

## U.G. 3rd Semester Examination - 2019

## ZOOLOGY

## [HONOURS]

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

Full Marks : 40

Time : 2½ 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) Name one rate-limiting enzyme of glycolysis and state its function. 1+1
  - b) Define  $K_m$ . What is the unit of  $K_m$ ?
  - c) What is anti-parallel  $\beta$ -pleated sheet?
  - d) How does enzyme help in accelerating a reaction?
  - e) Why is ammonia accumulation fatal in humans?
  - f) Why is B-DNA the most frequent form of DNA in living cells?
  - g) State the importance of Pentose phosphate pathway.

*[Turn over]*

Oleic, palmitoleic, linoleic

h) Give examples of two major unsaturated fatty acids prepared by anaerobic desaturation.

2. Answer any two of the following:  $5 \times 2 = 10$

a) What is plotted on 'X' and 'Y' axes on a Lineweaver-Burk plot? Show how to derive equation for the plot from the following

$$V_0 = \frac{V_{\max} [S]}{K_M + [S]}$$

explain how  $V_{\max}$  and  $K_M$  can be found from the graph's intercepts.

$1 + 4 = 5$

b) What are the favourable forces for protein bonding? Comment on the role of chaperons in protein folding.

$1 + 4 = 5$

c) Schematically represent the reactions of Krebs' Cycle where  $\text{NAD}^+$  is reduced to  $\text{NADH}$ .  $\text{H}^+$ ? Explain why Krebs' Cycle is also called Tricarboxylic Acid (TCA) Cycle?

$3 + 2 = 5$

d) Discuss about the control of *de novo* pyrimidine nucleotide synthesis in humans. State the function of a phosphodiester bond in DNA structure.

$4 + 1$

3. Answer any two of the following:  $10 \times 2 = 20$

a) i) In an experiment it was observed that DNA from cells after two replications consisted equal amounts of DNA with two different densities ( $^{14}\text{NDNA}$  and  $^{15}\text{NDNA}$ ). State the experimental procedure and the inference of the experiment.

ii) State the rate limiting step of  $\beta$  oxidation. Why triglycerides produce more energy than carbohydrate?  $5 + (3 + 2) = 10$

b) i) How many cycles of  $\beta$  oxidation are required to completely process a  $\text{C}_{18}$  fatty acid? State the set of reactions of a cycle.

ii) Name one inhibitor of Electron Transport chain. Explain how electron transport chain (ETC) produces transmembrane proton electrochemical gradient with the help of redox reaction.  $(1 + 4) + (1 + 4) = 10$

c) i) Name one amino acid that does not follow 'Ramachandran Plot'. Why do you think proline can act as a structural disruptor in  $\alpha$ -helix and  $\beta$ -sheets?

ii) Explain the following:

Zero order enzyme-substrate reaction,  
First order enzyme-substrate reaction and  
Second order enzyme-substrate reaction.

(1+3)+6

(d) i) Schematically represent the steps of urea cycle in mitochondria. How  $\alpha$ -keto acids determine the fate of transamination products?

ii) How deamination is involved in base alteration of DNA? (3+3)+4

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1 So citrate -  $\alpha$ -ketoglutarate  
 $\alpha$ -glutamate - succinyl-CoA