



# MACHAKOS UNIVERSITY

University Examinations for 2019/2020 Academic Year

SCHOOL OF AGRICULTURAL SCIENCES

DEPARTMENT OF AGRICULTURAL EDUCATION AND EXTENSION

FOURTH YEAR SPECIAL/ SUPPLEMENTARY EXAMINATION FOR

BACHELOR OF SCIENCE IN AGRICULTURAL EDUCATION AND EXTENSION

BACHELOR OF EDUCATION (SPECIAL NEEDS EDUCATION)

BACHELOR OF EDUCATION (SCIENCE)

AGR 412: POSTHARVEST TECHNOLOGY

DATE: 21/01/2021

TIME: 8.30-10.30 AM

---

## INSTRUCTIONS:

Answer question ONE and any other TWO questions

### QUESTION ONE (COMPULSORY - 30 MARKS)

- a) Fleshy fruits are divided into **TWO** broad categories based on their ripening patterns as measured by the rates of respiration and ethylene production:
- Define the **TWO** categories and in each category give **TWO** examples (4 marks)
  - With a clearly labelled illustration for each, explain the phases that each category undergoes from initiation to death (6 marks)
- b) Respiratory metabolic process is one of the most important physiological and biochemical processes in the postharvest handling technology of agricultural produce.
- Explain **FOUR** important applications of measuring the rate of respiration in the postharvest handling of perishable agricultural produce (4 marks)
  - From a respiratory metabolism and quality perspectives, explain the impact of overwaxing/overcoating oranges during postharvest treatment (3 marks)
- c) Explain the fundamental objectives and functions of harvest aids (5 marks)
- d) There are various methods used for cooling of harvested perishable commodities, among them hydrocooling.
- Describe the hydrocooling method (6 marks)
  - Give **TWO** merits and **TWO** demerits of hydrocooling method (2 marks)

**QUESTION TWO (20 MARKS)**

- a) The maturity of agricultural commodities has a good correlation to product quality:
- i. Explain the need to measure the maturity of agricultural commodities (4 marks)
  - ii. Explain the requirements for a maturity index (2 marks)
- b) Explain the predisposing factors that may lead to development of aflatoxin in non-perishable commodities (4 marks)
- c) Discuss the need for rapid cooling of harvested perishable agricultural commodities (10 marks)

**QUESTION THREE (20 MARKS)**

- a) Explain how postharvest technology stimulates agricultural production (4 marks)
- b) Explain the principle behind tissue browning that is manifested in perishable commodities of tropical/sub-tropical origin when subjected to chilling temperatures (4 marks)
- c) With the aid of the relevant graph for each, explain the effects of exogenous ethylene treatment on the respiratory metabolism of climacteric and non-climacteric fruits and on the regulation of each type of fruit own ethylene biosynthesis (8 marks)
- d) Explain the importance of controlling water loss from harvested perishable commodities (4 marks)

**QUESTION FOUR (20 MARKS)**

- a) Define the **TWO** measurements that may be used to assess the quality of harvested agricultural commodities (2 marks)
- b) Describe the various methods used to assess the quality of harvested agricultural commodities (9 marks)
- c) Explain the factors that affect the quality of harvested agricultural commodities (9 marks)

**QUESTION FIVE (20 MARKS)**

- a) Explain the **TWO** critical processes involved in cooling of harvested agricultural commodities (4 marks)
- b) Explain **FOUR** factors that influence the rate of cooling of harvested agricultural produce (4 marks)
- c) Describe **FOUR** methods that may be applied in the cooling of harvested agricultural produce (12 marks)