**ST JOSEPH’S UNIVERSITY, BENGALURU - 27**

**M.Sc. BIOTECHNOLOGY – I SEMESTER**

**SEMESTER EXAMINATION: OCTOBER 2022**

**(Examination conducted in December 2022)**

**BT7322 - MOLECULAR GENETICS AND MICROBIOLOGY**

**Time: 2 Hours Max Marks: 50**

**This paper contains ONE printed page and THREE parts**

**Part A - Answer any SEVEN questions: 2m x 7 = 14 marks**

1. How do overlapping genes prove the endosymbiont theory?
2. What kind of speciation is operant in Galapagos finches? Substantiate.
3. What are condensins? What is their role in epigenetics?
4. How are genetic screens useful in identifying mutants?
5. What is penetrance? What are the various types of penetrance?
6. What are forward mutations? What would be the dominance status of the mutant allele?
7. What are polygenes? What procedures do we generally use to study traits that show polygenic inheritance?
8. What is 16s rRNA? Why is it useful in classifying bacteria?
9. Briefly describe the diversity of algae based on their photosynthetic pigments.

**Part B - Answer any FOUR questions: 5m x 4 = 20 marks**

1. What is reversion? Explain the various types of reversion with the help of neat labeled diagrams.
2. Describe the utility of zebrafish as a model system.
3. Outline the technique of Comparative Genome Hybridization and state its utility.
4. What is Hardy-Weinberg equilibrium? Arrive at the equilibrium for a gene with 2 alleles in a population during 1 generation.
5. What are antiviral compounds? Explain the mode of action of any two antiviral compounds.
6. Explain how DNA fingerprinting and DNA base composition analysis are used in microbial identification

**Part C - Answer the following: 8m x 2 = 16 marks**

1. What are molecular markers? Explain how they aid in diagnostics.
2. a. Explain the process of conjugation in bacteria. Add a note on conjugative and nonconjugative bacteria.

**(OR)**

b. Elaborate on the metabolic interactions of the host-gut microbiota.