



"Investing in Africa's Future"

COLLEGE OF HEALTH, AGRICULTURE & NATURAL SCIENCES

NACP 112: AGRICULTURAL BOTANY AND PLANT PHYSIOLOGY

END OF SECOND SEMESTER SPECIAL EXAMINATIONS

AUGUST 2023

LECTURER: MR. T. A. MTAITA

DURATION: 3 HOURS

INSTRUCTIONS

Chose and answer **Four** questions only

Question One

- a) Analyze the difference between monocotyledons and dicotyledons and briefly indicate the importance of this information in agriculture. [10]
- b) Examine the basic functions of primary and modified plant organs. [15]

Question Two

- a) Why is transpiration considered to be a necessary evil? [3]
- b) Write a note on the dispersal of fruits and seeds. [6]
- c) Examine any six advantages of asexual propagation. [6]
- d) Given a complete plant (with stems, roots, leaves, flowers, etc.) how can you tell whether the plant: [10]
 - i. Has complete or incomplete flowers?
 - ii. Belongs to the family ASTERACEAE or ALLIACEAE?
 - iii. Has marginal or parietal placentation?
 - iv. Has a rhizome or a corm?
 - v. Is likely to be wind or insect pollinated?
 - vi. Belongs to the family POACEAE or FABACEAE?
 - vii. Is an angiosperm or gymnosperm?
 - viii. Is monoecious or dioecious?
 - ix. Has a racemose or cymose inflorescence?
 - x. Is a determinate or indeterminate plant?
 - xi. Is a xerophyte or mesophyte plant?

Question Three

- a) Examine the importance of each of the following modified organs in one named (by common and scientific names) in crop plants: [10]
 - i. Stem tuber
 - ii. Root nodule
 - iii. Leaf tendrils
 - iv. Stolon, and
 - v. Cladode.
- b) Write elaborative notes on:
 - i. Photoperiodism, and [5]
 - ii. Vernalization. [10]

Question Four

a). Suppose you find a plant which has modified organs that do not, at first, look like leaves, stems or roots. What features would you look for, on and around the organ for your recommendation?. **[5]**

b) Summarize the five advantages of asexual reproduction. **[5]**

b) For each of the following systems of pollination control:

(i) state whether it enforces self- or cross-pollination (or self- or cross fertilization) and

(ii). Explain how it encourages or enforces cross or self-pollination (or self- or cross fertilization) Incompatibility. **[5]**

1. Cleistogamy
2. Mooney, and
3. Heteromorphic sporophytic incompatibility

c) What are physiological explanations for each of the following observations?. **[10]**

- a. In strawberry, poor seed set results in small and irregularly shaped fruits.
- b. The most commercial application of gibberellins is in the barley malting industry Application of ABA to plants results in stomatal closure.
- c. Auxins promote shoot and root growth but synthetic auxins are used as herbicides in agriculture.
- d. Green (mature) bananas are treated with ethrel about five days before.
- e. The banana plant grows up to three meters (3) tall with the apical meristem still underground.

Question Five

a), Discuss how and why botanists use the rules of binomial nomenclature. **[5]**

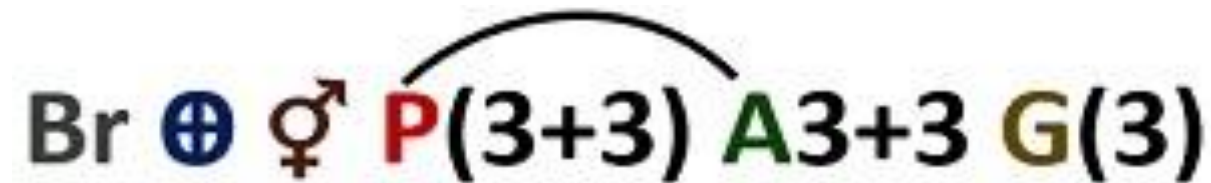
a) Distinguish between the following; **[5]**

- i) Pulse and forage crops
- ii) Tap root and fibrous root systems
- iii) Thorn and spine

- iv) Self and cross-pollinated plants, and
- v) Umbel and corymb

b). Examine the flower characteristics from the following floral formulas:

[10]



ii.



c). Examine the ideal characteristics of a good bioassay

[5]

Question Six

- a) Analyze why farmers in Tropical and sub-tropical countries like Zimbabwe grow spring wheat instead of winter wheat cultivars during the winter season. [3]
- b) Explain why natural auxins promote shoot and root growth but synthetic auxins are commonly used as herbicides in agriculture. [3]
- c) For each of the crop plants listed below: [10]
 - i. Provide its scientific name
 - ii. Name the family to which it belongs
 - iii. State whether it is self or cross pollinated, and
 - iv. Classify it on the basis of one major agronomic use
 - a) Pearl millet
 - b) Tomato
 - c) Cowpea
 - d) Cotton, and
 - e) Sunflower
- d) Given an unknown substance, describe what bioassay you would carry out to find out whether it is: [9]
 - i. An auxin

- ii. Gibberellin, or
- iii. Ethrel

End of the examination paper