



**B.Sc. PLANT BIOLOGY & PLANT BIOTECHNOLOGY**

**Paper 3b MICROBIAL GENETICS**

B.Sc. va (Candidates admitted from the academic year 2008-2009)

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### Special Theory

#### UNIT I

Genetics – Discovery of DNA structure – Circular and super helical DNA. RNA as genetic material. Organization and functioning of Prokaryotic genetic material.

**Terminology:** Genome, Nucleoid, Dnase, DNA gyrase, Topoisomerase, Supercoiling, Negative supercoiling, Postive supercoiling, Tension and torsion, Catenation and decatenation.

#### UNIT II

Bacterial Plasmids: Structure and properties, replication, incompatibility.

**Terminology:** F plasmid, R plasmid, Col plasmid, Ti plasmid, Hfr cell, Amplification, Conjugative plasmid, Mobilizable plasmid, Sex pilus, F pili and R pili.

#### UNIT III

Structure of bacterial transposons, types of bacterial transposons and transposition in bacteria.

**Terminology:** IS elements, Transposition, Composite transposons, B-lactamase, Tranposase, Resolvase, *res* site, Target sequence, Cointegrate and replicon fusion.

#### UNIT IV

Bacterial Genetics: Concepts of haploid genomes. Gene transfer mechanisms-Transformation-Natural transformation, Transduction, Conjugation-Self transmissible plasmids, F factor and Hfr strain.

**Terminology:** Relaxase, Relaxosome, Virions, Episome Ori V, Ori T, Competence, Lysis, Recombination, Bacteriophages, Endosymbionts and Pili.

## UNIT V

Bacteriophages: Structure, Lytic Development Cycle – T<sub>4</sub>.

**Terminology:** Coat, Capsid, Virulence, Temperate, Early proteins, Early mRNA, Late mRNA, Structural proteins, Catalytic proteins, Maturation proteins, Lysozyme and HMC.

## UNIT VI

Mutations UV induced mutation and its repair mechanism. Mismatch DNA repair mechanism.

Mutation types-frame shift mutation ,addition,deletions,substitution,transition and transversion.

**Terminology:** Thymine-dimer, photoreactivase, UVRA and UVRB.

### Suggested Reading

FRIEFELDER,D. 1994. Microbial Genetics. Second Edition. Jones and Barllette Publishers.

FRIEFELDER, D. 2005. Molecular Biology. Second Edition. Narosa Publishing House.

M.J. Pelczar Jr.*et al*, 2004.Microbiology. V.Edition.Tata McGraw Hill Publishers.

Presscott *et al.*,2005. Microbiology. 6<sup>th</sup> Edition. Tata McGraw Hill Publishers. Mexico.

Torrora,F,2004. Microbiology -An introduction. Pearson Benjamin Cumming. Singapore.

Michael T. Madigan, 2006. Brock Biology of Microorganisms.11<sup>th</sup> Edition. Pearson Prentice Hall.