



# MACHAKOS UNIVERSITY

University Examinations for 2019/2020 Academic Year

SCHOOL OF AGRICULTURAL SCIENCES

DEPARTMENT OF AGRICULTURAL EDUCATION AND EXTENSION

FOURTH YEAR FIRST SEMESTER EXAMINATION FOR

BACHELOR OF SCIENCE IN AGRICULTURAL EDUCATION AND EXTENSION

BACHELOR OF EDUCATION (SPECIAL NEEDS)

BACHELOR OF EDUCATION (SCIENCE)

AGR 412: POST-HARVEST TECHNOLOGY

DATE: 9/12/2019

TIME: 8.30-10.30 AM

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## INSTRUCTIONS;

Answer question ONE and any other TWO questions

### QUESTION ONE COMPULSORY: (30 MARKS)

- a) Fleshy fruits are divided into two categories based on their ripening patterns as measured by the rates of respiration and ethylene production:
- Name and define the **TWO** categories and in each category give **TWO** examples. (4 marks)
  - With a clearly labelled illustration 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 the importance of measuring the rate of respiration in the postharvest handling of perishable agricultural produce. (4 marks)
  - Explain from a respiratory metabolism and quality perspective the impact of overcoating/overwaxing oranges as a postharvest treatment that is aimed at improving the quality of the produce. (3 marks)
- c) Discuss the fundamental objectives and functions of harvest aids. (5 marks)
- d) Describe hydrocooling as a method used for cooling harvested perishable commodities clearly outlining the merits and demerits of the method. (8 marks)

### QUESTION TWO (20 MARKS)

- a) Modified atmosphere packaging (MAP) is increasingly being used in the storage of harvested fresh perishable agricultural commodities.
- With the aid of well labelled relevant graphical illustrations explain the **TWO** methods used to create modified atmosphere conditions. (4 marks)
  - Explain **FOUR** positive effects of film packaging other than creation of MA condition (4 marks)
- b) Discuss the physiological and biochemical basis for the use of controlled /modified atmosphere storage systems in extending postharvest storage life of perishable commodities. (12 marks)

### QUESTION THREE (20 MARKS)

- a) One of the most important objectives of postharvest technology procedures is maintenance of quality of the harvested agricultural commodities:
- Explain the term quality with respect to harvested agricultural commodities. (2 marks)
  - Discuss the various components of quality with respect to harvested agricultural food crops. (12 marks)
- b) Discuss the expected package requirements for packaging of fresh produce. (6 marks)

### QUESTION FOUR (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 relevant illustrations, discuss the importance and responses of the two categories of fleshy fruits to exogenous ethylene treatment during postharvest handling. (8 marks)
- d) Explain the importance of controlling water loss from harvested perishable commodities. (4 marks)

### QUESTION FIVE (20 MARKS)

- a) Maturity in agricultural commodities can be attained at any stage of development based on consumer needs:
- Name and define the **TWO** categories of maturity encountered in agricultural commodities. (2 marks)
  - Explain the need to measure maturity of agricultural commodities. (4 marks)
  - Explain the requirements for a maturity index. (5 marks)
- b) Discuss the need for rapid cooling of harvested perishable agricultural commodities. (9 marks)