

THE NATIONAL UNIVERSITY OF LESOTHO
DEPARTMENT OF NUTRITION
PRINCIPLES OF FOOD TECHNOLOGY – NUT4303

SUPPLEMENTARY EXAMINATION 3 HOURS TOTAL MARKS: 100

Instructions:

The paper consists of two (2) sections; section A (50 marks) and section B (50 marks).

- Attempt all the questions.
- Write each question on a separate page.

Section A

Question 1

Define the following terms as used in biotechnology: (10)

- i. Bio-preservation
- ii. Transgenic animal
- iii. Back-Slopping
- iv. Probiotics
- v. Plasmid

Question 2

- i. Describe the polymerase chain reaction in details and its importance in biotechnology? (20)
- ii. Discuss Translation? (10)
- iii. Outline in detail different ways to isolate and clone a specific gene? (10)

Section B

Question 1

- i. In Golden Rice two genes have been inserted into the rice genome, to replace the turned-off genes, thereby leading to the production and accumulation of beta-carotene in the grains. Explain the sources of these genes? (3)
- ii. A GM approach has been developed commercially which involves transferring genes from *Bacillus thuringiensis* (Bt) which offer protection against lepidopteran pests (moths and butterfly). Describe in details how the toxin kills the insects? (7)
- iii. Describe the herbicidal action of **Shikimic acid pathway**, illustrating the chemical equation of glyphosate (Round-up). (10)
- iv. Most of the GMO crops grown today were developed to help farmers prevent crop loss. What are the three most common traits found in GMO crops? (3)
- v. Outline steps used in the cheese production using Recombinant Chymocin? (10)

Question 2

- i. Traditionally, tomatoes are harvested green and transported to the retail sites before they are ripened using ethylene gas. Describe and discuss the properties of ethylene gas? (7)
- ii. Discuss the enzyme polygalactouronase and its importance in genetically modified tomatoes? (10)