FACULTY OF NATURAL RESOURCES MANAGEMENT AND AGRICULTURE

DEPARTMENT OF CROP SCIENCE

BACHELOR OF SCIENCE (HONOURS) DEGREE IN CROP SCIENCE

LCS 4105 PLANT BIOTECHNOLOGY

FIRST SEMESTER EXAMINATION

SEPTEMBER 2023

This examination paper consists of 3 pages

Time Allowed: 3 hours

Total Marks: 100

Examiner's Name: D. Dube

INSTRUCTIONS

1. Answer all questions in Section A

2. Answer only three questions in Section B

MARKS ALLOCATION

Question	Marks
Section A	40
Section B	60
Total Attainable marks	100

SECTION A: ANSWER ALL QUESTIONS IN THIS SECTION

Question one

a) Briefly explain the following terms

i. Organogenesis (2)

ii. Totipotency (2)

iii. Explant (2)

iv. Genetically modified Organism (2)

b) Briefly explain any 2 molecular genetic markers used in marker assisted plant breeding (6)

c) Explain how contamination can be avoided in tissue culture (6)

Question Two

a) Distinguish between traditional and molecular marker assisted plant breeding (8)

b) Describe the technique of meristem culture and its application in crop improvement

(10)

c) Briefly explain cryopreservation of plant genetic resources (2)

SECTION B: ANSWER THREE QUESTIONS IN SECTION B

Question Three

a) Briefly describe the stages involved in gene transfer using a vector mediated approach

(15)

b) Distinguish between PCR based and restriction enzyme based genetic markers

(5)

Question Four

a) Discuss general stages of tissue culture process for a successful tissue culture program (15)

b) Briefly describe PCR steps involved in DNA amplification for DNA sequencing (5)

Question Five

Highlight the traditional plant breeding process, giving suitable examples (20)

Question Six

Briefly discuss the regulatory and ethical issues concerning transgenic plants in Zimbabwe (20)

Question Seven

Cotton farmers in Zimbabwe are facing a challenge of pink bollworms hence increased cost of production due to incessant buying of chemicals to control the pest. One of the bacteriologists has managed to identify a gene which governs pink boll worm resistance in Bt bacteria. As a plant biotechnologist identify the problem and discuss how the gene of interest can be transferred from the Bt bacteria to the pink bollworm susceptible cotton variety through a vector mediated approach. (20)

END OF EXAMINATION PAPER!