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SEAT No. \_\_\_\_\_

No. of Printed Pages : 2

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**SARDAR PATEL UNIVERSITY**  
**M. Sc. Microbiology/Biotechnology II<sup>nd</sup> Semester Examination**  
**PS02CMIC02/PS02CBIT02: 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 Inteference
  - 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) Explain in detail interrupted mating experiment for mapping bacterial genes. (06)
- b) Explain the conjugation model of T-DNA transfer from *Agrobacterium tumefaciens* to plants (06)
- OR
- b) Describe any one model of Homologous recombination in detail. (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) Discuss the molecular mechanisms influencing the decision between lytic cycle and lysogeny upon infection of *E. coli* by a lambda phage. (06)
- Q.6 a) Discuss tetrad analysis of ordered tetrads. (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-

(2)