

School of Biological and Life sciences

**Bachelor of Science Honours in Biomedical Science
Semester End Examination - Jun 2024**

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

Sem II - P1UE203B - Biotechnology*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) Explain the fundamental objective of plant biotechnology, and provide an example of its application in agriculture. K1(2)
- 2) Define restriction enzymes in molecular biology and explain their function. K2(4)
- 3) Discuss the importance of preserving DNA libraries and common techniques for their long-term storage. K2(6)
- 4) Detail the methods employed in the quantification of nucleic acids, emphasizing both traditional and advanced techniques. Discuss the significance of accurate nucleic acid quantification in molecular biology research and diagnostics. Furthermore, elaborate on the challenges and strategies associated with the storage of nucleic acids for long-term preservation. K3(9)
- 5) Explore the role of animals in the production of therapeutic proteins and vaccines. Discuss two prominent animal-based platforms used for protein and vaccine production, providing detailed examples. Evaluate the advantages and potential challenges associated with using animals in the large-scale production of biopharmaceuticals. K3(9)
- 6) Describe the detailed mechanism of bacterial transformation, outlining the steps involved in the uptake of foreign DNA by competent bacterial cells and the factors influencing efficiency. K5(10)
- 7) Explain the molecular mechanism of how restriction enzymes recognize and cleave specific DNA sequences, discussing their structural features and catalytic properties. K4(12)
- 8) Analyze the significance of three major plant tissue culture techniques, including their applications in the propagation and genetic improvement of crops. Provide detailed examples of successful applications in agriculture and horticulture. K5(15)
- 9) Evaluate the significance of accurate quantification of nucleic acids in various laboratory procedures, including PCR, DNA sequencing, and gene expression analysis. How does precise quantification enhance the quality and reliability of experimental results? K5(15)
- 10) Evaluate the integration of high-throughput DNA microarrays and hybridization techniques in large-scale genomics studies, considering applications in personalized genomics and cancer profiling. K6(18)