(6 pages) Reg. No. : .....

Code No. : 20555 E **Sub. Code : CMMI 41**

B.Sc. (CBCS) DEGREE EXAMINATION, APRIL 2024.

Fourth Semester

Microbiology – Core

MOLECULAR BIOLOGY AND MICROBIAL 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. Chromatin is made up of ————————.
   (a) DNA
   (b) RNA
   (c) Proteins
   (d) DNA, RNA and proteins

2. Identify the enzyme is used in the unwinding of DNA.
   (a) Ligase (b) Helicase
   (c) Topoisomerase (d) Exonuclease

3. Select the process of synthesis of a protein from mRNA molecule.
   (a) transcription (b) translation
   (c) replication (d) recombination

4. In trp operon, the co-repressor is ————————.
   (a) lactose (b) tryptophan
   (c) glucose (d) galactose

5. Choose the following enzyme is the principal replication enzyme in E.coli.
   (a) DNA polymerase I
   (b) DNA polymerase II
   (c) DNA polymerase III
   (d) Both (a) and (b)

6. Predict the enzyme is required for transcription process.
   (a) RNAase (b) DNA polymerase
   (c) RNA polymerase (d) DNA ligase

7. Select the enzyme that catalyzes the transposition of an IS elements.

(a) integrase (b) transposase

(c) transcriptase (d) polymerase

8. Viral genome inserted the bacterial DNA is called as ————.

(a) lysogeny

(b) prophage

(c) lytic cycle

(d) virulent phage

9. The enzyme photolyase is used in what method of repair?

(a) nucleotide excision

(b) base excision

(c) photoreactivation

(d) both (b) and (c)

10. The transfer of genes one cell to another by a bacteriophages is known as ————.

(a) recombination

(b) conjugation

(c) transduction

(d) transformation

PART B — (5 × 5 = 25 marks)

Answer ALL the questions, choosing either (a) or (b).

Each answer should not exceed 250 words.

11. (a) Describe the structural components of nucleus.

Or

(b) Differentiate between DNA and RNA.

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

Or

(b) Interpret the process of regulation of gene expression in lac operon.

13. (a) Explain the prokaryotic RNA polymerase.

Or

(b) Write the different types of DNA.

14. (a) Illustrate the lytic life cycle of T4 bacteriophage.

Or

(b) Select the characteristic features of IS elements.

15. (a) Predict the salient features of Ames test.

Or

(b) Summarize the process of bacterial transformation.

PART C — (5 × 8 = 40 marks)

Answer ALL questions, choosing either (a) or (b).

Each answer should not exceed 600 words.

16. (a) Illustrate the structure of Watson and Crick model of DNA.

Or

(b) Explain the enzymatic activities of DNA polymerase I and II and its difference.

17. (a) Discuss the post transcriptional modification process in eukaryotes.

Or

(b) Describe the steps involved in the process of translation in prokaryotes.

18. (a) Interpret the process of DNA replication in E.coli.

Or

(b) Examine the steps involved in post translational modifications.

19. (a) Select the structural properties of bacterial plasmids.

Or

(b) Explain the genome organization of Polio virus.

20. (a) Summarize the frame shift mutation and its function.

Or

(b) Evaluate the mechanism of generalized transduction with neat diagram.

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