



"Investing in Africa's Future"

(College of health, Agriculture and Natural Sciences)

Paper Two

NACP 112: Agriculture Botany and Plant Physiology

END OF SECOND SEMESTER EXAMINATIONS

APRIL/MAY 2024

LECTURER: (Mr. Mtaita T A)

DURATION: (3 HRS)

INSTRUCTION

Choose and answer **FOUR** Questions Only

Question one

- a) With an aid of a table, make a comparison between roots and stems [5]
- b) Below are systems of pollination control:
- i. cleistogamy
 - ii. Dichogamy
 - iii. Chasmogamy
 - iv. Hormophic sporophytic incompatibility
 - v. Monoecy, in anemophilpou species
1. For each state whether it encourages or enforces self-or cross pollination [or cross fertilization] and [5]
 2. Explain how it encourages or enforces cross- or self-pollination [or self-or cross fertilization]. [5]
- c) Explore the meaning of the following terms and for each, name (by common and scientific names) one crop plant that provides an appropriate example. A crop plant must not be used more than once. [10]
- i. Monocot plant
 - ii. Biennial plant
 - iii. Xerophytes
 - iv. Grain legume
 - v. Angiosperm

Question Two

- a) Explain the following observations. [5]
- i) Water is necessary for fertilization in Bryophytes
 - ii) A mango seed can produce more than one seedling
 - iii) The seeds of gymnosperms have haploid endosperm
 - iv) *Sphaceloma manihoticola* causes 'super elongation' disease in cassava as secondary metabolite inducing the cassava pit to grow very tall
 - v) Green [mature] bananas are treated with ethrel about five days before marketing
- b) For each of the following modified plant organs, (i) name the organ that was modified, (ii) state whether that organ performs a substituted or specialized function, (iii) specify the substituted or specialized function, and (iv) name (by both common and scientific names) one plant species that produces it. Give your answer in tabular form, and give an appropriate title. [20]
- i) Prop roots,
 - ii) Tuber,
 - iii) Spathe,
 - iv) Phylloclade, and

- v) Tendril

Question Three

- a) Specify the type of fruit that is characteristic of each of the following families or genera [5]
- i. Cucurbitaceae
 - ii. Fabaceae
 - iii. Poaceae
 - iv. Asteraceae
 - v. Solanaceae
 - vi. Malvaceae
 - vii. Citrus, and
 - viii. Prunus
- b) Write detailed notes on vernalisation and photoperiodism [20]

Question Four

- a) What are the two general characteristics of phyto-hormones? [2]
- b) Analyse why farmers in tropical and sub-tropical countries like Zimbabwe grow spring wheat instead of winter wheat cultivars during the winter season. [3]
- c) Examine five characteristics of a good bioassay. [5]
- d) Describe in detail one bioassay for each of the following phyto-hormones [15]
- 1) Auxins
 - 2) Cytokinins
 - 3) Gibberellins
 - 4) Ethylene
 - 5) Absciscic acid

Question Five

- a) With an aid of an example, elaborate your understanding of the concept of floral formula in botany. [4]
- b) Suppose you find a plant which has modified organs which do not, at first, look like leaves, stems, or roots. What features would you look for, on and around the organ, in order to decide whether it was (i) a modified leaf, (ii) a modified stem, or (iii) a modified root? [9]
- c) Explain why natural seed dispersal mechanisms are undesirable in agriculture [4]
- d) Unpack the economic importance of any four phyto-hormones [8]

Question Six

- a) Distinguish between the following **[5]**
- i. Protandry and protogyny
 - ii. Indeterminate and determinate plants
 - iii. Taxonomy and binomial nomenclature
 - iv. aggregate and multiple fruits
 - v. photoperiodism and vernalisation
- b) Write detailed notes on:
- i. Pollination and pollination agents, and **[10]**
 - ii. Plant modified organs **[10]**