



University of Ruhuna- Faculty of Technology
Bachelor of Biosystems Technology Honours
Level 3 (Semester I) Examination, June 2023
Academic year 2021 / 2022

Course Unit: BST 3123 Tissue Culture Technology

Duration: 2 hours

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

- Answer **all Three (3)** questions in **PART 1 in the given space.**
- Answer Only **Two (2)** questions in **PART 2.**
- Use separate book for answering the questions in **PART 2.**
- Each question should be started with a new page.
- Calculators and mobile phones are not allowed

PART I

Question 1 (100 Marks)

Cloning is a modern technique that scientists use to make exact genetic copies of living things including genes, cells, tissues and whole animals.

I. Differentiate “cloning” and “natural production” (10 Marks).

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II. Write down four (04) major applications of gene or DNA cloning (20 Marks).

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III. Point out the main steps of reproductive cloning (35 Marks).

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IV. Mention one (01) main difference and one (01) application of reproductive cloning and therapeutic cloning (20 Marks).

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V. Write down five (05) drawbacks of reproductive cloning (15 Marks).

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Question 2 (100 Marks)

I. Compare the following pairs.

a) Embryogenesis Vs Organogenesis (05 Marks)

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b) Direct organogenesis Vs Indirect organogenesis (05 Marks)

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c) Direct somatic embryogenesis Vs Indirect somatic embryogenesis (05 Marks)

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d) Somatic hybridization Vs Somatic cybridization (05 Marks)

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II. Point out five (05) importance of protoplast culture technique (20 Marks)

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III. Mention **three (03)** reasons of using meristem culture for production of virus free clean propagules **(20 Marks)**.

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IV. List out **two (02)** methods to produce virus free plants and **two (02)** techniques to proof those propagules are virus free **(20 Marks)**.

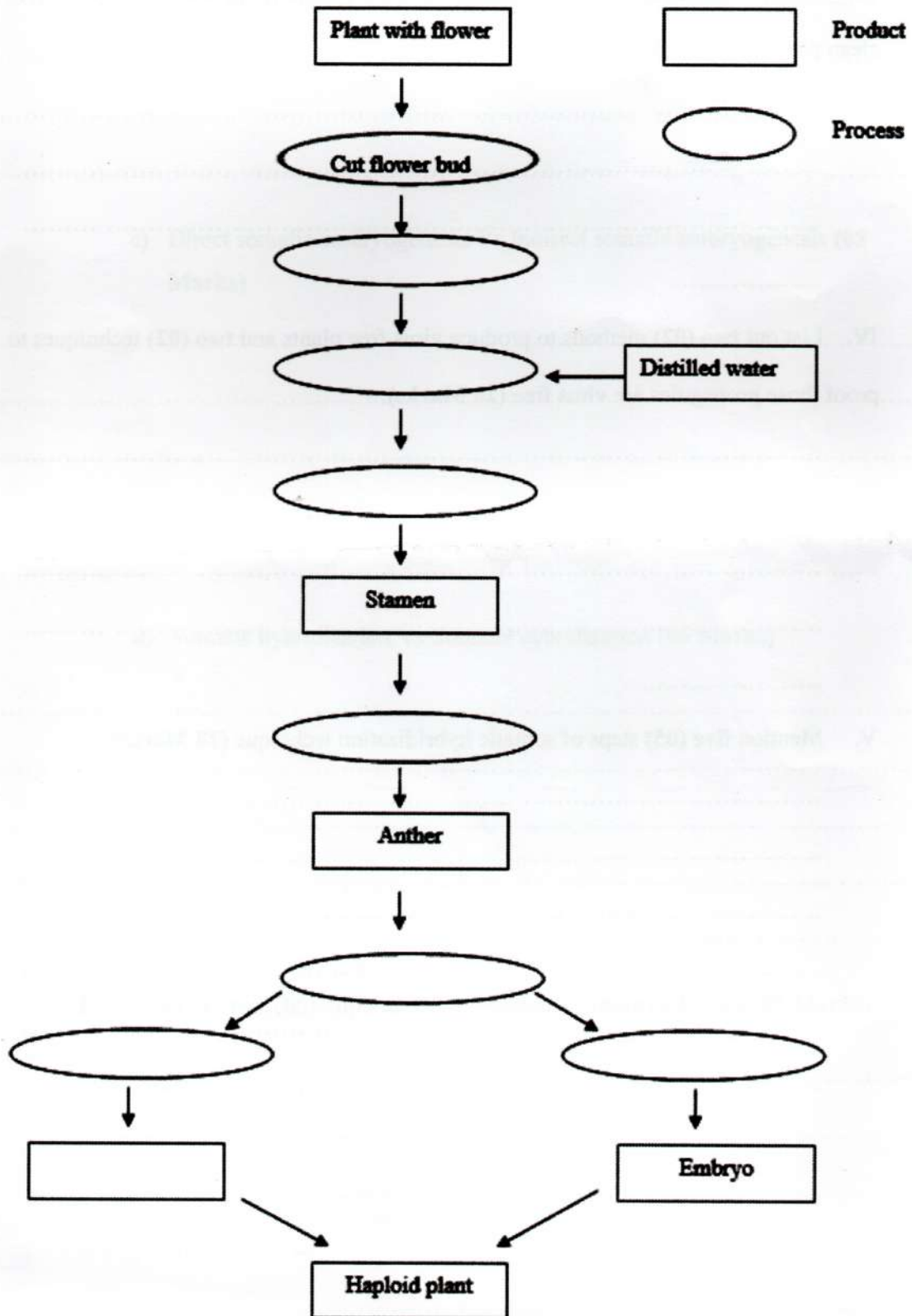
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V. Mention **five (05)** steps of somatic hybridization technique **(20 Marks)**.

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Question 3 (100 Marks)

I. Complete the following flow chart summarizing a one type of *in-vitro* culture technique by filling the spaces (20 Marks).



II. Read following statements. Put "T" if the statement is correct and put "F" if the statement is incorrect. Correct the false statement and rewrite again on the given space (20 Marks).

1	Auxin stimulates shoot development.	
2	Oryzalin can be used for polyploidy production	
3	The <i>in-vitro</i> cultures required about 60% of Relative Humidity.	
4	Continued use of auxin enhances embryogenesis.	
5	Tissue culture nutrient media needs basic pH level.	

III. What is Somaclonal variation? List out **three (03)** main causes for it (20 Marks).

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IV. Define the term “cryopreservation” while pointing out the principle behind the cryopreservation **(20 Marks)**.

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V. Define the term “hyperhydricity” and write down **three (03)** effects of hyperhydricity in plant tissue culture **(20 Marks)**.

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PART II

Question 01

Discuss the effects of microenvironment on micropropagation. **(100 Marks)**

Question 02

- a) What is meant by "cell viability" **(10 Marks)**?
- b) What is the significance of cell viability assay **(20 Marks)**?
- c) Write down a brief account of the different types of cell viability assays **(70 Marks)**.

Question 03

Write short notes on following topics

- a) Mammalian Cell morphology and its importance **(25 Marks)**
- b) Adherent cell cultures Vs. Suspension cell cultures **(25 Marks)**
- c) Chemical contamination of cells **(25 Marks)**
- d) Practical aspects of cell culture **(25 Marks)**

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