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**School of Biological and Life sciences**

Master of Science in Zoology  
Mid Term Examination - Nov 2023

Duration : 90 Minutes  
Max Marks : 50

**Sem I - P1PT102T - Bioanalytical and Biophysical Techniques**General Instructions

Answer to the specific question asked

Draw neat, labelled diagrams wherever necessary

Approved data hand books are allowed subject to verification by the Invigilator

- 1) Describe different types of light microscopy. K2 (2)
- 2) What is viscosity, and how is it defined in the context of macromolecules? K1 (3)
- 3) Illustrate different types of lenses used in compound microscope and mention their functions. K2 (4)
- 4) Define resolution, magnification and contrast. Describe the role of numerical aperture in improving resolution K2 (6)
- 5) Compare and contrast the applications of agarose gel electrophoresis and polyacrylamide gel electrophoresis (PAGE) in molecular biology research. K3 (6)
- 6) Calculate the resolution limit (according to Rayleigh Criterion) of a microscope having an oil immersion objective lens (angular aperture  $130^\circ$ ) and a condenser lens of highest angular aperture and the wavelength of light used is 450 nm? ( $\sin 72^\circ = 0.95$ ,  $\sin 65^\circ = 0.91$ , and refractive index of oil = 1.52) K3 (9)
- 7) Analyze the challenges associated with isoelectric focusing when dealing with complex protein mixtures. How can researchers address these challenges to obtain meaningful results? K4 (8)
- 8) Describe the process of labeling organelles with specific dyes or markers for visualization under a microscope. K4 (12)

**OR**

Describe the components of a phase contrast microscope and their functions in enhancing contrast during imaging. K4 (12)