



“Investing in Africa’s future”

COLLEGE OF HEALTH, AGRICULTURE AND NATURAL SCIENCES

ACP 305: PLANT BREEDING METHODS AND BIOTECHNOLOGY

SUPPLEMENTARY EXAMINATION

JULY 2022

LECTURER: Mr. Tabarira J.

DURATION: 3 HOURS

INSTRUCTIONS

Answer any **three** questions

All questions carry equal marks (20).

DO NOT repeat material.

Write legibly.

Credit will be awarded for logical, systematic and neat presentations

Question One

- i. Explain the major contributions of plant breeding in achieving global food security by year 2040. [12]
- ii. Define the following terms:
 - i. Plant breeding, [1]
 - ii. Biotechnology, [1]
 - iii. Phenotype, [1]
 - iv. Landrace, [1]
 - v. Transgene, [1]
 - vi. Genotype, [1]
 - vii. Inbreeding depression, and [1]
 - viii. Self pollination. [1]

Question Two

- a. Explain the possible reasons why most African governments spend large sums of money in the development of crop cultivars suitable for the smallholder farmers. [12]
- b. Give an appropriate explanation for each of the following statements:
 - i. Plant breeding is both an art and a science [2]
 - ii. Selection acts on existing variability [2]
 - iii. Meiosis is the source of variability in breeding populations, [2]
 - iv. Introductions are not always beneficial in crop production systems. [2]

Question Three

- a. Explain in detail **five crop** production challenges in your country. [10]
- b. Outline how plant breeding can be applied to address each of the problems cited above. [10]

Question Three

- v. Discuss in detail **five** possible reasons why GMO technology is perceived as the solution to food security challenges in developing economies. [15]
- vi. Briefly explain why hybrids are more in crop production systems [5]

Question Four

Differentiate between the paired terms:

- a. Plant breeding and biotechnology; [2]
- b. Genotype and phenotype; [2]
- c. Transgene and transgenic; [2]
- d. Inbreeding depression and hybrid vigour; [2]
- e. Selection and sampling; [2]
- f. Quantitative trait and qualitative trait; [2]
- g. Meiosis and mitosis; [2]
- h. Self-pollinated and cross-pollinated crop species; [2]
- i. Hybrid and inbred line; and [2]
- j. Inbreeding and cross breeding. [2]

Question Five

- a. Define genetically modified organism (GMO) [2]
- b. Explain in detail the possible reasons why most developing countries have not fully adopted this technology in their breeding programs. [18]

Question six

a. Plant breeding can be summarized using the following verbs:

- i. Variate; [2]
- ii. Isolate; [2]
- iii. Intermate; [2]
- iv. Evaluate; [2]
- v. Multiply; and [2]
- vi. Disseminate [2]

Briefly explain each of the activities stated above

b. State and explain four features that promote self pollination in self-pollinated crop species [8]

End of Paper
