

The Open University of Sri Lanka
Faculty of Engineering Technology

Department of Agricultural and Plantation Engineering



0045

Study Programme : Bachelor of Industrial Studies Honours (Agriculture)
Name of the Examination : Final Examination
Course Code and Title : AGI5569 Molecular Biology and Biotechnology
Academic Year : 2024/2025
Date : 12th February 2026
Time : 13:30 -16:30 hr
Duration : 03 Hours

Index No. :

Examination Type: Closed Book Test

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 (6) 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.
- 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) agricultural industries where biotechnology can be applied successfully in Sri Lanka.

i

ii

2. Briefly explain the pattern of base pairing and existing hydrogen bonds between bases to form the double helix of DNA.

3. Define the term 'Genome'

4. Mark the correct statements as "✓" and incorrect as "X".

i. Replication means the duplication of DNA.

☐

ii. Replication always begins at the same points along the DNA strand known as the origins of replication

☐

iii. Telomeric sequences prevent the shortening of the DNA helix after replication

☐

iv. Enzyme Helicase prepares the DNA for replication by breaking the hydrogen bonds between the DNA strands

☐

v. The place where the DNA strands are separated is called the replication fork.

☐

5. Name the two (02) types on endonucleases and explain the functioning of each of them.

i

ii

6. Define the following terms

Cloning vector

Expression Vector

7. Briefly explain the requirement of bioreactors for fermentation industry.

8. Name two (02) substrates which is possible to utilize to produce single cell protein.

i

ii

9. Briefly explain the purpose of conducting the Ligase Chain Reaction (LCR).

10. Name two (02) different types of viruses used as gene therapy vectors.

i

ii

11. Name four (04) general categories of products derived from transgenic animals

i

ii

iii

iv

12. Briefly explain the following terms used in plant tissue culture applications

Totipotency

In vitro

Acclimatization

Organogenesis

13. Name two (02) disinfections are used in explant sterilization.

i

ii

14. Mark the correct statements as "✓" and incorrect as "X" callus formation in tissue culture.

- i. Callus culture concerns the initiation and continued proliferation of undifferentiated parenchyma cells from parent tissue
- ii. Callus culture concerns the initiation and continued proliferation of differentiated parenchyma cells from parent tissue
- iii. Callus induction is important for the formation of plant hybrids.
- iv. Callus formation is controlled by endogenous auxins and cytokinin.
- v. Callus formation is controlled by endogenous cytokinin only.

☐☐☐☐☐

15. Name the stages of micropropagation

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SECTION 2: Answer any four (04) questions.

1. Explain the procedure of expressing inheritance encoded in genes to characters of organisms.
2. Briefly explain the following topics.
 - a. Gene cloning
 - b. DNA libraries
3. Explain the different application methods of biotechnology in dairy and food supplement industry.
4. Discuss the major applications of industrial fermentation technology, highlighting its role in agriculture and food production.
5.
 - a) Name different section/s of a plant tissue culture laboratory
 - b) Explain the work carried out in each of the sections you named in 5 (a)
6. Write an essay on possibility of developing tissue culture technology to upgrade the floriculture industry in Sri Lanka.