

[59, 63]

No. of Printed Pages: 2

SARDAR PATEL UNIVERSITY
M.Sc IIInd Semester Examination
Microbiology/Biotechnology
Thursday, April 23, 2015
2:30 PM to 05:30 PM
PS02CMIC02/PS02CBIT02 Microbial Genetics

Max. Marks: 70

- Note:** 1. Attempt all questions
 2. Figures on the right in brackets indicate marks

- Q1 Choose the most appropriate answer. (01 x 8)
- (i) Immediate early genes are transcribed as soon as T₄ phage infect host using
 (a) host RNA polymerase
 (b) complex of host and phage RNA polymerase
 (c) modified RNA polymerase of host
 (d) phage RNA polymerase
- (ii) The cI repressor carries out its repressing function in the lysogenic state by binding to
 (a) two operators O_L and O_R
 (b) two promoters P_L and P_R
 (c) promoter P_{RM}
 (d) promoter P_{RE}
- (iii) Exchange of genetic materials through the process of conjugation in *E. coli* was discovered by
 (a) J. Lederberg and E. L. Tatum
 (b) F. Griffith
 (c) Ellis and Delbruck
 (d) N. Zinder and J. Lederberg
- (iv) The process of transfer of DNA from one bacterium to another bacterium through bacteriophage is called
 (a) Transfection (b) Transformation
 (c) Transduction (d) Transduction
- (v) Which of the following nitrogen base is most susceptible towards hydrolytic deamination?
 (a) Guanine (b) Adenine
 (c) Thymine (d) Cytosine
- (vi) Mut S, Mut L and Mut H proteins in *E. coli* are dedicated to
 (a) NER (b) repair of oxidative DNA damage
 (c) Mismatch repair (d) both 'a' & 'c'
- (vii) A tetrad that carries four kinds of haploid spores: two different parental and two different recombinants is referred to as
 (a) tetratype (b) parental ditype
 (c) non-parental ditype (d) tritype
- (viii) P⁵³ stands for
 (a) protein with 53 amino acids
 (b) protein first discovered in 53 years old patient
 (c) protein of 53 KDa size
 (d) protein discovered in 1953

Cont.

- Q2 Attempt any **SEVEN** of the following. (02 x7)
- (a) Explain transformasomes.
 - (b) Explain cotransduction.
 - (c) Define the terms: conjugative, mobilizable and self transmissible plasmid.
 - (d) Explain the role of *finO* and *finP* in regulation of *traJ* expression.
 - (e) Explain mode of action of photolyase in brief.
 - (f) Explain the term: Point mutation.
 - (g) Explain difference between true reversion and suppressor mutations?
 - (h) What are oncogenes?
 - (i) What type of tetrad constitution is expected if a recombination event of a double cross-over involving two chromatids occurred during meiosis?
- Q3 (A) Describe the sequence of events that occurs at the molecular level during competence development in *Bacillus subtilis*. (06)
- (B) Describe how conjugation has been used as a method to map bacterial genome. (06)
- OR**
- (B) What is transduction? How can this process be applied in studying linkage between chromosomal genes and their relative distance? (06)
- Q4 (A) Highlight the main features of gene expression in phage λ following its infection to the susceptible *E. coli* host. (06)
- (B) Write a note on ϕ X174 (06)
- OR**
- (B) Explain with suitable example, how phage mutants are used in genetic mapping. (06)
- Q5 (A) Write a note on: 'Mismatch repair system in *E. coli*'. (06)
- (B) "SOS response in *E. coli* is regulated by two proteins, LexA and RecA". Explain in detail. (06)
- OR**
- (B) Write a note on: 'DNA damage induced by ROS and the mechanisms evolved by cells to safe guard their DNA from oxidative damage'. (06)
- Q6 (A) Write a note on: 'Apoptosis'. (06)
- (B) Give a comparative account of different types of restriction modification systems. (06)
- OR**
- (B) Describe classification of transposons on the basis of their genetic organization and mode of transposition. (06)