2024

(NEP–2020)

(2nd Semester)

BIOCHEMISTRY (MAJOR)

(Cell and Membrane Biology)

Full Marks : 75

Time : 3 hours

The figures in the margin indicate full marks for the questions

(SECTION : A—OBJECTIVE)

(*Marks* : 10)

Tick (✓) the correct answer in the brackets provided : 1×10=10

1. Which of the following is an eukaryotic cell?

(a) Mycoplasma ( )

(b) Bacteria ( )

(c) Blue-green algae ( )

(d) Fungi ( )

2. Lysosomes originate from

(a) endoplasmic reticulum ( )

(b) Golgi apparatus ( )

(c) peroxisomes ( )

(d) cytoplasmic vacuoles ( )

3. Which of the following organelles is absent in animal cell?

(a) Cilium ( ) *(b)* Vacuole ( )

(c) Glyoxysome ( ) *(d)* Centriole ( )

4. The most common intermediate filaments found in the nucleus are composed of

(a) lamin ( ) *(b)* actin ( )

(c) tubulin ( ) *(d)* keratin ( )

5. According to the sliding filament model, during muscle contraction, which of the following remains the same?

(a) Z disc ( ) *(b)* A band ( )

(c) I band ( ) *(d)* H zone ( )

6. Which among the following is not a characteristic of cancer cells?

(a) Loss of contact inhibition ( )

(b) Reduced requirement of growth factor ( )

(c) Decreased replication and transcription ( )

(d) Loss of anchorage dependence ( )

7. Which cell organelle is actively involved in apoptosis in animals?

(a) Nucleus ( ) *(b)* Mitochondria ( )

(c) Vacuole ( ) *(d)* Golgi apparatus ( )

8. The active cyclin-CDK complex regulates the cell cycle through

(a) phosphorylation of specific proteins ( )

(b) dephosphorylation of specific proteins ( )

(c) methylation of specific proteins ( )

(d) cleavage of specific proteins ( )

9. The major interaction responsible for stabilizing plasma membrane is

(a) hydrophobic interaction ( )

(b) hydrophilic interaction ( )

(c) covalent bond ( )

(d) ionic bond ( )

10. Cell signalling is

(a) intercellular ( )

(b) intracellular ( )

(c) Both *(a)* and *(b)* ( )

(d) None of the above ( )

(SECTION : B—SHORT ANSWERS)

(*Marks* : 15)

Write short notes on *five* of the following, taking at least *one* from each Unit : 3×5=15

UNIT—1

1. Difference between capsule and slime layers

2. Characteristics of plant cell

UNIT—2

3. Types of cytoskeleton

4. Axoneme

UNIT—3

5. Importance of stem cells in medicine

6. Checkpoints in the cell cycle

UNIT—4

7. Difference between active and passive transports

8. Importance of cell membrane fluidity

(SECTION : C—DESCRIPTIVE)

(*Marks* : 50)

Answer *five* of the following, taking at least *one* from each Unit : 10×5=50

UNIT—1

1. Write a note on the structure and components of prokaryotic cell.

2. What is the difference between Prokaryotic and Eukaryotic cells? Describe the structure and functions of mitochondria. 5+5=10

UNIT—2

3. Differentiate between the characteristic features of Cytoplasmic microtubules and Axonemal microtubules.

4. Explain the role of cytoskeleton in the entry of infectious organism.

UNIT—3

5. Write a detailed note on the process of cell division in germ cells.

6. Describe the mechanisms that convert the protooncogenes to oncogenes.

UNIT—4

7. Explain in detail the 'fluid mosaic model' of plasma membrane.

8. What are the main types of signalling molecules? Explain the process of cell signalling. 2+8=10

★ ★ ★