



GWANDA STATE UNIVERSITY
FACULTY OF LIFE SCIENCES
DEPARTMENT OF CROP SCIENCE
BACHELOR OF SCIENCE HONOURS DEGREE IN CROP SCIENCE
LCS 4108 CROP BREEDING AND BIOTECHNOLOGY
FIRST SEMESTER EXAMINATION
JANUARY 2021

This examination paper consists of 3 pages

Time Allowed: 3 hours
Total Marks: 100
Special Requirements: None
Examiner's Name: Dr. T Goche

INSTRUCTIONS

1. Answer **all** questions in Section A
2. Answer **only two** questions in Section B

MARK ALLOCATION

QUESTION	MARKS
SECTION A	60
SECTION B	40
TOTAL ATTAINABLE MARKS	100

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SECTION A: ANSWER ALL QUESTIONS IN THIS SECTION

1. a) Define the following.
 - i) gene pool
 - ii) centre of diversity
 - iii) genetic vulnerability
 - iv) germplasm
 - v) hybridisation (10)
- b) State four forces responsible for loss of genetic diversity (4)
- c) What are the objectives of plant introductions? (6)

2. a) i) What is mutation breeding? (2)
 - ii) Explain the primary purpose of mutation breeding. (4)
 - iii) State two ways a plant breeder can induce mutations. (2)
- b) i) Define genetic engineering. (2)
 - ii) Name two methods used for transferring genes under genetic engineering. (2)
 - iii) Explain the bio-ethical considerations concerning genetic engineering in Zimbabwe. (8)

3. a) Write short notes on :
 - i) pure lines (4)
 - ii) open pollinated varieties (4)
 - iii) mass selection (4)
- b) i) Define biosafety. (2)
 - ii) Explain the mandate of the Zimbabwe National Biotechnology Authority. (6)

SECTION B: ANSWER ANY TWO QUESTIONS IN THIS SECTION

4. a) Describe methods used to create populations for a breeding program? (5)
- b) Why should parents for hybridisation be chosen on the basis of their genetic value?
Give examples of sources of desirable parental germplasm. (5)
- c) How do you transfer a disease resistant recessive gene from wild soybean into a cultivated species of soybean? Outline and explain the procedure. (10)
5. Discuss the applications of tissue culture in industry and plant breeding. (20)
6. Discuss the differences between the pedigree-selection breeding procedure and the bulk population breeding procedure. (20)

END OF EXAMINATION PAPER