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

**M.Sc. Biotechnology- II SEMESTER**

**SEMESTER EXAMINATION: APRIL 2023**

**(Examination conducted in May 2023)**

**BT8322: GENETIC ENGINEERING**

**(For current batch students only)**

**Time: 2 hours Max Marks: 50**

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

**PART-A**

 **I. Answer any SEVEN of the following: 2m x 7 = 14 marks**

1. How are sticky ends generated?
2. State the properties of Klenow fragment.
3. Why are adapters important?
4. What are shuttle vectors?
5. State the function of RISC-loading complex (RLC).
6. What is bisulfite sequencing? Mention one application.
7. What is targeted metabolomics?
8. Explain differential proteomics.
9. What is a microbiome? Give an example.

**PART B**

 **II. Answer any FOUR of the following: 5m x 4 = 20 marks**

1. How are gene libraries constructed? Explain with a suitable diagram or flowchart.
2. Which gene transfer method would you choose for transforming plant cells? Justify your answer.
3. Explain the principle of RNAi technology with a suitable diagram.
4. State the principle of real-time PCR. How would you set up a reaction mixture for this PCR?
5. What is MALDI-TOF? How is it used in proteomics?
6. Illustrate one application of omics in the field of agriculture in detail.

**PART C**

 **III. Answer any TWO of the following: 8m x 2 = 16 marks**

1. Explain the following with suitable diagrams: a) Marker rescue, b) Insertional Inactivation.
2. A study was held in Siberian permafrost to identify the various microbial flora that were extinct from a sample obtained. Design an experiment based on your knowledge of omics technologies to analyze and identify the extinct microbes using NGS strategy (Hint: Use metagenomics strategy).
3. A patient was identified with a strange type of cancer. The doctors want to design a custom gene therapeutic to treat the patient. For this, understanding the cause of the cancer was important. Using the approaches of exome, transcriptome, proteome and metabolomics, design an experiment to understand the etiology of the cancer.