

M.Sc. Sem.-1 Examination

403

Life Science

January-2024

Time : 2-30 Hours]

[Max. Marks : 70

Instructions: All questions in Sections I & II carry equal marks

Illustrate your answers with neat diagrams wherever necessary.

Question 1 Write the following

- (i) Explain the structures of prokaryotic and eukaryotic cells in detail. (7 Marks)
- (ii) Describe the stages of the cell cycle and their significance. (7 Marks)

OR

- (i) Write a short note on cell adhesion and cell junctions. (7 Marks)
- (ii) Compare and contrast mitosis and meiosis. (7 Marks)

Question 2 Write the following

- (i) Write short notes on microtubules and microfilaments (7 Marks)
- (ii) Explain the mechanisms of active and passive transport across the cell membrane. (7 Marks)

OR

- (i) Explain the cytoskeleton in cell structure and its role in movement. (7 Marks)
- (ii) Explain the ultrastructure and molecular composition of biomembrane. (7 Marks)

Question 3 Write the following

- (i) Explain the structural components of a mitochondrion and their significance. (7 Marks)
- (ii) Describe the structure of chloroplasts and their role in photosynthesis. (7 Marks)

OR

- (i) Provide an overview of the role of mitochondria in cellular respiration. (7 Marks)
- (ii) Explain the process of light reactions and the Calvin cycle in chloroplasts. (7 Marks)

Question 4 Write the following

- (i) Discuss the role of the ER in the synthesis, folding, and modification of proteins. (7 Marks)

12/4/3-2

- (ii) Discuss the role of oncogenes and tumour suppressor genes in regulating metabolic pathways in cancer. (7 Marks)

OR

- (i) Explain the molecular and cellular consequences of lysosomal dysfunction in lysosomal storage disorders. (7 Marks)
- (ii) Define carcinogens and provide examples of chemical, physical, and biological agents that can act as carcinogens. (7 Marks)

Question 5 Attempt any seven out of twelve

(14 Marks)

- (i) Name the phases of the cell cycle.
- (ii) Name three main components of the cytoskeleton.
- (iii) What is the function of ribosomes?
- (iv) What is the function of the nucleus?
- (v) What is the composition of lysosomes, and what enzymes are typically found within them?
- (vi) What is diffusion? Give an example.
- (vii) What are the primary checkpoints in the cell cycle?
- (viii) What is the structure of mitochondria?
- (ix) What is the primary function of chloroplasts?
- (x) Briefly explain the Warburg effect and its significance in cancer metabolism.
- (xi) How do microbodies contribute to cellular redox balance, and what is their involvement in reactive oxygen species (ROS) metabolism?
- (xii) Name one lysosomal storage disorder and briefly describe its impact on cellular function.

—X—