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# P. P. SAVANI UNIVERSITY

**First Semester of M.Sc. Examination**
**Feburary-2022**
**SSBT7030/SSMB7030– Advances in Molecular genetics**
**08.02.2022, Tuesday Time: 12:00 p.m. to 02:30 p.m. Maximum Marks: 60**

***Instructions:***
1. The question paper comprises of two sections.
2. Make suitable assumptions and draw neat figures wherever required.
3. Use of scientific calculator is allowed.

## Section-I

**Q.1 Very Short Questions (Attempt any five)** [10]

**1.1** Name two photoproducts formed by UV rays in DNA.
**1.2** Define site specific recombination.
**1.3** What is non homologous recombination?
**1.4** What is phage compatibility?
**1.5** Enlist all the proteins involved in base excision repair.
**1.6** Give two examples of alkylating agents causes DNA mutation.

**Q.2 Write Short Notes (Attempt any two)** [06]

**2.1** What is methyl-directed mismatch repair? Explain it with the help of a labelled diagram.
**2.2** What are plasmids? Write their basic properties. Write any two differences between high and low copy number plasmids.
**2.3** Explain SOS repair mechanism with the help of a diagram.

**Q.3 Detail questions (Attempt any two)** [14]

**3.1** Enlist all the types of excision repair mechanism. Write in detail about nucleotide excision repair mechanism with the help of a diagram.
**3.2** What is tetrad analysis? Explain the tetrad analysis in *Saccharomyces cerevisiae and Neurospora crassa.*
**3.3** What are model organisms? Write at least five model organisms used in genetics. Describe in detail *Drosophila melanogaster* as a model organism.

## Section-II

**Q.1 Very Short Questions (Attempt any five)** [10]

**1.1** Define transformation
**1.2** Define Ti plasmid
**1.3** What are transposons?
**1.4** What are insertion sequences?
**1.5** What are integrons?
**1.6** What are Mu phages?

**Q.2 Write Short Notes (Attempt any two)** [06]

**2.1** What is artificial competence in transformation? Name any two methods used for preparing competent cells and explain any one method.

2.2 What are retrotransposons? Explain the mechanism of transposition with the help of a diagram.

2.3 Write two major differences between F factor mediated conjugation, Hfr conjugation and F prime conjugation. Explain conjugation between Hfr and F minus cell with the help of a diagram only.

**Q.3 Detail questions (Attempt any two)** **[14]**

3.1 What is transduction? Write major differences between specialized and generalized transduction. Explain specialized transduction with the help of a diagram only.

3.2 What are transposons? Write in detail about Tn3 transposons with the help of a neat and labelled diagram.

3.3 What is natural transformation? Name any three bacteria in which natural transformation occurs. Explain the mechanism of natural transformation in *Bacillus subtilis* with an appropriate diagram.