Short Answer Type Question - I

Q.1. What do you understand by secondary structured of protein? Explain. [DDE 2017]

Ans. Secondary structure is a three-dimensional form of a polypeptide chain Many secondary structure in possess two forms i.e. α-helix and β-pleated secondary structure.

Q. 2. List any four salient features of Watson-Crick model of DNA. [KVS Mumbai 2016]

Ans. Four salient features of Watson and Crick model are:

(i) DNA molecule consist of two polynucleotide chains, which are coiled like a rope in helical fashion. So the two strands form a double helix'.

(ii) The two strands of a Polynucleotides are antiparallel i.e., run in the opposite direction. The backbone is formed by the sugar-phosphate-sugar chain with the nitrogenous bases projected inside.

(iii) Each DNA helix has alternate minor and major groove having width of 12 $\overset{o}{A}$ and 22 $\overset{o}{A}$ respectively.

(iv) The distance between two consecutive spirals is 34 $\overset{o}{A}$ Thus, between two consecutive spirals, 10 nucleotides can be adjusted.

Q. 3. What are glycans? How are they formed?

Ans. Complex carbohydrates or polysaccharides are called as glycans. They are long chains formed by polymerisation of large number of monosaccharide monomers and are joined by glycosidic bonds with loss of water.

$$\underset{\text{Monosaccharide}}{n(C_6H_{12}O_6)} \rightarrow \underset{\text{Polysaccharide}}{(C_6H_{10}O_5)_n} + {}_nH_2O$$

Q. 4. What are the uses of inulin?

Ans. (i) It is a storage polysaccharide in roots of Dahlia and related plants.

(ii) it is used in testing kidney function.

Q. 5. In how many groups does polysaccharide classified?

Ans. Polysaccharides are classified into two group:

(i) Homopolysaccharides or Homoglycans: These are formed by polymerisation of only one type of monosaccharide monomers. For e.g., starch, glycogen, cellulose is composed of a single type of monosaccharide called glucose,

(ii) Heteropolysaccharide or Heteroglycans: These are produced by condensation of two or more types of monosaccharide derivatives. They include agar, peptidoglycan, arabino xylans etc.

Q. 6. How is a peptide bond formed?

Ans. (i) Amino acids condense to form peptide. In this process, the carboxylic group of one amino acid joins with the amino group of another amino acid with a loss of water molecule.

(ii) The bond thus formed (-CO-NH-) is called amide or peptide bond. A chain of two amino acid is called dipeptide, that of three is tripeptide and many is polypeptide.

Q. 7. Write a short note on chitin.

Ans. (i) Chitin is the second most abundant organic compound in nature.

(ii) It is a fibrous homopolysaccharide of high tensile strength.

(iii) Its basic unit is a nitrogen containing glucose derivative known as N-acetyl glucosamine.

(iv) Chitin is soft and leathery, it provides both strength and elasticity. It becomes hard when impregnated with calcium carbonate.

Q. 8. Why ATP is known as the energy currency of the cell?

OR

Why is ATP called as the coin of the energy?

Ans. ATP can pick up energy where it is being liberated and supply the same where it is being consumed. Hence, ATP is called energy currency of the cell.

Q. 9. What do you understand by denaturation?

Ans. Denaturation is the loss of the specific three-dimensional conformation of a protein molecule. The agents of denaturation are heat or radiation, strong acids and alkalies, high concentration of salts, organic solvents etc.

Q.10. What are the functions of nucleotides?

Ans. (i) They are building blocks of nucleic adds, ribonucleotides for RNAs while deoxyr-bonucleotides produce DNA.

(ii) Cyclic AMP functions as second chemical messenger in many hormones controlled chemical reactions.

(iii) Cyclic GMP is function in Ca^{++} or calmodulin mediated chemical reaction.

(iv) CoA is produced by reaction between nucleotide and pantothenic acid.

Q.11. What are amino acids?

Ans. They are organic acids having both carboxylic acid group (COOH) and amino group (NH_2) generally attached to α-carbon. Carboxylic group provides an acidic property to the amino acid while amino group gives it a basic reaction. The α-carbon also bears a variable hydrocarbon or alkyl group R and hydrogen.

Q. 12. What are cholesterol? What diseases occur due to this?

Ans. Cholesterol ($C_{27}H_{45}$ OH) occurs in both free and combined form when it is esterified with a fatty acid. Cholesterol and its ester are insoluble in water. When its level rises in the blood, it tends to get deposited in the walls of arteries, known as atherosclerosis.

Q.13. Identify the secondary protein and quaternary proteins in following examples. Trypsin, Haemoglobin protein, Myosin protein, Actin protein, Albumin, globulin.

Ans. Secondary Protein: Myosin protein, Actin protein, Albumin, Globulin, Trypsin.

Quaternary Protein: Hemoglobin protein

Q.14. What is histone protein? Where it is found in cell? Mention the function of it in eukaryotic cell.

Ans. Histone protein is basic proteins rich in lysine. It is found in nucleoplasm. It binds with negatively charged DNA forming octamers called nucleosome.

Q.15. Explain the term Michaelis constant.

OR

How does the substrate concentration affects the velocity of enzyme reaction?

Ans. Michaelis constant more appropriately Michaelis-Menten constant (Km) is a mathematical derivation with the help of which velocity of reaction can be calculated for any substrate concentration

OR

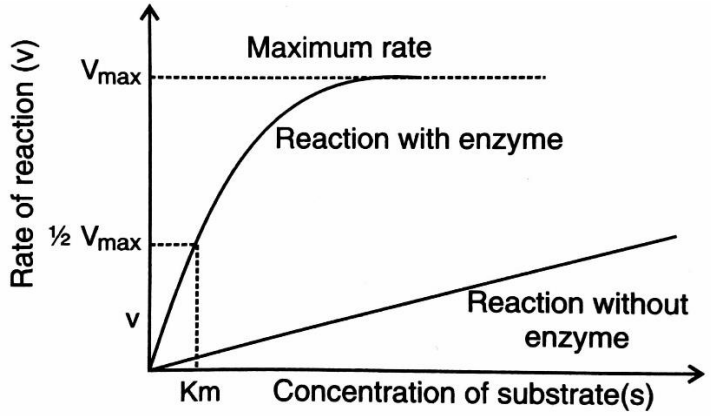


Fig. Calculation of Michaelis constant (Km) with the help of substrate concentration (S) and maximum velocity of the reaction (V_{max})

Q. 16. How does temperature effect an enzyme catalyzed reaction ? [Imp.]

Ans. (i) The temperature affects the velocity of enzyme action.

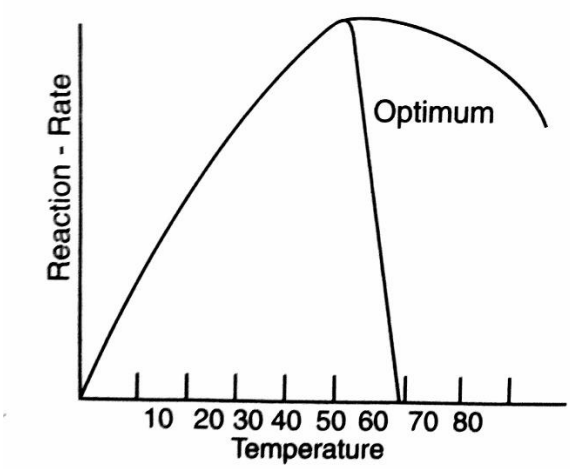
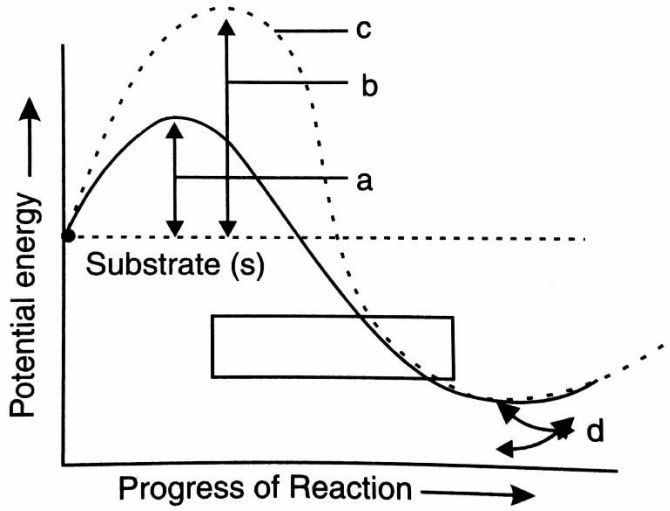


Fig. Effect of temperature on enzyme

(ii) When the temperature is high, there is a sudden decrease in enzyme action due to denaturation. Some enzymatic reactions occur below 45° C.

Q. 17. What do a, b, c and d represent in this graph? [KVS-2012-13]



Ans. (a) Activation energy (enzymatic reaction)

(b) Activation energy (non- enzymatic reaction)

(c) Transition state

(d) Product