



“Investing in Africa’s Future”

(College of health, Agriculture and Natural Sciences)

NACP 112: Agriculture Botany and Plant Physiology [*Paper Two*]

END OF SECOND SEMESTER EXAMINATIONS

April/May 2023

LECTURER: (Mr. Mtaita T A)

DURATION: (3 HRS)

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 gymnosperms?
 - viii. Is monoecious or diecious
 - 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). Supposed 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]**

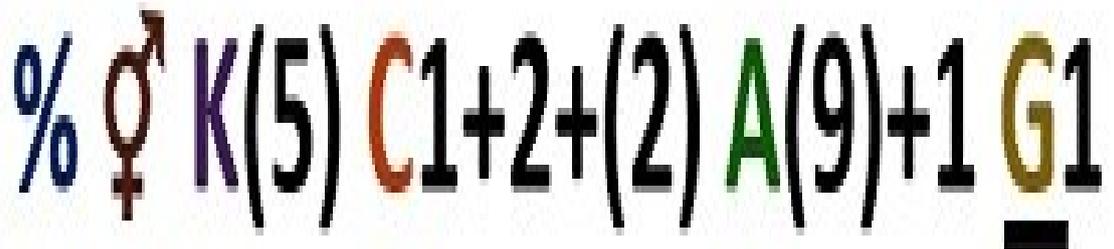
- a. Pulse and forage crops
- b. Tap root and fibrous root systems
- c. Thorn and spine
- d. Self and cross-pollinated plants, and
- e. Umbel and corymb

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 herbicide 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