

Date:7-12-2020

**ST. JOSEPH’S COLLEGE (AUTONOMOUS), BANGALORE-27**

**B. Sc. CHEMISTRY - VI SEMESTER**

**SEMESTER EXAMINATION: NOVEMBER 2020**

**CH 6215 : BIOCHEMISTRY**

**Time- 2 ½ hrs Max Marks-70**

**Note:** This question paper has **Two** printed pages and **three parts** (twenty one questions).

**PART A**

**Answer any 6 of the following. Each question carries 2 marks. 6 x 2 = 12**

1. How does the high dielectric constant of water, help living organisms?
2. Briefly explain the lock and key model of enzyme action.
3. Draw the partial structure of hyaluronic acid.
4. What is rancidity? How can it be prevented?
5. Give the structure of an amino acid with a

(i) charged polar -R group

(ii) non polar -R group

1. Why were carbon and phosphorus chosen for their role in biological systems?
2. How does an α- amino acid react with ninhydrin?
3. Differentiate between anabolism and catabolism.

**PART B**

**Answer any 8 of the following. Each question carries 6 marks. 8 x 6 = 48**

1. (i) With the help of suitable structures, explain how starch differs from glycogen.

(ii) Give the biological role of DNA. How does B-DNA differ from A-DNA?

**(3+3)**

1. (i) With the help of necessary coenzymes give the sites of ATP synthesis in ETC.

(ii) What are the salient features of genetic code?  **(3+3)**

1. Indicate the different types of specificity exhibited by enzymes with suitable examples.
2. Mention any two important characteristics of a peptide bond. Draw the α-helix and β- pleated sheet indicating the principle axis. Give a difference between the two structures.
3. (i) Explain in detail the classification of lipids with examples.

(ii) Give structures for

(a) an essential fatty acid

(b) a mixed acyl glyceride

(c) a glycerophospholipid with net charge (-1) at pH 7.0

**(3 +3)**

1. (i) What is a coupled reaction? Give an example.

(ii) Draw the structure of ATP. Give reason why it is considered as a high energy molecule.  **(3+3)**

1. Give the reaction catalyzed by the following enzymes.

(i) triose phosphate isomerase

(ii) α-keto glutarate dehydrogenase

(iii) ornithine transcarbamylase

1. The β-oxidation of fatty acyl CoA in the mitochondria, involves four reactions which are repeated. Give the four reactions. Calculate how many ATP’s are produced when stearic acid undergoes β-oxidation.
2. (i) Name the co-enzymes derived from (a) pyridoxal phosphate (b) lipoic acid. Give suitable reactions involving these coenzymes.

(ii) Graphically explain how the Km and Vmax value of an enzyme catalyzed reaction is affected by the presence of a competitive inhibitor. **(3+3)**

1. Briefly describe the mechanism of replication, with suitable diagram and enzymes involved, wherever necessary?

**PART C**

**Answer any 2 of the following. Each question carries 5 marks (2 x 5 = 10)**

19) Determine the length of a keratin molecule in A0 or nm, which contains 312 amino acid residues in its central rod domain, if the same peptide segment were a true α-helix. Presence of which amino acid may cause uncoiling of the α-helix and why?

20) i) The melting points of a series of C18 fatty acids are: stearic acid (69.6°C), oleic acid (13.4°C), linoleic acid (-5°C) and linolenic acid (-11°C). What structural aspects of these fatty acids can be correlated with the melting points. Give an explanation for the trend in melting points.

ii) Which positions in a purine ring of a purine nucleotide in DNA have the potential to form hydrogen bonds, and are not involved in Watson–Crick base pairing**. (3 +2)**

21) i) Cellulose obtained from seed threads of cotton, is tough, fibrous and completely insoluble in water. In contrast, glycogen obtained from muscle or liver disperses readily in hot water to form a turbid solution, though both are composed of (1 → 4)D glucose polymers. Give reason.

ii) Deficiency of certain hormones causes the following symptoms in individuals. Identify the hormones

(a) goitre

(b) fear and anxiety

(c) dehydration due to loss of water

**(2 + 3)**

………………….THE END………………………. CH 6215 A 20