



Register Number:

Date:

**ST. JOSEPH'S COLLEGE (AUTONOMOUS), BENGALURU-27**

**B.Sc. MICROBIOLOGY - II SEMESTER**

**SEMESTER EXAMINATION: APRIL 2022**

(Examination conducted in July 2022)

**MB 221- MICROBIAL BIOCHEMISTRY AND ANALYTICAL TECHNIQUES**

**Time- 2 hours**

**Max Marks- 60**

This paper contains 2 printed page and 4 parts

**I. Answer any Five of the following**

**5X3=15**

1. What are the forces that stabilize the tertiary structure of proteins?
2. What are the possible conformations of the DNA double helix?
3. How does a colorimeter differ from a spectrophotometer.
4. What is SDS-PAGE? What is its use?
5. How standard free energy of two sequential reactions are additive.
6. Differentiate between hydrogen bonds and Van der Waal's forces.
7. What are buffers? Name two biological buffers.

**II. Answer any Five of the following**

**5X6=30**

8. Sketch the formation of glycosidic bond between two glucose residues.
9. Discuss few properties of water (atleast 3) which make it so important for a biological system.
10. Explain how size-exclusion chromatography separates analytes of differing sizes.
11. How do amphipathic compounds mix with water?
12. Write down the function of the following components used in agarose gel electrophoresis and PAGE
  - i. Agarose
  - ii. EtBr
  - iii.  $\beta$ -mercaptoethanol
  - iv. Sucrose
  - v. TEMED
  - vi. Coomassie brilliant blue
13. State six physical properties of lipids
14. Elaborate on the different types of preparative centrifugation?

**III. Answer any One of the following**

**1X10=10**

15. What are Zwitterions? Discuss how an amino acid changes its pKa value with change in pH of the solution.

16. a. How do sugars of DNA and RNA differ? Support your answer with structures. **3**  
b. Explain Beer-Lambert's law. Draw the principle components of a spectrophotometer. **7**

**IV. Answer the following**

**1X5=5**

17. What will happen if you add few drops of HCl to a beaker containing acetate buffer? Write the reaction. **5**