

M.Sc. 2nd Semester Examination, 2025

MICROBIOLOGY

PAPER—MCB-205

Full Marks : 25

Time : 1 hour

The figures in the right hand margin indicate marks

Candidates are required to give their answers in their own words as far as practicable

GROUP — A

Answer any two questions from the following :

2 × 2

1. Name two experiments by which it has been proved that DNA replicates bi-directionally.

1 + 1

2. Differentiate between Type I and Type II topoisomerase.

1 + 1

(Turn Over)

3. What are Okazaki fragments ? Name the enzyme that removes RNA from the Okazaki fragments during eukaryotic DNA replication. 1 + 1
4. Distinguish between germ-line and somatic mutation. Name the mechanism by which UV-induced DNA damage is repaired. 1 + 1

GROUP – B

Answer any two questions from the following :

4 × 2

5. Mention different subunits of *E.coli* RNA polymerase and describe their roles in transcription. Name the RNA involved in splicing. 3 + 1
6. Describe the bacteriophage M13 DNA replication process. Name one viral DNA that replicates unidirectionally. 3 + 1

7. How does the Rho-dependent mechanism terminate transcription? Mention how miRNA regulates transcription and translation. 2 + 2
8. Schematically describe the formation of the pre-replication complex in G1 phase and its activation in S-phase during eukaryotic DNA replication. 2 + 2

GROUP – C

Answer any one question from the following :

8 × 1

9. Describe the regulation of *Lac*-operon gene expression by the repressor. Describe schematically how steroid hormone regulates eukaryotic gene expression. Mention the role of Histone acetylase and histone methyltransferase in the regulation of eukaryotic gene expression. 3 + 3 + 2

(4)

10. Describe the initiation and elongation steps of bacterial translation. What is N-linked and O-linked glycosylation of protein ? 3+3+2

[Internal Assessment – 5 Marks]
