

**Instructions:** Illustrate your answers with neat diagrams wherever necessary.

**Q. 1 Write the following**

- (i) Discuss the factors contributing to cell variability. (7 Marks)
- (ii) Compare and contrast the structural organization of prokaryotic and eukaryotic cells. (7 Marks)

**OR**

- (i) Illustrate the stages of the cell cycle and their regulation. (7 Marks)
- (ii) Explain the process of cell division in prokaryotic cells (binary fission) compared to eukaryotic cells (mitosis and meiosis). (7 Marks)

**Q. 2 Write the following**

- (i) Explain the properties of the plasma membrane in detail. (7 Marks)
- (ii) What is protein trafficking? Explain its molecular mechanism. (7 Marks)

**OR**

- (i) Write a note on the molecular organisation of the plasma membrane. (7 Marks)
- (ii) Explain intermediate filaments in detail. (7 Marks)

**Q. 3 Write the following**

- (i) Explain the molecular organization and functions of the nucleus. (7 Marks)
- (ii) What are the key characteristics of a cancer cell? (7 Marks)

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OR

- (i) Explain the process of carcinogenesis and the role of carcinogens. (7 Marks)
- (ii) Describe the chemistry of chromatin and its role in gene regulation. (7 Marks)

**Q. 4 Write the following**

- (i) What is nucleus? explain its structure and function. (7 Marks)
- (ii) Give a brief note on the Golgi complex. (7 Marks)

OR

- (i) What are peroxisomes? Explain peroxisomal disorders. (7 Marks)
- (ii) Give a brief note on the endoplasmic reticulum. (7 Marks)

**Q 5. Attempt any seven out of twelve**

(14 Marks)

- (i) What is a cancer biomarker?
  - (ii) Define "chromatin" and its main components.
  - (iii) What is the role of the nucleolus in the cell?
  - (iv) List two functions of cell adhesions.
  - (v) What is the subunit of microfilaments?
  - (vi) What is osmosis?
  - (vii) Plasma membrane is made up of which major components?
  - (viii) Briefly explain the role of mitosis in cell division.
  - (ix) What are the key differences between prokaryotic and eukaryotic cells in terms of structure?
  - (x) Which cells are rich in endoplasmic reticulum?
  - (xi) Which gene is mutated in Gaucher disease?
  - (xii) What is cis golgi and trans golgi?
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