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

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

**SEMESTER EXAMINATION: APRIL 2023**

**(Examination conducted in May 2023)**

**BTDE8522: MULTIOMICS TECHNOLOGIES**

**(For current batch students only)**

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

**This paper contains ONE printed page and ONE part**

**PART-A**

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

1. What is a cancer gene panel? Mention one application.
2. What is ATAC Sequencing? How is this different from MNase Sequencing.
3. What is 2D gel electrophoresis? Write one of its applications.
4. What is targeted metabolomics?
5. What is Drop-Seq. What is its application?
6. What is SILAC?
7. What is metabolic engineering?
8. What is KEGG?
9. What is Cell free Biosynthesis?

**PART B**

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

1. What is Metagenomics? Mention a few applications of metagenomics.
2. A researcher wants to identify the methylation pattern among the drought resistant cultivar of wheat. Which technique do you suggest he should consider, with using NGS.
3. Distinguish between Bottom up and Top down proteomics.
4. What is single cell epigenomics? Explain with an illustration the strategy of single cell ATAC sequencing.
5. What is pathway engineering? Illustrate an example.
6. What are metabolic networks? Describe any two metabolic network databases.

**PART C**

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

1. A cancer patient approached a physician for personalized medicine. Being a biotechnologist specialized in multomics, design a strategy of NGS based sequencing approach to identify the cancer type, and suggest the plan of treatment to the physician based on other multiomics approaches such as proteomics and metabolomics as well.
2. What is bottom up proteomics? Write down about the detailed strategy of labeled differential bottom up proteomics approach.
3. A researcher wants to engineer a plant for producing a secondary metabolite on a commercial scale. Using strategies of omics, synthetic and systems biology, suggest a design to help him achieve this objective.