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SEAT No. _____

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SARDAR PATEL UNIVERSITY
M. Sc. Microbiology/Biotechnology IInd Semester Examination
PS02CMIC22/PS02CBIT22: Microbial Genetics
Wednesday, 20/03/2019

Time: 2:00 p.m. to 5:00 p.m.

Max. Marks: 70

Note: Figures on the right indicate marks.

Q.1 Choose the most appropriate answer (08)

- i Which of the following is a base analogue of adenine?
a) 5-bromouracil b) 2-aminopurine c) EES d) nitrosourea
- ii Which of the following is used to determine mutagenic nature of a chemical agent?
a) Fluctuation test b) Ames test c) Weigle test d) Kirk test
- iii Col plasmids are characterized for encoding
a) hydrocarbon degradation b) antibiotic resistance
c) bacteriocin production d) bioluminescence
- iv Which of the following has an ability to mediate specialized transduction?
a) T4 phage b) P1 phage c) P22 phage d) lambda phage
- v The _____ nuclease is responsible resolution of Holliday Junction.
a) RuvA b) RuvB c) RuvC d) RecA
- vi The _____ is a sensor histidine kinase associated with competence development in *Bacillus subtilis*.
a) ComX b) ComP c) ComK d) CSF
- vii The _____ protein introduces nick at right border and remains associated with 5' end of T-strand during its transfer from *Agrobacterium* to plant.
a) VirD2 b) VirA c) VirF d) VirC1
- viii The formation of co-integrate intermediate during transposition is a characteristic feature of
a) Tn10 b) Tn5 c) Tn7 d) Tn3

(1)

(P.T.O.)

- Q.2 Attempt **any Seven** of the following (14)
- Explain the difference between suppression and reversion mutations.
 - Write in brief on: Adaptive response towards DNA alkylation
 - Write in brief on: Conditionally lethal mutants
 - Write on deletion mapping
 - Explain Plasmid Incompatibility.
 - What is F' plasmid?
 - Write in brief on: Chromatid Interference
 - Describe the genetic organization of retrotransposons.
 - Write on functions of VirA and VirG encoded by Ti-plasmid.
- Q.3 a) What are spontaneous mutations? Discuss different ways by which spontaneous mutations can occur in a cell. (06)
- b) Explain how nitrous acid, 5-BU and EES cause mutations. (06)
- OR
- b) Explain how reactive oxygen species can be mutagenic & discuss the DNA repair mechanism associated with oxidative damage. (06)
- Q.4 a) Write a note on: Regulation of plasmid copy number. (06)
- b) Discuss the molecular mechanisms influencing the decision between lytic cycle and lysogeny upon infection of *E. coli* by a lambda phage. (06)
- OR
- b) Discuss tetrad analysis of ordered tetrads. (06)
- Q.5 a) Discuss the difference between competence development in *Bacillus subtilis* and *Streptococcus pneumoniae*. (06)
- b) Discuss how transformation can be used for mapping of chromosomal genes. (06)
- OR
- b) Explain in detail interrupted mating experiment for mapping bacterial genes. (06)
- Q.6 a) Explain the conjugation model of T-DNA transfer from *Agrobacterium tumefaciens* to plants (06)
- b) Describe in brief salient features of different RM systems. (06)
- OR
- b) Explain giving suitable example, the structure and mechanism of transposition of class I composite transposons. (06)

-X-X-X-X-X-X-

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