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PG CBCS
M.SC. Semester-II Examination, 2021
ZOOLOGY
PAPER: ZOO 202

Full Marks: 40   **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.

Group-202.1
(Marks: 20)
(BIOPHYSICS)

Answer TWO questions of the following: **10X2=20**

1. (a) With proper reasoning, cite one example each of: (i) two solutions are isosmotic but not isotonic, and (ii) two solutions are isotonic but not isosmotic. 6.84 g of sucrose dissolved in 200 ml water shows an osmotic pressure of 2.46 atm at 27^0C - calculate the molecular weight (in daltons) of sucrose.   3+3

   (b) First law of thermodynamics is explained with reference to a close system only – why? Distinguish between laminar and turbulent blood flow in blood vessels. 1 + 3

2. (a) Distinguish between liquid emulsion and solid emulsion with examples. What is dialysis? Write a note on clinical importance of dialysis.   2+1+3

   (b) A bird lays a fertilized egg in its nest. What type of 'system' is the egg, from thermodynamic point of view? The earth is an 'open as well as closed system' – justify from thermodynamic point of view.   2+2

3. (a) How does 'fluorescence recovery after photo bleaching' justify the mobility of protein molecules in plasma membrane? Explain the difference between lateral movement and translational movement of lipid molecules in plasma membrane. 3+3

   (b) When does a protein exist as a zwitterion? A protein 'X' is found to be (i) electrically neutral at a pH of 7.4, (ii) +vely charged at a pH of 7.0 and (iii) –vely charged at a pH of 7.6 – explain with the help of suitable illustration, the relation between pH change and ionic status of 'X'.   1 + 3

4. (a) Define and exemplify auto-fluorescence, induced fluorescence and metachromatic fluorescence. The latent heat of evaporation of water is 2256 kJ kg^-. Calculate ΔH and ΔE in converting 1 mole of water at 100ºC into steam at the same temperature, assuming water to behave as an ideal gas [given that R = 8.32 J mol^- K^-].   3 + 3

(P.T.O.)

(b) Name two fixatives commonly used in electron microscopy. Why can't you use alcohol and acetic acid as fixatives for electron microscopy? Mention two differences between the functioning of a TEM and a SEM.   1+1+2

Group-202.2
(Marks: 20)
(BIOCHEMISTRY)

Answer <u>TWO</u> questions of the following: 10x2=20

1. Describe the energetic of TCA cycle. Write down the mechanism of transamination reaction.   5+5
2. What is parallel β-sheet structure of protein? Write a note on Ramachandran plot. Describe the quaternary structure of protein with proper example. Distinguish between domain and motif of protein structure.   2+2+4+2
3. State the organization of the components of mitochondrial electron transport chain along with the prosthetic groups in each. Write down the chemiosmotic hypothesis of ATP synthesis.   5+5
4. How do you distinguish saturated fatty acid from unsaturated fatty acid? Write down the process of β oxidation of Palmitic acid. How many ATPs are formed by this process?   4+5+1

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