

**B. Sc. MICROBIOLOGY  
FOURTH SEMESTER  
MICROBIAL GENETICS  
BMB – 401**

( Use Separate Answer Scripts for Objective & Descriptive )

Duration : 3 hrs.

Full Marks : 70

**( PART-A: Objective )**

Time : 20 min.

Marks : 20

**Choose the correct answer from the following:**

**1X20=20**

- Which of the following is NOT a type of reverse mutation?
  - Back mutation
  - Intergenic suppressor mutation
  - Intragenic suppressor mutation
  - Missense mutation
- Name the term given to the type of mutation which depends on the conditions of the environment?
  - Forward mutation
  - Reverse mutation
  - Conditional lethal mutation
  - Gain of function mutation
- Which of the following chemical mutagen affects only replicating DNA?
  - Acridine dye
  - Alkylating agent
  - Deaminating agent
  - Base analog
- Mark the INCORRECT statement about mutation?
  - Mutation is predestined
  - Major source of evaluation
  - Usually deleterious and recessive
  - It is a reversible process
- Which of the following gene helps in identifying transformed cells?
  - plasmid
  - selectable marker
  - structural gene
  - vector
- The DNA molecule used for integrating foreign gene for cloning is called
  - vector
  - carrier
  - template
  - transformer
- The Ti plasmid is found in
  - Agrobacterium*
  - Yeast as a 2mm plasmid
  - Rhizobium* of the roots of leguminous plants
  - Azotobacter*
- Antibiotics are used in genetic engineering. They are useful
  - to keep culture free of microbial infections
  - to select healthy vectors
  - to identify replication start sites
  - as selectable markers
- The transfer of genes from one cell to another by a bacteriophage is known as
  - Recombination
  - Conjugation
  - Transduction
  - Transformation

10. Which of the enzymes are used to cut the recipient DNA?  
 a. endonuclease  
 b. exonuclease  
 c. ligases  
 d. polymerase
11. The transfer of naked DNA from one cell to another is referred to as \_\_\_\_\_  
 a. Transduction  
 b. Lysogeny  
 c. Transformation  
 d. Conjugation
12. The ability of bacteria to uptake the host DNA from the environment is known as  
 a. Competent cell  
 b. Plasmid  
 c. Transformed cell  
 d. None
13. The cycle which is completed quickly in the infection by a phage is \_\_\_\_\_  
 a. Lysogenic  
 b. Lytic  
 c. Replication  
 d. Capsid formation
14. Which of the following statements is not true in the context of infection by an M13 phage?  
 a. Lytic phage  
 b. Lysogenic phage  
 c. New phage particles are continually synthesized  
 d. The DNA is not integrated in host genome
15. The IS elements can be identified by the presence of \_\_\_\_\_  
 a. Antibiotic resistance gene  
 b. Endonuclease cleavage site  
 c. 50 bp inverted repeat  
 d. Integrase site
16. The direct repeat within the IS element has a length of \_\_\_\_\_  
 a. 20 bp  
 b. 11-15 bp  
 c. 5-11 bp  
 d. 3-7 bp
17. Transposase restriction mechanism of IS element restricts the transposon and the target DNA in a combination of which of the following?  
 a. Blunt end cut for transposon and sticky end cut for target DNA  
 b. Blunt end cut for both transposon and target DNA  
 c. Sticky end cut for transposon and blunt end cut for target DNA  
 d. Sticky end cut for both transposon and target DNA
18. Which of the following is a non-composite transposon?  
 a. Tn5  
 b. Tn10  
 c. Tn3  
 d. Tn9
19. Bacterial recombination causes transformation of the recipient cell to \_\_\_\_\_  
 a. donor cell  
 b. merozygote  
 c. Zygote  
 d. recipient cell
20. The cell in which the F factor carries along with it some chromosomal genes are known as \_\_\_\_\_  
 a. F+ cell  
 b. F- cell  
 c. F' cell  
 d. F''' cell

**(PART-B : Descriptive)**

Time : 2 hrs. 40 min.

Marks : 50

*[ Answer question no.1 & any four (4) from the rest ]*

1. Explain the mechanism of Specialized transduction with a neat diagram? 10
2. Define tautomerism? Explain the pathway of spontaneous mutation with a neat diagram. 2+8=10
3. Explain the mechanism of lytic versus lysogenic pathway with a neat diagram. 10
4. a. A transformation experiment is carried out using donor that is A+B+C+ and the recipient that is A-B-C-. A+ transformation is selected. Of these 64% are B+ and none are C+. B+ transformation is also selected. Of these 8% are also C+. What is the gene order? 5+5=10  
b. A transformation experiment is carried out using donor that is A+B+C+ and the recipient is A-B-C-. B+ transformation is selected. Of these 88% are C+ and none A+. C+ transformation is also selected where 10% is A+ What is gene order?
5. Define Plasmid? Explain the various types of Plasmid? Explain the mechanism of recombinant DNA technology with a neat diagram 5+5=10
6. Define conjugation ? Explain F' conjugation with a neat diagram 2+8=10
7. Explain mutagen? Describe the mechanism of bromouracil on mutation in DNA. 10
8. Define Transposon and types of transposon with a neat diagram 10

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