QP Code: P25B013

Reg. No : .....

Name : .....

ST MARY'S COLLEGE (AUTONOMOUS), THRISSUR-20

II SEMESTER (CBCSS-PG) DEGREE EXAMINATION, MARCH 2025

M Sc Biotechnology

GBT2C02 : MOLECULAR BIOLOGY

2024 Admission Onwards

Time:3 Hours **Maximum Weightage:30**

Part A

*Short answer type questions: Answer **any four** questions. Weightage **2** for each question.*
(4x2 = 8 Weightage)

1. How does the CoT curve help to analyze the complexity of a genome? [BTL2]
2. Explain how composite transposons are formed. [BTL2]
3. Describe the function of microRNAs (miRNAs) in gene regulation. [BTL2]
4. Predict what would happen to DNA replication if helicase is nonfunctional. [BTL3]
5. Compare the start and stop codons in terms of their importance to the translation process. [BTL4]
6. Compare the role of the repressor in the lac operon and the trp operon. [BTL4]
7. How the chemical structure of the 5' cap contributes to mRNA stability and translation? [BTL5]

Part B

*Short essay-type questions: Answer **any four** questions. Weightage **3** for each question.*
(4x3 = 12 Weightage)

8. What are the primary types of DNA damage? [BTL1]
9. Illustrate the double-helix structure of DNA with suitable labeled diagram. [BTL2]
10. Demonstrate how CRISPR-Cas9 could be used to knock out specific genes. [BTL3]
11. Apply the concept of homologous recombination to explain how double-strand breaks are repaired. [BTL3]
12. Compare the mRNA maturation process in prokaryotes and eukaryotes, highlighting the key differences. [BTL4]

Turn Over

13. Investigate the mechanisms of transcriptional termination in prokaryotes and eukaryotes, identifying key proteins involved. [BTL4]

14. Compare the role of initiation and elongation factors in prokaryotes and eukaryotes during translation. [BTL4]

Part C

*Essay-type questions: Answer **any two** questions. Weightage **5** for each question.*
(2x5 = 10 Weightage)

15. Illustrate the mechanisms of DNA replication in eukaryotes. [BTL1]

16. How does the interaction between tumor suppressor genes and oncogenes contribute to the development of a cancerous phenotype? [BTL2]

17. Compare and contrast the mechanisms of transposition for SINEs and LINEs. [BTL4]

18. Compare and contrast the molecular mechanisms of different types of conjugation. [BTL4]

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