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

Registration Number:

Date & Session:

**B.Sc. Biotechnology- II SEMESTER**

**SEMESTER EXAMINATION: APRIL 2024**

**(Examination conducted in May 2024)**

**BT221: MICROBIOLOGICAL METHODS**

**(For current batch students)**

**Time: 2 Hours Max Marks: 60**

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

**PART A**

**Answer any TEN of the following: 2m x 10 = 20 marks**

1. Confocal microscopes often provide better images compared to traditional fluorescence microscopes. Justify.
2. Why is 70% alcohol more effective than 100% alcohol as a disinfectant?
3. What is the cytopathic effect?
4. Differentiate between enriched and enrichment media.
5. Mention the target sites of antibacterial agents.
6. A laboratory technician is performing a centrifugation experiment to separate different components of a cell lysate. The technician is using a benchtop centrifuge with a maximum rotational speed of 10,000 revolutions per minute (rpm) and a rotor radius of 10 cm.

During the experiment, the technician centrifuged the cell lysate at full speed for 10 minutes. The technician wants to calculate the Relative Centrifugal Force (RCF) experienced by the samples during centrifugation. Using the given information, calculate the RCF value experienced by the samples during centrifugation.

1. What is the significance of staining techniques in microbiology? What are the different types of staining techniques?
2. What are cryoprotectants? Briefly describe one technique of preservation using them.
3. What is TCID50?
4. Write the effect of ethylene oxide on microbes.
5. Differentiate between positive and negative staining techniques giving suitable examples.
6. Describe the UHT pasteurization method.

**PART B**

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

1. Describe the significance of the use of oil with higher objectives and how it enhances resolution and image quality.
2. Explain in detail the use of radiations in microbial control.
3. Give a detailed account of the working and construction of an autoclave.
4. Describe any two molecular mechanisms of antimicrobial resistance.
5. a. Why is it necessary to preserve pure cultures and list the various methods to preserve them.
6. A researcher has successfully isolated a pure culture of bacteria after conducting an experiment which was very difficult. He now needs to preserve this culture for future use and ensure regular subculturing for ongoing research. However, the researcher does not have extensive facilities for preservation. Considering the need for convenience, cost- effectiveness, and regular subculturing, which method of preservation would you suggest for storing the culture effectively? Justify your choice.
7. a. Define absorption spectrum. Represent the absorption spectrum of a chromophore having maximum absorption at 500 nm.

b. You are given 3 tubes A, B and C which contain one sample of either protein or DNA or RNA. Using UV-Visible absorption spectroscopy, how do you distinguish which tube contains what?

**PART C**

**Answer any TWO of the following: 10m x 2 =20 marks**

1. Explain briefly methods to assess antibacterial activity of a potential drug.
2. Describe the effectiveness of hot air ovens in sterilizing laboratory equipment and glassware. Discuss the advantages and limitations of dry heat sterilization compared to moist heat sterilization methods.
3. Outline the classification of antifungal agents based on their mode of action. Describe the mode of action of Amphotericin B.

**BT221-A-24**