



NATIONAL OPEN UNIVERSITY OF NIGERIA

**Plot 91, Cadastral Zone, Nnamdi Azikiwe Expressway, Jabi - Abuja
Faculty of Science**

DEPARTMENT OF BIOLOGICAL SCIENCES

2024 1 EXAMINATION

COURSE CODE: BIO309

COURSE TITLE: PLANT BREEDING

CREDIT UNIT: 3 UNITS

TIME ALLOWED: 3 HOURS

INSTRUCTION: ANSWER QUESTION ONE AND ANY THREE OTHERS.

- 1ai. What is a cultigen? **(2 marks)**
- 1a.ii. What is the most important advantage of vegetatively propagated offspring. **(4 marks)**
- 1a.iii. Give a concise account of how hybrid vigour is explained by two hypotheses **(6 marks)**
- 1bi. How does classical breeding generate genetic diversity. **(4 marks)**
- 1b.ii. Mention any five (5) traits that breeders have tried to incorporate into crop plants in the last century. **(5 marks)**
- 1b.iii. State the two (2) way in which recurrent selection differ from mass selection. **(4 marks)**
- 2ai. Why is it that effective selection is limited only to female parents and heritability estimates are reduced by half in mass selection? **(4 marks)**
- 2a.ii. Why is it that dicots in general have higher number of chromosomes than monocots. **(2 marks)**
- 2bi. Describe the karyotype. **(4 marks)**
- 2b.ii. What are the cytological bases of plant breeding. **(3 marks)**
- 2b.iii. Why are landraces ideally suited to a particular region or environment? **(2 marks)**
- 3ai. Explain how epistatic interaction between different pairs of genes occurs. **(4 marks)**
- 3a.ii. What is the opposite of inbreeding depression. **(2 marks)**
- 3bi. What is Inbreeding depression and what is its effects? **(4 marks)**
- 3b.ii. What kind of characters are exempted from the influence of inbreeding depression. **(3 marks)**
- 3b.iii. What is another name for allozymes and what is their function? **(2 marks)**
- 4ai. Explain the RNase mechanism of gametophytic self-incompatibility (GSI). **(5 marks)**
- 4a.ii. What are autosomes and are they represented? **(4 marks)**
- 4bi. How can one prevent selfing in plant. **(3 marks)**
- 4b.ii. How does self-incompatibility lead to the spread and success of angiosperms on earth? **(3 marks)**
- 5ai. How is male sterility different from female sterility? **(6 marks)**
- 5a.ii. Mention two (2) reasons why a self-fertilizing method of reproduction is more effective. **(2 marks)**
- 5bi. What is the main advantage of marker assisted selection in plant breeding? **(4 marks)**

5bii. How is genetic modification of plants achieved? **(3 marks)**

6ai. What stages of cell division is best suited for studies on chromosome morphology and why? **(4 marks)**

6aii. Why are some chromatids being referred to as "sister chromatids"? **(3 marks)**

6bi. What are the advantages of participatory plant breeding? **(4 marks)**

6bii. When can inbred strains be described as 'isogenic'? **(2 marks)**

6biii. What determines the self-incompatibility (SI) phenotype of the pollen in Sporophytic Self-Incompatibility (SSI)? **(2 marks)**

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