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ZOOLOGY

(Major)

(Biochemistry and Bioenergetics)

Paper : 5.2

Full Marks : 60

Time : 3 hours

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

1. Answer the following questions as directed :

1×7=7

(a) The hydrogen ion (H^+) with its high ratio of charge cannot exist free in aqueous solution.

(State True or False)

(b) *Cis-trans* isomerism occurs in compounds with _____ bonds.

(Fill in the blank)

(c) Keratin, the protein of hair, is synthesized from _____ amino acids.

(Fill in the blank)

- (d) What do you mean by amino sugars?
- (e) Fatty acids can be transported into and out of mitochondria through
- (i) active transport
 - (ii) facilitated transfer
 - (iii) non-facilitated transfer
 - (iv) None of the above

(Choose the correct answer)

- (f) The $\text{Na}^+ - \text{K}^+$ ATPase catalyzes the hydrolysis of _____ to _____.

(Fill in the blanks)

- (g) The fatty acids containing even number and odd number of carbon atoms as well as the unsaturated fatty acids are oxidised by _____.

(Fill in the blank)

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

- (a) What is the pH of Blood? How is it regulated?
- (b) Differentiate between Heterochromatin and Euchromatin.
- (c) Write two important aspects of Lysozyme.
- (d) Write the significance of Free Energy.

3. Answer briefly any *three* of the following :

5×3=15

- (a) Write a short note on Acid-Base balance.
- (b) What is Optical Isomerism? Explain with example.
- (c) Write a short note on Coenzymes.
- (d) Write the biological significance of carbohydrate.
- (e) Explain the conformational coupling hypothesis of oxidative phosphorylation.

4. Answer any *three* of the following :

- (a) What are Proteins? What is the primary structure of proteins? Describe briefly the biological importance of protein.

1+3+6=10

- (b) Describe the ultrastructure of Plasma-Membrane as proposed by Singer and Nicolson. State the functions of plasma membrane.

5+5=10

- (c) How are Enzymes classified? Describe the mechanism of enzyme action. 4+6=10

- (d) What do you mean by Thermodynamics? Discuss the 2nd law of Thermodynamics in relation to biological study. 2+8=10
- (e) What is ATP? Write down the role of ATP in metabolism and in free energy production. 2+8=10
- (f) What is a respiratory chain? Describe briefly the organization of the respiratory chain in a mitochondria. 10

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