



MACHAKOS UNIVERSITY

University Examinations for 2018/2019 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 EXTENTION

BACHELOR OF EDUCATION (SCIENCE)

AGR 412: POST HARVEST TECHNOLOGY

DATE: 26/7/2019

TIME: 11.00-1.00 PM

INSTRUCTIONS:

Answer *ALL* questions from Section A and any other *TWO* from Section B:

SECTION A: COMPULSORY: (30 MARKS)

QUESTION ONE

- (a) Differentiate between climacteric and non-climacteric fruits and give **TWO** examples in each category (4 marks).
- (b) With the aid of a well-labelled diagrams name and show the various phases of climacteric development in both climacteric and non-climacteric fruits (5 marks).
- (c) Explain the practical implication of each of the following terms in the postharvest handling of harvested agricultural commodities:
 - (i) Relative humidity (2.5 marks)
 - (ii) Dew point (2.5 marks)
- (d) Given that the specific humidity of the atmosphere surrounding stored maize is 0.012 Kg/Kg and that the wet bulb temperature is 18°C, use the Psychrometric Chart provided to determine the:
 - (i) Dry bulb temperature (1 mark)
 - (ii) Relative humidity (1 mark)
 - (iii) Water vapour pressure (1 mark)
- (e) Quality is an important aspect in the marketing of agricultural commodities.

- (i) Explain the physical and chemical alterations that occur during the ripening of fleshy fruits (5 marks).
- (ii) Explain how the alterations in (i) **above** contribute to quality attributes (4 marks).
- (iii) Explain the importance of establishing quality standards in the marketing of perishable commodities (4 marks).

SECTION B: ANSWER ANY TWO QUESTIONS (40 MARKS)

QUESTION TWO (20 MARKS)

- (a) Respiratory metabolism is an important process in harvested agricultural commodities.
 - (i) Discuss the effects of respiration in harvested plant commodities (5 marks).
 - (ii) Discuss the importance of measuring the rate of respiration in these commodities (5 marks).
- (b) Discuss the effects of exogenous ethylene on the respiratory metabolism of climacteric and non-climacteric fruits and on the regulation of its own biosynthesis (10 marks).

QUESTION THREE (20 MARKS)

- (a) The maturity of harvested perishable 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 FOUR (20 MARKS)

- (a) Explain the difference between controlled atmosphere and modified atmosphere storage systems (2 marks)
- (b) Modified atmosphere packaging (MAP) is increasingly being used for the storage of fresh horticultural commodities.
 - (i) With the aid of relevant graphical illustrations explain the **TWO** methods used to create modified atmosphere conditions (4 marks)
 - (ii) Explain **FOUR** positive effects of film packaging other than creation of MA conditions (4 marks)

- (c) Discuss the physiological and biochemical basis for the use of controlled /modified atmosphere storage systems for extending postharvest storage life of perishable commodities (10 marks)

QUESTION FIVE (20 MARKS)

- (a) With reference to tomato as a model fruit, describe:
- (i) the symptoms and causes that translate to postharvest loss (6 marks).
 - (ii) the measures taken to alleviate the postharvest problems (4 marks).
- (b) Discuss the factors that lead to postharvest loss of harvested horticultural commodities in Kenya (10 marks).