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M.Sc. (CBCS) DEGREE EXAMINATION, APRIL 2021.

Second Semester

Microbiology — Core

MOLECULAR BIOLOGY AND GENETICS

(For those who joined in July 2017 onwards)

Time : Three hours

Maximum : 75 marks

PART A — (10 × 1 = 10 marks)

Answer ALL questions.

Choose the correct answer :

1. Meselson and stahl model of replication was called.
 - (a) Conservative replication
 - (b) Semi-conservative replication
 - (c) Dispersive replication
 - (d) Cridu chat

2. Which of the following is a bypass repair system?
 - (a) BER
 - (b) NER
 - (c) SOS
 - (d) Recombinational repair

3. Soon after the formation of RNA, it is processed. This is done by
 - (a) Addition or removal of nucleotides
 - (b) Changing its solubility property
 - (c) Changing codons
 - (d) Making it double-stranded

4. The initiation codon codes for
 - (a) Leucine
 - (b) Methionine
 - (c) Valine
 - (d) Tyrosine

5. The number of secondary binding sites for the lac repressor in the lac operon is
 - (a) 4
 - (b) 2
 - (c) 1
 - (d) 3

6. The method of post transcriptional gene silencing is particularly useful in
- (a) Plants
 - (b) Animals
 - (c) Insect
 - (d) Micro organism
7. The virus mediated gene transfer using genetically modified bacteriophage is called
- (a) Transfection
 - (b) Transduction
 - (c) Transformation
 - (d) Conjugation
8. 'F' plasmid is often used in conjugation. The correct statement is
- (a) The 'F' plasmid encodes the factor which is transferred from one cell to another.
 - (b) The factor encoded by the 'F' plasmid is called as filamentous (F) factor.
 - (c) It is transferred from one cell to another by filament.
 - (d) The bacteria must belong to the same species to carry out the conjugation.

9. The central block of the composite transposable element consists of a gene for
- (a) Transposase
 - (b) Antibiotic resistance
 - (c) Integrase
 - (d) Lactamase
10. Which of the following is a non-composite transposon?
- (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) Write note on bio directional and rolling circle replication of DNA.
- Or
- (b) Write about mechanism of SOS repair.

12. (a) Explain capping and poly adenylation in RNA processing.

Or

- (b) Discuss about signal sequencing and protein transport.

13. (a) Explain the features of the trp-operon in *E.coli*.

Or

- (b) Describe post-transcriptional gene silencing.

14. (a) Note on self transmissible and mobilizable plasmids.

Or

- (b) What is Hfr? How it is formed? Highlight its significance.

15. (a) Write about complex and compound transposons.

Or

- (b) Note on retroposon.

PART C — (5 × 8 = 40 marks)

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

Each answer should not exceed 600 words.

16. (a) Describe the experiments which demonstrated that DNA is a universal genetic material

Or

- (b) Write a detailed essay on plasmids-types, structure and replication.

17. (a) Write in brief about process of transcription.

Or

- (b) Discuss the synthesis of mRNA in prokaryotes and eukaryotes.

18. (a) Write a detailed essay on regulation of gene expression.

Or

- (b) Describe the Genetic map of λ operon and its mechanism of operation with suitable diagram.

19. (a) Describe the transformation process in bacteria.

Or

(b) Explain the process of generalized transduction with suitable diagram.

20. (a) Write the mechanism of

(i) T10 (ii) T5.

Or

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