The Open University of Sri Lanka
Faculty of Engineering Technology
Department of Agricultural & Plantation Engineering

Study Programme	:Bachelor of Industrial Studies Honours (Agriculture) Degree Programme
Name of the Examination	: Final Examination
Course Code and Title	**: AGI6585 Applications in Biotechnology**
Academic Year	: 2023/2024
Date	: 27th February 2025
Time	: 13.30 - 16.30 hrs
Duration	**: 3 hours**

Index number .....

General Instructions

1. Read all instructions carefully before answering the questions.
2. Answers should be in clear handwriting.
3. Do not use red colour pen.
4. This question paper consists of **two (02) sections.**

Section 1

- Consists of 15 questions in **six (06)** pages.
- Answer all questions.
- All questions carry equal marks.
- Write answers only in the space provided.
- Please do not remove the question paper from the examination hall.
- You may spend **one (01)** hour to answer this section.

Section 11

- Contain **six (06)** questions in **one (01)** page.
- Answer any **four (04)** questions.
- You may spend **two (02)** hours to answer this section.
- All questions carry equal marks.
- Answer for each question should commence from a new page.

SECTION I: Answer all questions. Use the space given under each question.

1. Name two (02) fungal species produce industrially important enzymes.

   i

   ii

2. Briefly explain one (01) example for Biotechnological applications in environment

3. Name three (03) original sources of substrates possible to utilize for biofuel production.

   i.

   ii.

   iii

4. Indicate whether the following statements on plant nutrients are true (T) or false (F).
   i. The activity of Rhizobium bacteria can be used as a source of providing nitrogen to the plants instead of N-fertilizer. ☐

   ii. The activity of Rhizobium bacteria can be used as a source of providing phosphorous to the plant instead of P-fertilizer. ☐

iii. Azolla fixes atmospheric nitrogen in association with nitrogen fixing blue green algae. ☐

iv. Azolla fixes potassium in association with the blue green algae. ☐

v. Phosphorus mobilising Biofertilizers transfer phosphorus from the soil to the root cortex of plants. ☐

5. Briefly explain the effect of pH on composting process.

6. "Vermiculture is the culture of earthworms". Briefly explain the effect of temperature on earthworm production.

7. What is meant by the 'Somaclonal variation'?

8. Briefly explain the '*in situ* conservation' of plant genetic resources.

9. Indicate whether the following statements on protoplast culturing are true (T) or false (F).

i. The protoplast in culture can be regenerated into a whole plant. ☐

ii. Hybrids can be developed from protoplast fusion ☐

iii. Genetic transformations are easy when use protoplast DNA. ☐

iv. Protoplasts are excellent materials for ultra-structural studies. ☐

v. Isolation of cell organelles and chromosomes is easy from protoplasts. ☐

10. Name four (04) culture methods applicable for haploid production

i.

ii.

iii.

iv.

11. List four (04) methods of detecting genetically modified crops and products

i.

ii.

iii

iv.

12. Name two (02) international agreements existing for the biodiversity protection.

i

ii

13. List two (02) objectives of National Biosafety Framework in Sri Lanka

i

ii

14. Define the term 'Bioinformatics'.

15. Name two (02) institutes located in the world for bioinformatics.

i

ii

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SECTION 2: Answer any four (04) questions.

1. Discuss the advantages and benefits of biopesticides over synthetic/chemical pesticides (25 marks).

2. Describe the biogas production under following topics,
   a. Characteristics of inputs (10 marks)
   b. Steps of biogas production (15 marks)

3. Discuss the application of somaclonal variation on improving crops (25 marks).

4. Describe the importance of single cell culturing and plant development on agricultural industry (25 marks).

5. Discuss the effects of applying biotechnology on native as well as agricultural biodiversity (25 marks).

6. a. Discuss the advantages of Liquid Bio-fertilizer over conventional carrier-based bio-fertilizers (10 marks)
   b. Explain application of genetic engineering technology in developing animal husbandry (15 marks)