2025

(NEP—2020)

(2nd Semester)

BOTANY (MAJOR)

(Biochemistry and Cell 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 type of bond is formed between two amino acids in a protein?

(a) Glycosidic bond ( ) *(b)* Peptide bond ( )

(c) Phosphodiester bond ( ) *(d)* Hydrogen bond ( )

2. Which of the following is a disaccharide?

(a) Glucose ( ) *(b)* Fructose ( )

(c) Sucrose ( ) *(d)* Ribose ( )

3. Which of the following is not a function of carbohydrates?

(a) Energy storage ( ) *(b)* Structural support ( )

(c) Enzyme catalysis ( ) *(d)* Cell recognition ( )

4. RNA is composed of repeating units called

(a) amino acids ( )

(b) nucleotides ( )

(c) monosaccharides ( )

(d) fatty acids ( )

5. ATP is known as the energy currency of the cell because

(a) it stores genetic information ( )

(b) it transports oxygen ( )

(c) it provides energy for cellular processes ( )

(d) it acts as a structural component of the cell membrane ( )

6. Which part of the nucleus is responsible for ribosome production?

(a) Nuclear envelope ( ) *(b)* Nuclear pore ( )

(c) Nucleolus ( ) *(d)* Chromatin ( )

7. Which phase of the cell cycle is the longest?

(a) G1 phase ( ) *(b)* S phase ( )

(c) G2 phase ( ) *(d)* M phase ( )

8. In which stage of mitosis do the sister chromatids separate and move to opposite poles?

(a) Prophase ( ) *(b)* Metaphase ( )

(c) Anaphase ( ) *(d)* Telophase ( )

9. Which organelle is known as the 'protein factory' of the cell?

(a) Golgi apparatus ( )

(b) Ribosome ( )

(c) Endoplasmic reticulum ( )

(d) Lysosome ( )

10. Mitochondria are responsible for

(a) protein synthesis ( ) *(b)* photosynthesis ( )

(c) ATP production ( ) *(d)* detoxification ( )

(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—I

1. Composition of amino acids

2. Peptide bond formation

UNIT—II

3. Composition of DNA

4. Messenger RNA

UNIT—III

5. Nucleolus

6. Nuclear membrane

UNIT—IV

7. Endoplasmic reticulum

8. Golgi apparatus

(SECTION : C—DESCRIPTIVE)

(*Marks* : 50)

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

UNIT—I

1. Write a detailed account on the classification of carbohydrates with examples. 10

2. Write short notes on the following : 5+5=10

(a) Protein structure and their significance

(b) Amino acids classification based on their side chains

UNIT—II

3. Explain the classification and nomenclature of enzymes. 10

4. Write short notes on the following : 5+5=10

(a) Structure and function of DNA

(b) Structure and function of ATP

UNIT—III

5. Describe the different phases of the cell cycle, highlighting the key events in each phase with well-labelled diagrams. 10

6. Write short notes on the following : 5+5=10

(a) The cell membrane

(b) Cell origin theories

UNIT—IV

7. Describe the structure and function of mitochondria and ribosomes in a eukaryotic cell. How do these organelles contribute to cellular metabolism and protein synthesis? 10

8. Write short notes on the following : 5+5=10

(a) Cytoskeletal elements

(b) Plastids

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