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(A-40) SARDAR PATEL UNIVERSITY
M. Sc. Integrated Biotechnology, Tenth Semester Examination
Tuesday, 21-04-2015
10:30 a.m. – 01:30 p.m.
PS10CIGGB1: Microbial Genetics

Marks: 70

[08 X 01 = 08]

Q-1 Attempt the followings

- i. Alkylating agents generally cause mutation because they
 - (a) Alkylate the phosphates of DNA
 - (b) Alkylate the nitrogenous bases of DNA
 - (c) Both (a) and (b)
 - (d) None of the above
- ii. In nucleotide excision repair, the recognition and removal of damaged nucleotides is done by
 - (a) Endonuclease
 - (b) DNA polymerase
 - (c) ABC-exonuclease
 - (d) Dam-methylase
- iii. Plasmids may express
 - (a) Antibiotic resistance genes
 - (b) Modified proteins of interest
 - (c) Both a & b
 - (d) None
- iv. The recombination frequency between two genes on a chromosome is:
 - (a) More when the distance between the genes is high
 - (b) More when the distance between the genes is less
 - (c) Not influenced by the distance between them
 - (d) Directly proportional to the level of heterochromatin
- v. The integrated genome of lambda phage within the DNA of host cell is called
 - (a) lysogene
 - (b) Prophage
 - (c) Temperate phage
 - (d) Virulent phage
- vi. Homologous recombination can be employed to generate
 - (a) Transgenic animals
 - (b) Gene knockout animals
 - (c) Site specific mutagenesis
 - (d) Specific promoter sequences
- vii. Apoptosis is triggered by
 - (a) Ligation of Fas
 - (b) p53
 - (c) Both
 - (d) None
- viii. All of the following are true about transposons except
 - (a) transposons move from one location to a different one within a chromosome
 - (b) both donors and target sites must be homologous
 - (c) transposons may activate a gene
 - (d) transposons may inactivate a gene

Q-2 Answer the following questions. (Any 7 out of 9)

[07 X 02 = 14]

1. What is photoreactivation?
2. Describe the fate of mutation in *MutT*, *MutM* and *MutY* gene.
3. List some genes which you would expect to find on a plasmid.
4. What are male specific phages?
5. What is mobilisable plasmid?
6. Compare class I and class II transposons with suitable example.
7. What are replicative transposons?
8. What is haploidization?
9. Differentiate between site specific recombination and homologous recombination.

Q-3 (A) Calculate the mutation rate in an Newcombe experiment given below: [06]

Incubation (h)	No. of batch plated	Ending no. of bacteria	No. of resistant colonies	
			Unspread	Spread
5	5.1×10^4	2.6×10^8	8 (plate 1)	13 (plate 2)
6	5.1×10^4	2.8×10^9	49 (plate 4)	3719 (plate 5)

(B) Discuss the mechanism of Nucleotide excision repair in *E. coli*. [06]

OR

(B) Explain the mechanism of SOS inducible repair of DNA. [06]

Q-4 (A) Discuss the double strand break model for homologous recombination in detail. [06]

(B) Explain the structure and mechanism of F transfer apparatus. [06]

OR

(B) State the current model for the transfer of T-DNA. [06]

Q-5 (A) What is competence? Discuss the natural transformation competence in brief. [06]

(B) Explain the mechanism of specialized transduction. [06]

OR

(B) Write a note on tetrad analysis. [06]

Q-6 (A) Explain the genetic organization and mechanism of transposition of IS sequence. [06]

(B) Write note on apoptosis. [06]

OR

(B) Calculate the map distance. If two factor-cross that yields 112PD, 4NPD and 24 TT. [06]
