

2018

M.Sc. Part-I Examination

ZOOLOGY

PAPER—II (Group—B)

Full Marks : 50

Time : 2 Hours

The figures in the right-hand margin indicate full marks.

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

Illustrate the answers wherever necessary.

Answer any four questions taking two from each unit.

Unit—I

[Histology and Physiology]

1. (a) How would you define fixation ? Cite an example of a common fixative. 2½
- (b) Why Glutaraldehyde is better fixative than Formaldehyde ? 2½
- (c) What are the factors responsible for true fixation ? 2½

(Turn Over)

- (d) Write notes on any two of the following : $2 \times 2\frac{1}{2}$
- (i) Microwave Fixation
 - (ii) Vascular perfusion
 - (iii) Alcohol Fixatives
 - (iv) Fixation by oxidizing agents.

2. (a) How living cells are stained ? $1\frac{1}{2}$
- (b) Distinguish between stain and dye with suitable examples. 2
- (c) "Dyes are colored"—Justify with suitable explanation. 3
- (d) Cite example of a cationic dye and an anionic dye. 2
- (e) Describe the extraction procedure and preparation of hematoxylin dye, with the scientific name of the plant. 4
3. (a) Elucidate the roles of Vitamins B₃ and B₆ in human body. Name the diseases caused by deficiency and excess of potassium. $2+2+1$
- (b) Write short notes on : $2+2$
- (i) Ec50
 - (ii) Spare Receptor
- (c) Describe the mechanism of action of steroid hormone. $3\frac{1}{2}$

4. (a) Why is Action potential considered unidirectional ? $2\frac{1}{2}$
- (b) Draw and describe the structure of synapse and emphasize the role of Docking complex. $3\frac{1}{2}$
- (c) Briefly describe saltation conduction that occurs along a myelinated nerve fibre. 3
- (d) Explain Frank-Starling mechanism. $3\frac{1}{2}$

Unit—II

[Biophysics and Biochemistry]

5. (a) Write the 2nd law of thermodynamics and mention in a formula.
- (b) What determines the spontaneity of a reaction ? How entropy is related to Gibb's free energy.
- (c) Why ATP has been chosen as universal energy currency ? Explain the same with the help of ATP structure.
- (d) What do you mean by chemosmotic hypothesis ? What reaction does take place in cytochrome oxidase (IVth complex of ETC). $2+2+2+4+2\frac{1}{2}$
6. (a) What extra information do we get from LB plot than MM plot in an enzyme kinetic reaction ? Define K_m and K_{cat}.

- (b) What are the component of the protein secondary structure ? What are the importance of phi and psi angle in protein structure prediction ?
- (c) What are the difference between competitive and noncompetitive inhibition of an enzyme ? Discuss with suitable diagram.
- (d) What do you know about deamination and transamination ? How does it help in energy metabolism. 3+3+4+2½
7. (a) Write the regulatory mechanism of glycolytic pathways with steps and diagram. 5
- (b) Write the decarboxylation steps of TCA cycle with diagram. What are the fate of NADH and FADH₂ produced in the TCA cycle ?
- (c) Mention the regulatory mechanism of fat and protein metabolism to produce glucose. Draw the suitable reaction steps.
8. (a) Write notes on any one of the following : 4½
- (i) Oxidative phosphorylation
- (ii) Anabolic role of TCA cycle.
- (b) Explain any two of the following : 2×4
- (i) Ketogenic amino acid
- (ii) Facilitated diffusion
- (iii) Iso-osmotic solution
- (iv) Beer-Lambert Law.