(6 pages)

Reg. No. : .....

**Code No. : 5543** **Sub. Code : ZMBM 21**

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

Second Semester

Microbiology – Core

MOLECULAR BIOLOGY AND GENETICS

(For those who joined in July 2021 onwards)

Time : Three hours Maximum : 75 marks

PART A — (10 × 1 = 10 marks)

Answer ALL questions.

Choose the correct answer :

1. Eukaryotes differ from prokaryotes in the mechanism of DNA replication due to ————
   (a) Different enzymes for the synthesis of lagging and leading strand
   (b) Use of DNA primer rather than RNA primer
   (c) Unidirectional rather than bidirectional replication
   (d) Discontinuous rather than semi discontinuous replication

2. DNA polymerase enzyme involved in base excision repair mechanism is
   (a) Pol-alpha
   (b) Pol-beta
   (c) Pol gamma
   (d) Pol-delta

3. When RNA polymerase binds to the specific region of DNA and indicates transcription then it is called as
   (a) Donor site (b) Demeter site
   (c) Acceptor site (d) Promoter site

4. In the translation, uses as the interpreter of m RNA?
   (a) sRNA (b) qRNA
   (c) tRNA (d) nRNA

5. Promoter regions of the lac operon can be accessed by?
   (a) RNA polymerase (b) DNA polymerase
   (c) Proteins (d) All of the above

6. DNA, ———— is also a method for gene silencing through short RNAs?
   (a) Acetylation (b) Phosphorylation
   (c) Methylation (d) A cyclation



7. The ability of cells to take up DNA fragments from surrounding is called ————
   (a) Transfection (b) Transduction
   (c) Transformation (d) Conjugation

8. When the phage transduces only those bacterial genes adjacent to the prophage in the bacterial chromosome, then it is known as ————?
   (a) Generalized transduction
   (b) Specialized transduction
   (c) Restricted transduction
   (d) Conjugation

9. The IS elements can be identified by the presence of
   (a) Antibiotic resistant gene
   (b) *Endonuclease cleavage*
   (c) 50 bp inverted repeat
   (d) Integrase site

10. Which of the following are non composite transposons?
    (a) Tn5 (b) Tn10
    (c) Tn3 (d) Tn9



PART B — (5 × 5 = 25 marks)

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

11. (a) Explain Hershey and chase experiment to prove DNA as genetic material.

    Or

    (b) Write about excision repair mechanism of DNA

12. (a) Give the salient features of genetic code.

    Or

    (b) Note on signal sequences in protein transport.

13. (a) Write about *ara* operons and gene regulations.

    Or

    (b) Assume the role of antisense RNA.

14. (a) How does conjugation occurs in bacteria and mention its types?

    Or

    (b) Explain the mechanism of generalized transduction.

15. (a) Write note on transposons of yeast.

    Or

    (b) Explain about the transposons of *E.coli*.

PART C — (5 × 8 = 40 marks)

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

16. (a) Briefly explain molecular mechanisms of DNA replication.

Or

(b) Discuss the types, structure and replication of plasmids.

17. (a) Catagorize the synthesis of mRNA in prokaryotes.

Or

(b) Give a detailed account on general principle and process of translation.

18. (a) Elaborate the biosynthesis of *trp* operon.

Or

(b) Write about the transcriptional control in gene regulations.

19. (a) Give a detailed account on the role of self transmissible and mobilizable plasmids in gene transfer mechanisms.

Or

(b) Discuss the process of transformation in detail.



20. (a) Elaborate the discovery and nomenclature of insertion sequences.

Or

(b) Write a detailed account on complex and compound transposons.

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