

(6 pages)

Reg. No. : .....

Code No. : 7543

Sub. Code : ZMBM 21

M.Sc. (CBCS) DEGREE EXAMINATION,  
NOVEMBER 2023.

Second Semester

Microbiology – Core

MOLECULAR BIOLOGY AND GENETICS

(For those who joined in July 2021-2022)

Time : Three hours

Maximum : 75 marks

PART A — (10 × 1 = 10 marks)

Answer ALL questions.

Choose the correct answer :

1. The elongation of the leading strand during DNA synthesis \_\_\_\_\_
  - (a) Progresses away from the replication fork
  - (b) Occur in 3'-5' direction
  - (c) Produces Okazaki fragment
  - (d) Depend on the action of DNA polymerase

2. Which of the following statement is correct?
  - (a) Photo reactivation is absent in human
  - (b) Photo reactivation is present in all organisms
  - (c) Photo reactivation is present only in plants and animals
  - (d) Photo reactivation present only in bacteria
3. In the prokaryotic organisms, transcription occurs in \_\_\_\_\_
  - (a) Nucleus
  - (b) DNA
  - (c) Cytoplasm
  - (d) Golgi bodies
4. The synthesis of polynucleotide chain of m RNA is catalyzed by the enzyme
  - (a) RNA helicase
  - (b) RNA polymerase
  - (c) DNA polymerase
  - (d) DNA helicase
5. In the *lac* operon model lactose molecules function as
  - (a) Inducers which bind with the operator gene
  - (b) Repressors, which bind with the operator gene
  - (c) Inducers, which bind with the repressor protein
  - (d) Co repressors, which bind with repressor protein

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6. The method of post transcriptional gene silencing is particularly useful in \_\_\_\_\_
  - (a) Plants
  - (b) Animals
  - (c) Insects
  - (d) Micro organisms
7. Introduction of DNA molecules in to the recipient organism is termed as \_\_\_\_\_
  - (a) Transformation
  - (b) Translation
  - (c) Transduction
  - (d) Transcription
8. Plasmids can be classified in to how many types depending on the genes present for their transformation?
  - (a) One
  - (b) Two
  - (c) Three
  - (d) Four
9. Which one is the more complex transposons?
  - (a) Tn10
  - (b) Tn3
  - (c) Tn5
  - (d) Tn9
10. The enzyme that catalyzes the transposition of IS element is called \_\_\_\_\_
  - (a) Transposase
  - (b) Integrase
  - (c) Transcriptase
  - (d) Polymerase

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PART B — (5 × 5 = 25 marks)

Answer ALL questions, choosing either (a) or (b).  
Each answer should not exceed 250 words.

11. (a) Explain Griffith experiment to prove DNA as genetic material.

Or

(b) Categorize the SOS repair mechanisms.
12. (a) Give a brief account on general principle and process of transcription.

Or

(b) Explain the important characteristics of genetic code.
13. (a) What is operon concept? Give a brief note on regulation of gene expression.

Or

(b) Justify gene silencing.
14. (a) Write about conjugation in bacteria.

Or

(b) Explain transduction in bacteria and mention its types.

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15. (a) Organize the transposons and their genetic applications.

Or

- (b) Note on retroposons.

PART C — (5 × 8 = 40 marks)

Answer ALL questions, choosing either (a) or (b)  
Each answer should not exceed 600 words.

16. (a) Elaborate (i) Rolling circle model of DNA replication and (ii) Meselson - Stahl experiment.

Or

- (b) Discuss in detail about enzymology of DNA replication.

17. (a) Explain in detail the mechanism of prokaryotic transcription.

Or

- (b) Write about capping and polyadenylation in RNA processing.

18. (a) Illustrate the *lac* operon model and write in detail about its regulations.

Or

- (b) Explain briefly about post transcriptional modifications.

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19. (a) Describe the mechanism of transformation in gene transfer.

Or

- (b) Discuss Hfr conjugation - in gene transfer.

20. (a) Summarize the transposons of *E-coli* and their importance.

Or

- (b) Write a detailed account on transposable elements.
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