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SARDAR PATEL UNIVERSITY  
M. Sc. Microbiology/Biotechnology II<sup>nd</sup> Semester Examination  
PS02CMIC02/PS02CBIT02: Microbial Genetics  
Tuesday, 05/04/2016

Time: 10:30 am to 1:30 pm

Max Marks: 70

Note: Figures on the right indicate marks

- Q.1 Choose the most appropriate answer (08)
- i Which of the following is most susceptible to spontaneous hydrolytic deamination in DNA?  
a) Adenine            b) Thymine            c) Guanine            d) Cytosine
  - ii During tetrad analysis, when frequency of parental ditypes is found to be equal to non parental ditypes for two genes, it implies that the two genes are  
a) unlinked    b) linked    c) linked to centromere    d) recessive
  - iii The expression of following genes is essential for the lysogenic path of lambda phage when it infect *E. coli*  
a) *N, cro*    b) *cI, cII, cIII*            c) *P, O*            d) *att, xis, int*
  - iv Co-existence of virulent phages with genotypically sensitive bacteria is associated with temporary inability of bacteria to allow the phage to adsorb on bacterial cell is considered as  
a) carrier stage    b) lysogenization    c) pseudolysogeny    d) none of the above
  - v Presence of F-factor in the bacterial cell indicate it as  
a) male            b) female            c) F' cell            d) F<sup>-</sup> cell
  - vi The process of transfer of DNA from one bacterium to another bacterium through bacteriophage is called  
a) transfection    b) transformation    c) transduction    d) conjugation
  - vii Methyl transferases of RM systems seem to have evolved by  
a) Convergent evolution            b) Divergent evolution  
c) Mix of convergent and divergent evolution    d) none of the above
  - viii Which of the following proteins can induce apoptosis?  
a) p53            b) pRB            c) PDGF            d) Ras

- Q.2 Attempt any seven of the following: (14)
- a) Explain the term plasmid incompatibility
  - b) Explain the term transformasomes
  - c) Explain plaque type mutants of phages
  - d) Differentiate specialized transduction from generalized transduction
  - e) Define: Mutation rate
  - f) Explain the term: Chromatid interference
  - g) Write in brief on type of DNA damage caused by UV light.
  - h) Write in brief on IS elements.
  - i) Differentiate between apoptosis and necrosis

- Q.3 a. Describe the sequence of events that occurs at the molecular level during competence development in *Bacillus subtilis*. (06)
- b. Write the role of each of vir region involved in the process of T-DNA transfer from *Agrobacterium tumefaciens* to plant and explain the process of transfer. (06)
- OR
- b. Explain the various events which take place during specialized transduction. (06)
- Q.4 a. Explaining the lytic cycle discuss the general mechanisms that regulate transcription of phage T4 upon infection to host. (06)
- b. Describe how conjugation has been used as a method to map bacterial genome. (06)
- OR
- b. Explain molecular mechanism of recombination with the help of Holliday model. (06)
- Q.5 a. Describe the mismatch repair pathway in eukaryotes. (06)
- b. Describe the type of DNA damage caused by reactive oxygen species and explain how cells safeguard their DNA from such damage. (06)
- OR
- b. Write a note on: Suppressor mutations. (06)
- Q.6 a. Write a note on: Mitotic recombination in fungi (06)
- b. Discuss salient features of different types of RM systems in brief. (06)
- OR
- b. Describe genetic organization and molecular mechanism of transposition of retrotransposons. (06)

-x-x-x-x-x-