



“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

Que

- 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 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. Vary;

[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** _____
