M.Sc.

2nd Semester Examination - 2019

ZOOLOGY

Paper - ZOO 202

Full Marks : 40 Time : 2 Hours

The figures in the margin indicate full marks. Candidates are required to give their answers in their own words as far as practicable.

Group - A

(Biophysics)

1. Answer any *two* questions of the following : 2×2=4

   (a) γ-rays are electromagnetic radiations which, unlike to X-rays — Explain.

   (b) Higher the membrane cholesterol, the lower is the membrane fluidity — Why ?

   (c) To study the 3D-structure of cell, cryopreservation is an essential part of cell processing — Narrate your opinion.

   (d) Write a note on : Nanotube.

[Turn Over]

2. Answer the following questions (any *two*) : 4×2=8

(a) What is X-ray ? What is its wavelength ? Visible light and X-ray both are generated from electronic transition within an atom. Then what is the reason of difference in energy of these two radiations? 1+1+2

(b) State the second law of thermodynamics. What is meant by (i) Internal energy (ii) Entropy of a system. 2+1+1

(c) Mention the various ways in which membrane proteins are associated with the lipid bilayer. 4

(d) Write notes on : 2+2

(i) FRAP

(ii) 'Cell cytometry' — Concept and Functions.

3. Answer the following questions (any *one*) : 8×1=8

(a) (i) 'AFM is a common tool for demonstration of atom in Industry' — state its principle with suitable illustration. 5+1+2

(ii) State the role of 'Liposomes' in medical science. Write a note on Radiation Dosimetry.

(b) Write notes on (any *four*) of the following : 2×4

(i) Use of radio-isotope in science

(ii) Black membrane

(iii) Quantum dots

(iv) Cryoprotectant

(v) Scintillation counter

(vi) $T_{1/2} = \frac{0.693}{\lambda}$

[$T_{1/2}$ = half life period of a radioactive substance] λ = Disintegration constant.]

Group - B

(Biochemistry)

4. Answer any *two* questions of the following : 2×2=4

(a) What are the structural complexity of 'Domain' and 'Motif' ? 2

(b) Explain why ATP acts as a competitive inhibitor in phosphorylation by hexokinase. 2

[Turn Over]

(c) An enzyme catalyzed reaction has km of 2 mM and $\sqrt{max}$ of 10 $nM.S^{-1}$. What is the reaction velocity when the substrate conc. is (i) 0.50 nM (ii) 20 nM ? 1+1

(d) Demonstrate the Kinetics of non-competitive inhibitions with 'Line-Weaver Burk Plot'. 2

5. Answer any *two* questions of the following : 2×4=8

(a) State the mechanism of β-oxidation of polyunsaturated fatty acid in mitochondria.

(b) Describe the mechanism of 'Enzyme action' with special reference to 'Triose-phosphate isomerase'.

(c) Explain with diagram the non-oxidative recycling of pentose phosphate to Glucose-6 Phosphate.

(d) Illustrate the Structure of TIM barrel or α/β barrel.

6. Answer any *one* question from the following : 1×8=8

(a) (i) State the biochemical steps of oxidation of propionyl CoA.

(ii) Comment on "Hydrophobic interactions must be important determinant for protein structure".

(iii) Write a note on Enzyme inhibitions. 3+2+3

(b) (i) What is Oxidative phosphorylation?

(ii) Write down chemiosmotic hypothesis of ATP synthesis.

(iii) Illustrate the flow of electrons through Q cycle with proper diagram. 2+2+4
