3 Yr. Degree/4 Yr. Honours 3rd Semester Examination, 2024 (CCFUP)

Subject : Zoology

Course : ZOOL3012 (Major)

(Cell Biology)

Time: 2 Hours **Full Marks: 40**

The figures in the margin indicate full marks.

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

1. Answer *any five* questions of the following: 2×5=10

(a) What is facilitated diffusion and how is it different from simple diffusion?

(b) What is meant by 'Signal hypothesis' in connection with protein sorting?

(c) Define Redox Potential with example.

(d) What is the role of second messenger in cell signalling?

(e) Define the term 'receptor' and 'ligand' in the context of cell signalling.

(f) Define Catastrophe and Rescue in connection with microtubule dynamics.

(g) Define Replicative Cell Senescence.

(h) "Membrane integral proteins are amphipathic"— Explain.

2. Answer *any two* questions of the following: 5×2=10

(a) Define Apoptosis. Mention the cytological features of an apoptotic cell. 2+3

(b) Who coined the term "fluid mosaic model"? Describe the "fluid mosaic model" in the context of the plasma membrane. 1+4

(c) State the difference between rough and smooth ER. Explain vesicular transport and cisternal maturation model of Golgi transport. 2+3

(d) Mention the role of tyrosine kinase receptors in cell signalling. How does intracellular signalling differ from cell surface signalling? 2+3

3. Answer *any two* questions of the following: 10×2=20

(a) Describe in brief different types of proteins found in plasma membrane. State the differences between active transport and passive transport. Mention the basic difference between primary active transport and secondary active transport. What are the weak-interactions needed for lipid bilayer formation? 4+2+2+2

(b) What are the key regulatory mechanisms that control the progression of the cell cycle? How do checkpoints ensure that the cell divides only when it is ready? 5+5

(c) Explain the role of lysosomes in cellular digestion and waste management. How does this organelle maintain cellular homeostasis? 5+5

(d) Draw Mitochondrial Respiratory Chain. Explain the mechanism by which proton-motive force is generated. What is chemi-osmotic theory? 3+5+2
