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**School of Biological and Life sciences**

Bachelor of Science Honours in Biomedical Science

Mid Term Examination - May 2024

Duration : 90 Minutes

Max Marks : 50

**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) Outline the essential elements of a phage library and elucidate their utilization in selecting and showcasing particular proteins. K2 (2)
- 2) What is meant by the term "phage library," and how does it contribute to the functionality of phage display technology? K1 (3)
- 3) Discuss three different types of plant tissue culture techniques, highlighting their specific applications in agriculture and biotechnology. Provide an example for each type. K2 (4)
- 4) Explain the concept of Marker-Assisted Selection (MAS) breeding. Discuss three advantages of using MAS in plant breeding programs, providing examples of crops where MAS has been successfully employed. K2 (6)
- 5) Compare and contrast two major molecular breeding techniques, such as Marker-Assisted Selection (MAS) and Genomic Selection (GS). Discuss the principles, advantages, and potential challenges associated with each technique, providing examples of crops where these techniques have been successfully applied. K3 (6)
- 6) Provide a comprehensive overview of phytoremediation, including the mechanisms by which plants contribute to environmental cleanup. Discuss three specific examples of contaminants that can be effectively mitigated using phytoremediation strategies. Evaluate the advantages and challenges associated with the widespread implementation of phytoremediation. K3 (9)

7) Examine the pivotal role of plant biotechnology in the production of secondary metabolites with a focus on pharmaceutical and industrial applications. Discuss three specific biotechnological approaches employed to enhance the yield and quality of secondary metabolites. Evaluate the economic and environmental implications of utilizing plant biotechnology for large-scale production. Illustrate the significance of precision in genetic modifications for optimizing the biosynthesis of valuable compounds. K4 (8)

8) Provide an in-depth exploration of plant tissue culture, covering its principles, methodologies, and applications. Discuss three key techniques used in plant tissue culture and their specific applications in plant propagation and genetic improvement. Evaluate the challenges associated with maintaining sterile conditions and controlling contamination in plant tissue culture. Illustrate the ethical considerations related to the commercial use of plant tissue culture in agriculture. K4 (12)

**OR**

Analyze the process and significance of somatic hybridization in plant breeding. Discuss the principles underlying the fusion of plant cells and the creation of somatic hybrids. Provide three examples of crops where somatic hybridization has been successfully employed to introduce novel traits or improve existing ones. Evaluate the potential challenges and ethical considerations associated with the release of somatic hybrid plants into the environment. Propose strategies to address concerns and promote responsible use of somatic hybridization in crop improvement. K4 (12)