

[95]

SARDAR PATEL UNIVERSITY  
M. Sc. Genetics, Second Semester Examination  
Day and Date: Wednesday, 11-04-2018  
Time: 02:00 pm to 5:00 pm  
Paper Code and Subject: PS02CGEN22, Microbial Genetics

Total Marks: 70

[8x1=8]

Q-1 Multiple choice questions (All are compulsory).

- (i) Which of the following is used by microbial geneticists as a tool?  
A) Bacteriophage      B) Plasmids      C) Transposable elements      D) All of these
- (ii) The main difference between a self-transmissible and a mobilizable plasmid is that the self-transmissible plasmid  
A) transfers both strands of the plasmid DNA  
B) carries genes encoding the mating apparatus  
C) transfers antibiotic resistance genes      D) usually has a transposon inserted in to it
- (iii) In the extracellular medium, DNA-degrading enzymes would likely be to prevent transfer of DNA by  
A) conjugal transfer by a self-transmissible plasmid  
B) generalized phage transduction  
C) natural transformation      D) none of the above
- (iv) The term used for plasmids possessing both RTF and r determinants is  
A) non self-transmissible plasmids      B) non conjugative plasmids  
C) conjugative plasmids      D) none of the above
- (v) Which of the following genes are constitutively expressed and control the plant induced activation of other virgenes?  
A) virA and virG      B) virC and virD      C) virB and virE      D) virA and virB
- (vi) Opines are  
A) amino acid derivatives found in tumor tissues  
B) amino acid derivatives found in normal tissues  
C) amino acid derivatives found in both normal as well as tumor tissues  
D) none of the above
- (vii) Inverted repeat sequences at each end and a gene encoding transposase is contained in which of the following transposable element?  
A) Composite transposon      B) Insertion element      C) Virus      D) Plasmid
- (viii) The transposase gene encodes an enzyme that facilitate  
A) viral replication within a genome      B) general recombination  
C) site-specific integration of transposable elements      D) none of the above

[7x2=14]

Q-2 Answer the following questions in short. (Any Seven)

- (i) Draw the structure of labeled F plasmid.
- (ii) What a note on photoreactivation.
- (iii) Write the importance of autolysin in transformation.
- (iv) What is U-tube experiment?
- (v) Define Prototrophic and Auxotrophic.
- (vi) What is retrotransposons?
- (vii) Write a note on complementation system.
- (viii) What is abortive transductants?
- (ix) What a note on non-composite transposon.

P.T.O

- Q-3 (A) Discuss how DNA is damaged by Alkylation, Radiation, Base Analogs and Intercalating Agents. [ 06 ]  
 (B) Explain the mechanism of Methyl-directed mismatch repair in *Escherichia coli*. [ 06 ]

OR

- (B) Discuss how damaged DNA of apurinic or apyrimidinic site is repaired by Base Excision Repair (BER). [ 06 ]

- Q-4 (A) Discuss the structure of ColE1 plasmid and explain how its copy number is regulated. [ 06 ]  
 (B) Discuss single strand break recombination mechanism with a suitable model. [ 06 ]

OR

- (B) Explain *recBCD* Pathway of homologous recombination in detail. [ 06 ]

- Q-5 (A) Define transformasome and transformation mechanism in *Haemophilus Influenza* in detail. [ 06 ]  
 (B) Discuss the mechanism of Hfr (high frequency of recombination) conjugation in *E. coli*. [ 06 ]

OR

- (B) Discuss structure of T4 bacteriophage and Explain its generalized transduction mechanism. [ 06 ]

- Q-6 (A) Explain host controlled and physiological significance of RM system. [ 06 ]  
 (B) Draw structure of labeled Ti plasmid and discuss the mechanism of interkingdom gene transfer. [ 06 ]

OR

- (B) Discuss genetic organization and the mechanism of transposition of a composite transposon giving an example. [ 06 ]

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