(7 pages) **Reg. No. :** .....

Code No. : 10382 E **Sub. Code : EMMI 31/ FCMI 31**

B.Sc. (CBCS) DEGREE EXAMINATION, NOVEMBER 2025.

Third Semester

Microbiology – Main

Major — MOLECULAR BIOLOGY AND MICROBIAL GENETICS

(For those who joined in July 2023 onwards)

Time : Three hours Maximum : 75 marks

SECTION A — (10 × 1 = 10 marks)

Answer ALL questions.

Choose the correct answer.

1. Cell cycle RNA replication primarily occur in

(a) M phase (b) G 1 phase

(c) S phase (d) G2 phase

2. Left-handed DNA helix is

(a) B form (b) A form

(c) C form (d) Z form

3. In prokaryotic transcription the promotor region is recognized by

(a) DNA polymerase

(b) Sigma factor

(c) Rho factor

(d) Helicase

4. Antibiotic binds to 30s ribosomal subunit of prokaryotes is

(a) Erythromycin

(b) Chloramphenicol

(c) Tetracycline

(d) Rifampicin

5. SOS repair mechanism which protein act as a repressor

(a) RecA

(b) Lex A

(c) UvrA

(d) DNA polymerase

6. Nucleotide excision repair primarily address?
   (a) Single base mutation
   (b) Double strand breaks
   (c) Bulky adducts and cross link
   (d) Incomplete replication

7. Ti plasmid considered to be a
   (a) Conjugative plasmid
   (b) Cryptic plasmid
   (c) Resistance plasmid
   (d) Fertility plasmid

8. Lysogenic cycle integrating viral DNA into host cell's genome called as a
   (a) Virion (b) Provirus
   (c) Prophage (d) Capsid

9. Bacteriophage life cycle generalized transduction typically occur in
   (a) Lytic cycle
   (b) Lysogenic cycle
   (c) Replication phase
   (d) Integration phase

10. Griffith experiments used microorganism is
   (a) *Escherichia coil*
   (b) *Bacillus subtilis*
   (c) *Streptococcus aureus*
   (d) *Streptococcus pneumoniae*

SECTION B — (5 × 5 = 25 marks)

Answer ALL the questions.

Answer Should not Exceed 250 Words.

11. (a) Briefly write about denaturation and renaturation process in DNA.

Or

(b) Diagrammatic illustration of semi conservative DNA replication process.

12. (a) Write a short note on regulation of gene expression.

Or

(b) Describe the ribosomal structure in prokaryotes.

13. (a) Define mutation and its types.

Or

(b) Briefly explain about SOS repair mechanism.

14. (a) Describe the basic steps involved in the amplification of plasmids.

Or

(b) Draw a structure and characterization of T_4 bacteriophage.

15. (a) Describe the process of bacterial conjugation.

Or

(b) Define transposition and types of transposition reaction.

SECTION C — (5 × 8 = 40 marks)

Answer ALL the questions.

Answer Should not Exceed 500 Words.

16. (a) Explain elaborately about structure of DNA and its types of DNA.

Or

(b) What are the enzymes involved in DNA replication and explain in a detailed manner?

17. (a) Write an essay on transcription mechanism in prokaryotes.

Or

(b) Explain with neat diagram of protein synthesis process in prokaryotes.

18. (a) Discuss DNA repair mechanism in microorganism.

Or

(b) Briefly explain about the physical and chemical mutagens with suitable examples.

19. (a) Discuss life cycle of T_4 Bacteriophage.

Or

(b) Describe the types of plasmids found in bacteria and explain their functions.

20. (a) Explain bacterial transformation mechanisms in detailed with diagrammatic illustration.

Or

(b) Define transposable elements and describe their classification.
