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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 )

(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) : 2×4=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. 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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