



University of Ruhuna- Faculty of Technology
Bachelor of Biosystems Technology Honours
Level 2 (Semester II) Examination, November / December 2022
Academic year 2020 / 2021

Course Unit: BST 2253
Gene Technology

Duration: 2 hours

Student No:

Pease **read** and **follow** the instruction carefully before answering the questions.

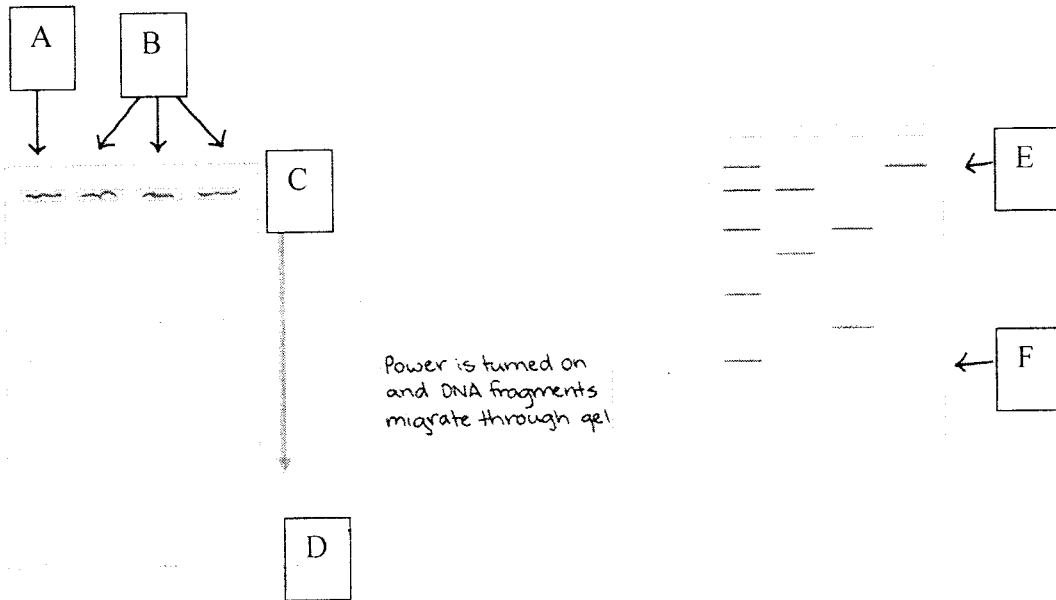
- Answer **All Three (03)** questions in **PART I** in the given space.
- Answer **Only Two (02)** question in **PART II**.
- Use the separate book for answering the question in PART II.
- Each question should be started with new page.
- Calculators and mobile phones are not allowed

Part I: Structured essay (3 questions each with V parts)

Answer all questions

Question 1 (100 Marks)

Migration process of DNA in a gel is given in the following diagram. Answer the questions based on the diagram.



I. Name the technique shown by the diagram given above (10Marks)?

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II. Identify the parts from A to D (20 Marks).

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III. Mention the important features of the DNA molecule / fragments that determine its rate of migration through a gel (20 Marks).

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IV. Based on the answer given in Part III, identify the E and F (20 Marks).

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V. Agarose is the main component used to produce the gel. Briefly explain how agarose involves regulating the DNA migration. (30 Marks).

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Question 2 (100 Marks)

Following diagram is based on a technique widely used in genetic engineering.

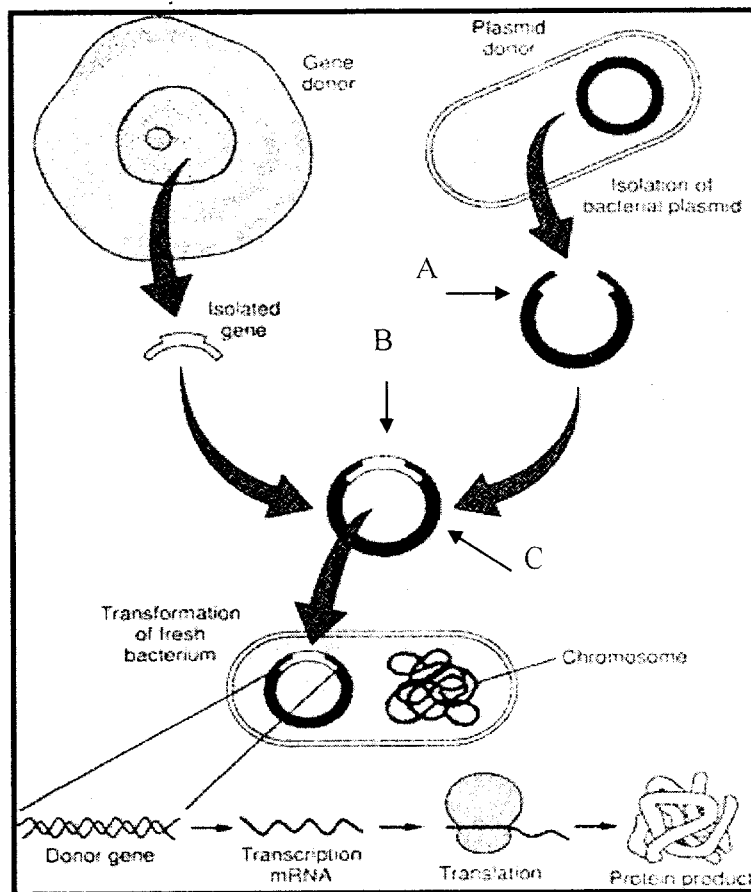


Figure 1

I. Define the term “Genetic engineering” (10 Marks).

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II. What is the name of this technique mentioned in Figure 1 (10 Marks)?

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III. Identify the processes (A and B) and product (C) (30 Marks).

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IV. What do you mean by cloning vector (5 Marks)?

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V. Point out two (02) applications of genetic engineering techniques of following mentioned fields (45 Marks).

a). Medicine

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b). Agriculture

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c). Industry

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Question 3 (100 Marks)

Genetically Modified Organism (GMO) is any organism whose genetic material has been artificially manipulated in a laboratory through genetic engineering to make a better product.

- I. Mention four (04) medicinal uses of Genetically Modified bacteria (GM bacteria). Give one (01) example for each **(20 Marks)**.

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- II. What are the purposes of developing 03 main generations of Genetically Modified crops (GM crops) **(15 Marks)**.

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III. Mention four (04) purposes of producing GM animals in livestock farming **(20 Marks)**.

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IV. Give an example for GM animals which can be used as “Bioreactors” or “Biosensors”. Briefly mention the mechanism of action **(15 Marks)**.

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V. Write down two (02) possible risks of GMOs used in following areas **(30 Marks)**.

a). Health

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b). Environment

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c). Agriculture

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PART II – Essays

Answer two (02) questions only

Question 1 (100 Marks)

Write a comparative essay on the technical differences used in DNA and protein detection methods in gene technology.

Question 2 (100 Marks)

Briefly describe the main steps in the Western blotting technique.

Question 3 (100 Marks)

Write an essay on the methods used to identify the correct clones.

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