Total number of printed pages-4

63(FY)(SEM-3) MIN/BOTMIN2014

2024

BOTANY

Paper : BOTMIN2014

Biomolecules and Cell Biology

Full Marks :50
Pass Marks : 20

Time : 2 hours

The figures in the margin indicate full marks for the questions

1. Choose the correct answer (Any five): **1x5=5**

(i) In a water molecule, what is the angle between the two hydrogen atoms?

a) 105.5° b) 150.5°

c) 104.5° d) 90°

(ii) How does a buffer contribute to the stability of biomolecules?

a) By completely dissolving biomolecules.

b) By stabilizing pH levels and preventing significant fluctuations.

c) By enhancing the hydrophobic nature of biomolecules.

d) By eliminating hydrogen ions from the solution.

(iii) What type of sugar is linked to nitrogenous bases in RNA molecules?

a) Glucose

b) Fructose

c) Deoxyribose

d) Ribose

(iv) What are the main structural components of the endoplasmic reticulum (ER)?

a) Vesicles and tubules

b) Thylakoids and cisternae

c) Tubules and cisternae

d) Grana and vesicles

(v) How do coenzymes differ from other types of cofactors?

a) Coenzymes are organic compounds, whereas other cofactors are inorganic substances

b) Coenzymes attach permanently to enzymes, unlike other cofactors

c) Coenzymes are essential for every enzymatic reaction

d) Coenzymes are produced exclusively in animals

2. **Answer the following questions (Any five) : 2x5=10**

(a) Write any two effects of pH on biomolecules.

(b) What are oligosaccharides, and how do they differ from disaccharides? 1+1

(c) What are storage lipids in plants? Give two examples. 1+1

(d) What is meant by protein denaturation?

(e) Differentiate phagocytosis and pinocytosis.

(f) What is Lock and Key Hypothesis?

(g) List the three main checkpoints in the cell cycle and describe their functions in brief.

3. Answer the following questions (any Five): 5x5=25

(a) Write a short note on protein structure.

(b) With a neat labelled diagram describe the key components of fluid mosaic model of cell membrane. 2+3

(c) Write a note on biological roles of proteins.

(d) What is protein denaturation? Explain how different factors can cause protein denaturation? 1+4

(e) What role does the ATP play in the synthesis of nucleic acids?

(f) 'Mitochondria are semiautonomous organelles.' Explain.

(g) What are enzymes? Explain how enzymes are classified according to the International Union of Biochemistry and Molecular Biology (IUBMB) with examples.

(h) Differentiate endergonic and exergonic reactions with examples.

4. Answer the following questions (any one): 10x1=10

(a) Write a detail note on the structure and characteristics of A, B, and Z Types of DNA.

(b) Describe the process of passive transport in plant cells and how it facilitates the movement of water, ions, and nutrients across the plant cell membrane via diffusion and osmosis.
