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**School of Biomedical Science**  
**Bachelor of Science in Medical Biotechnology**  
**Semester End Examination - Nov 2023**

**Duration : 180 Minutes**  
**Max Marks : 100**

**Sem V -C2UH504T - Bioinstrumentation**

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) Based on rotors how will you classify centrifuges? K1 (2)
- 2) Explain the principle behind NMR spectroscopy. K2 (4)
- 3) Elaborate the working principle of ion exchange chromatography. K2 (6)
- 4) Make use of an experiment to explain how mass spectroscopy is used to estimate the size of a protein. K3 (9)
- 5) Identify the differences between differential and isopycnic separation of samples. K3 (9)
- 6) Give a detailed description of process and instrumentation of ESI MS to analyze a protein sample. K5 (10)
- 7) Analyze different chemicals used for breaking the cell for sample preparation. K4 (12)
- 8) With the help of a diagram, explain the differences in the arrangement of lenses between SEM and TEM, K5 (15)
- 9) Discuss the method to separate cell organelles using differential centrifugation. K5 (15)
- 10) Elaborate the similarities and differences between HPLC and FPLC. K6 (18)