

Roll No.....

Total No. of Units : 04

Total No. of Printed Pages : 03

Code No. : B03/107

Third Semester Examination, January 2022

M.Sc. MICROBIOLOGY

Paper - I

**BIOPHYSICAL TECHNIQUE AND  
INSTRUMENTATION AND BIOINFORMATICS**

Time : 3 Hrs.

Max. Marks : 80

- Part A and B of each question in each unit consist of very short answer type questions which are to be answered in one or two sentences.  
Part C (Short answer type) of each question will be answered in 200-250 words.
- Part D (Long answer type) of each question should be answered within the word limit 400-450.

**Unit - I**

- Q.1 A. What is Stokes Shift? (2)
- Q.1 B. What are the two commonly employed fluorophore probes that can be used to identify the structure and distribution of nucleus and mitochondria in living cells? (2)
- Q.1 C. What is quenching of fluorescence? How does it occur? (4)

**OR**

Write the limitations of fluorescence microscopy.

- Q.1 D. Write the principle of Transmission Electron Microscope. Explain how to prepare a sample for TEM. (12)

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**OR**

Explain the density gradient centrifuge, its types and applications.

**Unit - II**

Q.2 A. What is the major difference between Affinity Chromatography and Ion-exchange Chromatography? (2)

Q.2 B. Why two types of gel (stacking and separating gel) are prepared in SDS-Polyacrylamide gel electrophoresis technique? (2)

Q.2 C. Explain how to interpret chromatogram of HPLC? (4)

**OR**

Discuss the steps involved in Southern Blotting.

Q.2 D. Write the principle, types, instrumentation and applications of HPLC. (12)

**OR**

Write the difference between PCR and RT-PCR.

**Unit - III**

Q.3 A. What is Lambda max ( $\lambda_{\max}$ )? (2)

Q.3 B. Write the difference between Prism and Diffraction grating. Which one is more useful as Monochromator? (2)

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Q.3 C. Write the applications of UV-Visible spectrophotometer. (4)

**OR**

Write the applications of NMR.

Q.3 D. Draw the schematic diagram of UV-Visible spectrophotometer and explain instrumentation. (12)

**OR**

Discuss the applications of radioactivity in Biology.

**Unit - IV**

Q.4 A. What is Bioinformatics? (2)

Q.4 B. Write the importance of  $T_m$  (melting temperature) value. (2)

Q.4 C. What are the basic pillars of Bioinformatics? (4)

**OR**

Write the difference between prokaryotic and eukaryotic mRNA.

Q.4 D. What are Biomolecules? Explain their structure and functions. (12)

**OR**

What are Bioinformatics Resources? Explain the application of NCBI.