



Register Number:

Date: 11-01-2021

ST. JOSEPH'S COLLEGE (AUTONOMOUS), BENGALURU-27
M.Sc. MICROBIOLOGY - I SEMESTER
SEMESTER EXAMINATION: JANUARY 2021
MB 7418 – MICROBIOLOGICAL TECHNIQUES

Time: 2 1/2 hours

Max Marks: 70

This paper contains 2 printed pages and 4 parts

I. Answer any Five of the following

5X3=15

1. Compare the appearance of microorganisms as seen by bright field and dark field microscope?
2. Explain the Abbe's equation?
3. Why 16s and 18s rRNA is being use as molecular markers in the study of taxonomy and phylogeny?
4. Why atomic force microscope is being used as an imaging tool in biological studies?
5. What is the difference between
 - a. Bactericidal and bacteriostatic
 - b. Fungicide and viricide
6. Calculate the pH of a buffer solution prepared by mixing 50 mL of 0.5 M lactic acid and 75 mL of 0.5 M sodium lactate (The pKa of lactic acid is 3.86).
7. How will you conclude that a disinfectant is more or less effective than phenol?

II. Answer any Five of the following

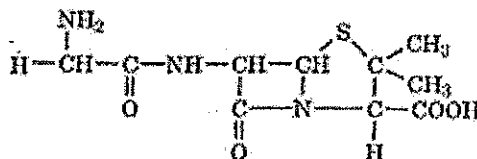
5X5=25

8. Why do oil and water mixed together separate into layers?
9. Write down the function of the following components used in SDS-PAGE
 - i) TEMED
 - ii) SDS
 - iii) β -mercaptoethanol
 - iv) Sucrose
 - v) Coomassie brilliant blue
10. How can you use circular dichroism for determination of secondary and tertiary structure of protein?
11. Explain the MTT assay for determining the number of viable cells?
12. Explain the ionization mechanism of MALDI.
13. How can you prepare specimen for visualization under Transmission Electron Microscope (TEM).
14. List the different types of radiations used to destroy microorganisms and discuss their mode of action.

III. Answer any Two of the following

2X10=20

- 15 a. Draw the titration curve of a monoprotic, diprotic and a triprotic acids? 6
- b. For the following structure indicate the number of signals that would appear in its proton NMR spectrum and give reason for your answer. 4



- 16 a. Explain how FACS can be used for sorting heterogeneous mixture of cells. 6
- b. Do all specimens examined by fluorescence microscopy need to be stained with a fluorochrome? Explain. 4
17. Classify the different fatty acid extraction techniques used for analysis of microbial community? Explain any two techniques.

IV. Answer the following

1X10=10

- 18 a. Scanning probe microscopy can be applied to samples that have not been dehydrated, while electron microscopy cannot. Why is this an important advantage? 4
- b. Suppose you have a mixture of biomolecules. List the techniques you'll use to separate them (at least 3). Discuss the principle of each. 6