THE NATIONAL UNIVERSITY OF LESOTHO

FACULTY OF HEALTH SCEINCE

DEPARTMENT OF NUTRITION

PRINCIPLES OF FOOD BIOTECHNOLOGY – NUT4303

FIRST SEMESTER EXAMINATIONS 3 HOURS TOTAL MARKS: 100

Instructions:

- Attempt all the questions.

- Write each question on a separate page.

Question 1

i. Explain recombinant DNA technology? (3)
ii. Describe the steps involved in the process of DNA technology? (7)
iii. Explain the Polymerase Chain Reaction technique used in genetic engineering. Describe in details its thermal cycles? (10)
iv. Discuss Translation as used in Biotechnology? (10)

Question 2

i. Compare and construct DNA and RNA molecules? (20)
ii. Recombinant DNA (rDNA) technology refers to the process of joining DNA molecules from two different sources and inserting them into a host organism, to generate products for human use. Illustrate the statement with the schematic diagram? (20)

Question 3

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 this process in details? (10)
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? (10)
iii. Describe the herbicidal action of **Shikimic acid pathway**, illustrating the chemical equation of glyphosate (Round-up). (10)

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