KAMARAJ COLLEGE (Autonomous)

Accredited with A+ Grade by NAAC

(Affiliated to Manonmaniam Sundaranar University, Tirunelveli)

(3 Pages) **Reg. No:……**

Question Code: 26E00910 **Course Code : 24USBO31**

UG Degree - End Semester Examinations, April 2026

Third Semester

B.Sc., BOTANY

Cell and Molecular Biology

(For those who joined in July 2024 onwards)

Time : 3Hours **Maximum : 75 Marks**

PART – A (10 × 1 = 10 Marks)

Answer ALL Questions

Choose the correct answer :

CO:1 1. The cell wall of bacteria is mainly composed of _____.

K:1 (a) Cellulose (b) Peptidoglycan

(c) Chitin (d) Lignin

CO:1 2. Mitosis was first described by _____.

K:1 (a) Charles Darwin (b) Gregor Mendel

(c) Walther Flemming (d) Louis Pasteur

CO:2 3. Smooth ER is mainly involved in _____ synthesis.

K:2 (a) Protein (b) Lipid

(c) Carbohydrate (d) Nucleic acid

CO:2 4. Chlorophyll pigment is present in the _____ membrane.

K: (a) Outer Membrane (b) Inner Membrane

(c) Thylakoid (d) Nuclear

CO:3 5. RNA contains _____ instead of thymine.

K:1 (a) Adenine (b) Cytosine

(c) Guanine (d) Uracil

CO:3 6. Okazaki fragments are formed during _____ strand synthesis.

K:2 (a) Leading (b) Template

(c) Lagging (d) Coding

CO:4 K:2 7. The Citric Acid Cycle is also known as _____ cycle.

(a) Calvin (b) Urea

(c) Krebs (d) Glyoxylate

CO:4 K:2 8. NADPH is produced in the _____ reaction.

(a) Dark (b) Light

(c) Glycolytic (d) Fermentation

CO:5 K:1 9. DNA fragments are joined by _____.

(a) DNA Ligase (b) Helicase

(c) DNA polymerase (d) RNA polymerase

CO:5 K:2 10. Human insulin is produced using _____ technology.

(a) Hybridoma (b) Fermentation

(c) Recombinant DNA (d) Cloning

PART – B (5 X 5 = 25 Marks)

Answer ALL Questions choosing either (a) or (b).

Answer should not exceed 250 words.

CO:1 K:4 11. (a) Describe the ultrastructure of a prokaryotic cell with a suitable diagram.

(OR)

(b) Critically analyze the Fluid Mosaic Model proposed by S. J. Singer and G. L. Nicolson.

CO:2 K:3 12. (a) Illustrate the structure of the Ribosome.

(OR)

(b) Describe the structure and function of the chloroplast.

CO:3 K:3 13. (a) Explain the structure of DNA based on Watson and Crick model.

(OR)

(b) Describe the mechanism of DNA replication.

CO:4 K:4 14. (a) Analyze the stepwise conversion of glucose to pyruvate during Glycolysis.

(OR)

(b) Examine the interdependence between light and dark reactions of photosynthesis.

CO:5 15. (a) Describe the role of r-DNA technology in medicine.

K:3

(OR)

(b) Explain the applications of molecular techniques in biotechnology.

PART – C (5 X 8 = 40 Marks)

Answer ALL Questions choosing either (a) or (b).

Answer should not exceed 500 words.

CO:1 16. (a) Compare the ultrastructure of prokaryotic and eukaryotic cells.

K:4

(OR)

(b) Analyze the cell cycle and its role in regulating cell division.

CO:2 17. (a) Classify the types of Endoplasmic Reticulum based on structure and function.

K:4

(OR)

(b) Examine the ultrastructure of Mitochondria as seen under an electron microscope.

CO:3 18. (a) Compile the major types of the RNA and their function.

K:4

(OR)

(b) Explain the process of Transcription.

CO:4 19. (a) Evaluate the efficiency of Oxidative Phosphorylation in ATP production compared with substrate-level phosphorylation.

K:5

(OR)

(b) Assess the importance of photosynthesis in maintaining atmospheric balance and supporting life on Earth.

CO:5 20. (a) Design a model illustrating the steps of recombinant DNA technology.

K:6

(OR)

(b) Propose ethical guidelines for regulating genetic engineering practices.