

**B.Sc. 3rd Semester (Honours) Examination, 2022 (CBCS)**

**Subject : Zoology**

**Course : CC-VII**

**(Fundamentals of Biochemistry)**

**Time: 2 Hours**

**Full Marks: 40**

*The figures in the margin indicate full marks.*

*Candidates are required to give their answers in their own words  
as far as practicable.*

**1. Answer any five of the following:**

**2×5=10**

- (a) How many ATPs can be generated from an 18 carbon saturated fatty acid?
- (b) Define kinetically perfect enzyme with example.
- (c) What are the advantages of Lineweaver-Burk Plot?
- (d) Define uncoupler with example in respect to ETC.
- (e) How hyperchromaticity is related with DNA structure?
- (f) Why amino acids are amphoteric in nature?
- (g) Which of the following sugar is non-reducing and why?

Glucose, Lactose, Maltose, Sucrose

- (h) Distinguish between motif and domain.

**2. Answer any two of the following:**

**5×2=10**

- (a) Write important features of  $\alpha$ -helix with proper diagram. Name two amino acids that can destabilize  $\alpha$ -helix. **4+1**
- (b) Name the rate limiting enzyme of glycolysis. Why do you think they are regulatory? Outline the fate of pyruvate produced in glycolysis. **1+2+2**
- (c) State the chemical structure of deadenosine triphosphate (dATP). A short DNA molecule contains 420 base pairs. Calculate the length and approximate number of turns in the molecule. **2+3**
- (d) Name different phospholipids found in plasma membrane. Draw the chemical structure of any one of them. **2+3**

3. Answer *any two* of the following: 10x2=20
- (a) Write the reactions of the oxidative phase of pentose phosphate pathway. Why this pathway is called hexose monophosphate shunt? Discuss the biochemical utilities of this pathway. 5+2+3
- (b) Illustrate mitochondrial electron transport chains showing electron and proton transfers within and between its components. Discuss the role of  $F_1-F_0$  ATPase in chemiosmotic coupling. What is P/O ratio? 4+4+2
- (c) Write short note on *any two* of the following:
- (i) Optical Isomerism of monosaccharides
  - (ii) Mechanism of action of one regulatory enzyme
  - (iii) Catalytic activity of transaminase
- (d) Derive the relationship between substrate concentration and enzyme reaction rate in the light of Michaelis-Mentens' assumptions. How uncompetitive inhibitor can affect Michaelis constant and reaction velocity of an enzyme? Discuss the role of hexokinase as isoenzyme in human physiology. 5+2+3
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