

### U.G. 3rd Semester Examination - 2021

## ZOOLOGY

### [HONOURS]

Course Code : ZOOL-H-CC-T-07

Full Marks : 40

Time :  $2\frac{1}{2}$  Hours

*The figures in the right-hand margin indicate 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) What is the difference between lyase and ligase enzyme? Mention with example.
  - b) What do you mean by citrate shuttle?
  - c) Why does the citric acid cycle called TCA cycle?
  - d) What is the difference between allozyme and isozyme?
  - e) What do you mean by oxidative deamination?
  - f) A segment of DNA has 120 adenine and 120 cytosine bases. What is the total number of nucleotides present in the segment?

- g) What is the relation between free energy and equilibrium constant in a reaction?
- h) Mention the significance of pentose phosphate pathway.

2. Answer any **two** questions: 5×2=10
  - a) What do you mean by lipogenesis? What is the committed step in lipogenesis? Mention the significance of lipogenesis. 1+2+2=5
  - b) What do you mean by glycogenesis and glycogenolysis?  $2\frac{1}{2}+2\frac{1}{2}=5$
  - c) What do you mean by  $K_m$ ? What is the unit of  $K_m$ ? Mention the significance of  $K_m$ . 2+1+2=5
  - d) In which amino acid do have a secondary amino group? Describe the zwitterionic property of amino acid. How it is different from amphoteric property of amino acid? 1+2+2=5
3. Answer any **two** questions: 10×2=20
  - a) What is redox system? How do electron carriers,  $FADH_2$  and  $NADH$ , bring electrons to the inner mitochondrial membrane and generate a proton gradient across the inner membrane of the mitochondria? Describe the chemiosmotic theory of oxidative phosphorylation. 1+6+3=10

[Turn over]

b) Describe the process of transportation of activated fatty acids into the mitochondria. Why does the degradation of fatty acid known as  $\beta$  oxidation? How many ATPs and how much energy will be produced from a palmitic acid (16 carbon fatty acid) after its complete  $\beta$  oxidation?  $4+2+(3+1)=10$

c) "Glucokinase and hexokinase are two enzymes that have the same substrates and products"- Explain. How does phosphofructokinase reaction stage in glycolysis regulated? What is the significance of glycolysis?  $2+5+3=10$

d) An enzyme has reacted to a substrate at a concentration 0.03 mmol/L. If this reaction has initial velocity  $1.5 \times 10^{-3}$  mmol/L.min<sup>-1</sup> and the maximum velocity  $4.5 \times 10^{-3}$  mmol/L.min<sup>-1</sup>, calculate the Km value of this enzyme. What do you mean by un-competitive and non-competitive inhibition of enzyme activity? How do these two inhibitors change the Lineweaver-Burk plot?  $3 + (1 \frac{1}{2} + 1 \frac{1}{2}) + (2+2)=10$

e) Write briefly about the following (any **two**):

$$5+5=10$$

i) Fatty acid synthase complex

ii) Ramachandran plot

iii)  $\Delta G$  in chemical reaction

iv) Motif and domain in protein

v) Watson and Crick model of DNA

-----