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ZOOLOGY

( Major )

Paper : 5.2

( **Biochemistry and Bioenergetics** )

Full Marks : 60

Time : 3 hours

*The figures in the margin indicate full marks  
for the questions*

1. Answer the following as directed : 1×7=7

(a) What is protein denaturation?

(b) The sugars which differ from one another only in the configuration of one carbon atom are termed as \_\_\_\_ of each other.

( Fill in the blank )

(c) A low value of  $K_M$  indicates

(i) high substrate concentration

(ii) high product concentration

(iii) weak enzyme-substrate binding

(iv) strong enzyme-substrate binding

( Choose the correct answer )

( 2 )

(d) Starch is formed by \_\_\_\_ bond.  
( Fill in the blank )

(e) Name two simple fibrous proteins.

(f) \_\_\_\_ are esters of fatty acids with higher alcohols.

( Fill in the blank )

(g) What are cofactors?

2. Write very brief answer of the following  
(any four) :  $2 \times 4 = 8$

(a) Differentiate between essential fatty acid and non-essential fatty acid with examples.

(b) How is protein associated with chromosomes?

(c) Explain Henderson-Hasselbalch equation.

(d) State the properties of enzymes.

(e) Explain entropy and enthalpy.

(f) Write the role of  $F_0-F_1$  complex in ATP synthesis.

( 3 )

3. Answer the following briefly (any three) :  $5 \times 3 = 15$

(a) Explain the second law of thermodynamics.

(b) Define buffers. State the important buffer systems of the body.

(c) State the role of high energy phosphates as 'energy currency' of the cell.

(d) Write the biological importance of lipid.

(e) Describe the ornithine cycle.

4. Answer the following (any three) :  $10 \times 3 = 30$

(a) Describe  $\beta$ -oxidation of fatty acid. 10

(b) What are the protein and lipid constituents of plasma membrane? Write the functions of plasma membrane with special emphasis on transport through plasma membrane.  $2+2+6=10$

(c) Describe the mechanism of enzyme action. State the factors influencing the enzyme activity.  $5+5=10$

(d) Describe oxidative phosphorylation. Explain the chemiosmotic hypothesis of oxidative phosphorylation.  $3+7=10$

(e) Describe the structure of protein. State how the structure of protein determines biological functions.  $5+5=10$

(f) What is meant by enzyme kinetics? Discuss Michaelis-Menten equation with suitable explanation.  $2+8=10$

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