins nucleic acids polysaccharides and lipids which is strictly not a macromolecule?

Ans. Lipids

12. Which are the building blocks of proteins?

Ans. Amino acids.

13. Why the proteins are called polypeptides?

Ans. Because the proteins contain a linear chain of amino acids linked by peptide bonds.

14. How many types of amino acids are present in a protein?

Ans. Twenty types of amino acids are present in a protein.

15. What are non-essential amino acids?

Ans. The amino acids synthesise in the human body are called Non-essential amino acids.

16. How a man get essential amino acids?

Ans. A man get the essential amino acids through the food.

17. Name the most abundant protein in the biosphere.

Ans. Ribulose biphosphate carboxylase-oxygenase(RuBiSCo).

18. Which protein is most abundant in animal world?

Ans. Collagen.

19. Which are the building blocks of polysaccharides?

Ans. Monosaccharides

20. Why the cellulos is called homopolymer?

Ans. Because it is made up of only one type of monosaccharide-glucose.

21. What are hetero polymers?

Ans. The polysaccharides made up of different types of monosaccharides are called heteropolymers.

22. Give an example for heteropolymer.

Ans. Chitin.

23 Name the polysaccharide form the exoskeleton of Arthropods.

ANS.. Chitin.

24. which are the buildings blocks of nucleic acids?

Ans. Nucleotides.

25. Name the pentose sugar present in DNA.

Ans. Deoxy ribose sugar.

26. Name the pentose sugar present in RNA.

Ans. Ribose sugar.

27. By which bond the amino acids are linked in a protein.

Ans. Peptide bond.

28. In polysaccharides by which bond the mono saccharides are linked?

Ans. glycosidic bond.

29. What is a phospho di ester bond?

Ans . It is a bond, links the two nucleotides of a polynucleotide chain.

30. What is anabolism?

Ans. It is a metabolism where more complex structures are formed by simple structures.

31. What is catabolism?

Ans. It is a metabolism where a complex structure is break into simpler structures.

32. Which is the energy currency in the living cell?

Ans. ATP

33. Expand ATP.

Ans. Adenosine Tri Phosphate.

34. What is living state of organism?

Ans. The living state of organism is a non-equilibrium, steady-state, to be able to perform work.

35. What are enzymes?

Ans. Enzymes are biocatalysts accelerate the rate of biochemical reaction without undergoing any permanent change or involved in the reaction.

35. What are ribozymes?

Ans. Some nucleic acids behave like enzymes are called ribozymes.

36. What is the chemical nature of enzymes?

Ans. Chemically enzymes are proteins.

37. What are the active sites of enzymes?

Ans. An Active site of an enzyme is a crevice or pocket into which the substrate fits.

38. What is a co-factor?

Ans. The Non-protein constituent of enzyme is called co-factor.

39. What is an apoenzyme?

Ans. The protein part of enzyme is called apoenzyme.

40. What is co-enzyme?

Ans. It is an organic compound associated with apoenzyme during catalytic activity.

41. Given example for co-enzyme.

Ans. Nicotinamide adenine dinucleotide(NAD).

42. What is a substrate?

Ans. The substance on which the enzymes act is called substrate.

43. What are ligases?

Ans. These are the enzymes linking two compounds.

44. What are holoenzymes?

Ans. The enzymes contain both protein and non-protein group is called holoenzyme.

45. What inhibition?

Ans. The binding of some chemicals to enzyme, shuts off enzyme activity this called inhibition.

II. Two marks questions.

1. What is meant by wet weight, and dry weight?

Ans. Weight of the tissue along with water present in it is called wet weight.

Weight of the tissue after all the water evaporates from the tissue is called dry weight.

2. What is Ash? Mention any two elements present in it.

Ans. When the tissue is fully burnt all the carbon compounds axidised to gaseous form and are removed, the remaining is called ash.

The elements present in ash are calcium, magnesium.

3. Mention the four substituent's of amino acids.

Ans. a. Hydrogen b. Carboxyl group c. Amino group d. Variable group

4. Differentiate oils from fats.

Ans. Oils are the lipids which have lower melting point, so they are liquid at room temperature, where as fats are the lipids which have higher melting point, so they are solid at room temperature.

5. List nitrogen bases of DNA.

Ans. Adenine, guanine, cytosine, thymine.

6. List the four metabolites.

Ans. Alkaloids, rubber, coloured pigments, gums.

7. List the factors which affect the enzymatic activity.

Ans. Temperature, PH, Substrate concentration and inhibitor

8. What is meant by secondary and tertiary structure of proteins?

Ans. When the protein threads are folded it is called secondary structure.

When a long protein chain is folded upon itself like a hollow wollen ball it s is called tertiary structure.

9. Explain the analysis of chemical com position of living organism.

Ans. Take any living tissue and grind it in tricloro acitic acid , a thick slurry is obtained. It filter through cheese cloth or cotton, then two fractions are obtained, one is called Filtrate it is the acid soluble pool and the second one residue called acid insoluble fraction. Thousands of organic compounds are in acid soluble pool.

10. List any four functions of protein.

Ans. A. collagen forms intercellular ground substance

B. Insulin acts as hormone.

C. Antibody fights against infectious agents.

D. Trypsin act as an enzyme

11. Write the chemical composition of cell.

Ans. Water : 70-90%

Proteins: 10-15%

Carbohydrates : 3%

Lipids : 2%

Nucleic acids : 5-7%

Ions: 1%

12. What are polysaccharides? Give any two examples.

Ans. Polysaccharides are long chains of simple sugars linked by glycosidic bond.

Ex.: cellulose, chitin.

13. What is metabolism? Mention the types.

Ans. Sum of biochemical reactions in the organisms is called metabolism.

The types are anabolism and catabolism.

III. Four Marks questions.

1. Explain the mode of enzyme action.

Ans. Each enzyme has a substrate binding site in its molecule so that a highly reactive enzyme-substrate complex is produced this dissociates into its products and unchanged enzyme with an intermediate formation of the enzyme-product complex.

The catalytic cycle of enzyme action can be described in the following steps.

a. First the substrate binds to the active site of the enzyme fitting into the active site.

b. the binding of the substrate induces the enzyme to alter its shape, fitting more tightly around the substrate

c. the active site of the enzyme, now in close proximity of the substrate breaks the chemical bonds of the substrate and the new enzyme- product complex is formed.

d. the enzyme releases the products of the reactions and the free enzyme is ready to bind to another molecule of the substrate and run through the catalytic cycle once again.

2. Explain different factor affecting enzyme activity.

Ans. Enzyme activity can be affected by a change in the temperature, PH and substrate concentration

a. Temperature and PH

Enzymes generally function in a narrow range of temperature and PH. Enzymes shows highest activity at a particular temperature and PH called optimum temperature and optimum PH. Enzyme activity declines both below and above the optimum value. Low temperature preserves the enzymes in a temporarily inactive state; where as high temperature destroys enzymatic activity because proteins are denatured by heat.

b. Concentration of substrate.

With the increase in substrate concentration, the velocity of the enzymatic reaction rises at first. The reaction ultimately reaches a maximum velocity which is not exceeded by any further rise in concentration of the substrate. This is because the enzyme molecule fever than substrate molecules and after saturation of these molecules there are no free enzyme molecules to bind with the additional substrate molecules.

IV Five marks questions

1. Explain the different types of enzymes classified based on their function.

Ans. Based on their function enzymes are classified into following types

a. oxido reductases : These are the enzymes which catalyse oxido reduction between two substrates .

b. Transferases: These are the enzymes catalyzing a transfer of a group between a pair of substrate

c. hydrolases : Enzymes catalyzing hydrolysis of ester, ether, peptide and glycosidic bond

d. lyases : Enzymes that catalyse removal of groups from substrates by mechanisms other than hydrolysis living double bonds.

e. Isomerases: these are the enzymes catalyzing inter-conversion of optical, geometric or positional isomers.

f. Ligases: These are the enzymes catalysing the linking together of two compounds.

2. Describe the secondary structure of DNA.

Ans. Secondary structure of DNA is explained by Watson and Crick. According to Watson and Crick model DNA exists as a double helix. Two strands of polynucleotides are antiparallel. The back bone is formed by the sugar—phosphate-sugar chain. The nitrogen bases are projected perpendicular to this back bone but face inside. A and G of one strand compulsorily base pairs with T and C respectively on the other strands. There are two hydrogen bonds between A and T. There are three hydrogen bonds G and C. Each strand appears like a helical stair case. Each step of ascent is represented by a pair of bases. At each step of ascent the strand turms 36°. One full turm of the helical strand would involve ten base pairs. The distance between two base pairs of a strand is 3.4A°.