



NAMIBIA UNIVERSITY
OF SCIENCE AND TECHNOLOGY

FACULTY OF HEALTH, NATURAL RESOURCES AND APPLIED SCIENCES
SCHOOL OF AGRICULTURE AND NATURAL RESOURCES SCIENCES
DEPARTMENT OF AGRICULTURAL SCIENCES AND AGRIBUSINESS

QUALIFICATIONS: BACHELOR OF SCIENCE IN HORTICULTURE	
QUALIFICATIONS CODE: 07BHOR	LEVEL: 7
COURSE CODE: PPT720S	COURSE NAME: POSTHARVEST PHYSIOLOGY AND TECHNOLOGY
DATE: NOVEMBER 2024	PAPER: 1
DURATION: 3 HOURS	MARKS: 100

FIRST OPPORTUNITY EXAMINATION QUESTION PAPER	
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MODERATOR:	PROF. VICTOR NTULI

INSTRUCTIONS
<ol style="list-style-type: none">1. Answer all the questions.2. Write neatly and clearly.3. Mark all answers clearly with their respective question numbers.4. All written work MUST be done in blue or black ink.5. No books, notes and other additional aids are allowed.

PERMISSIBLE MATERIALS

1. Calculator
2. Examination paper
3. Examination script

THIS QUESTION PAPER CONSISTS OF 4 PAGES
(Excluding This Front Page)

Section A: Multiple choice questions**[15 marks]**

Evaluate the statements below and select the most appropriate answer or phrase from the given possibilities. Fill in the appropriate letter next to the number of the correct statement/phrase on your ANSWER SHEET.

1. Which of the following is a naturally occurring gaseous hormone?
 - a) IAA
 - b) Zeatin
 - c) 2Ip
 - d) Ethylene
2. A high concentration of ethylene is present in _____
 - a) Young leaves
 - b) Meristic regions
 - c) Buds
 - d) Ripening fruits
3. The precursor of ethylene is _____
 - a) Tryptophan
 - b) Serine
 - c) Methionine
 - d) Cysteine
4. Individual shrink wrapping for packaging is generally most suitable for _____
 - a) Climacteric commodities
 - b) Semi-climacteric commodities
 - c) Non-climacteric commodities
 - d) Both (a) and (b)
5. The browning of fresh potato cut surface is due to _____
 - a) Non-enzymatic browning
 - b) Mallard reaction
 - c) Fermentation
 - d) Enzymatic browning
6. In most fruits and vegetables, changes in colour are due to the degradation of chlorophyll. Which of the following factors is not responsible for the degradation of chlorophyll?
 - a) pH
 - b) Oxidation
 - c) Enzymes
 - d) Malic acid
7. When is it possible to harvest a fruit or vegetable?
 - a) At physiological maturity
 - b) Ripening
 - c) Senescence

- d) After 3 months
- 8. Fruit stem end rot is one of the most devastating diseases affecting fruits post-harvest. What is the causative agent of fruit stem end rot?
 - a) Too many auxins in the plant
 - b) Fungal infection
 - c) Harvesting too early
 - d) Enzymatic browning
- 9. Crops which have higher moisture content generally have
 - a) Poorer storage characteristics
 - b) Taste nice
 - c) Low rates of respiration
 - d) Are good for the market
- 10. Which organization is responsible for regulating all standards related to food safety in Namibia?
 - a) Ministry of Health and Social Services.
 - b) Ministry of Agriculture, Water and Land Reform.
 - c) Namibia Standard Institute.
 - d) Ministry of Trade and Industry.
- 11. Postharvest sanitation includes:
 - a) Proper sorting and culling of products.
 - b) Enforcing good worker hygiene.
 - c) Excluding all animals from the packing house.
 - d) All of the above.
- 12. Which of the following are the limitations of controlled atmosphere storage?
 - a) Causes black heart in potatoes.
 - b) Slow down the ripening in bananas, tomatoes, and other produce.
 - c) Sweeten sweet potatoes.
 - d) Degreen cabbages and lettuce.
- 13. Ideal packaging should include the following:
 - a) Sufficient mechanical strength.
 - b) Unaffected by moisture content.
 - c) Allow rapid cooling of the contents.
 - d) All of the above.
- 14. The FIFO (First-In First-Out) system for inventory control means
 - a) The oldest inventory items are sold or used first.
 - b) The oldest inventory items are sold or used for a few days before their expiry date.
 - c) The new inventory items are sold or used immediately.
 - d) The new inventory items are sold or used for a few days before their expiry date.
- 15. A pumpkin is ripe when
 - a) It is soft to the touch and emits a sweet aroma.
 - b) It has a hard skin and a deep, rich color.

- c) They are firm and green.
- d) Kernels are fully formed, and the husks dry out.

Section B: True/False questions

[15 marks]

Evaluate the statements below and indicate whether the statement is true or false. Write the word 'True' or 'False' next to the corresponding number on your ANSWER SHEET.

1. Botanically, fruits contain seeds and come from the flower of a plant.
2. Simple fruits develop from a single flower with multiple ovaries.
3. Temperature influences all physiological and biochemical processes related to plant growth and yield.
4. Vegetables are generally tart in flavor.
5. Low humidity may cause browning of leaf edges on plants with thin leaves or leaflets.
6. Citrus fruits are high in antioxidants.
7. Berries are high in Vitamin C.
8. The fibrous mesocarp and leathery exocarp are typically removed before coconuts are sold in stores.
9. Establishing critical limits in HACCP involves setting the maximum and minimum values for various food safety parameters.
10. Food processors do not need to consider customer perspectives when determining product quality.
11. The lower the light intensity, the lower the ascorbic acid content of plant tissues.
12. Natural colour pigments are affected by food processing.
13. Preservation is the way of keeping produce in a state that will elongate the shelf life.
14. Citrus and mango fruits produced in full sun generally a higher Total Soluble Solids.
15. Less than 5 % of water absorbed in the plant system is utilized for the development of different plant components.

Section C: short/long questions

[70 marks]

Please answer ALL the questions in this section.

Short questions

[35 marks]

1. Mention the three basic parts of a carpel in a flower. [3]
2. Define fruits and vegetables from the botanical perspective. [4]
3. Mention the three types of damages in agricultural produce. [3]
4. List the four physiological processes in agricultural produce that are regulated by light. [4]
5. What are the four factors that affect the quality of vegetables during harvesting? [4]

6. Explain the types of carbohydrates found in fruits and vegetables and their role in sweetness, texture, and structure. [8]
7. As the newly appointed manager of the Mashare Irrigation Scheme, you are responsible for spinach production. What strategies would you recommend for harvesting and handling spinach to maintain its quality, given that the scheme lacks refrigerated storage facilities? [9]

Long questions

[35 marks]

8. Imagine you are the Food Safety Manager at Namibia Fresh Produce. A shipment that arrived late yesterday is under your review, and you discover that the strawberries in the shipment have started to decay. Describe and justify the steps you would take in such a situation. [14]
9. Explain what ethylene is, how it is synthesized in plants, and describe its role in the ripening and aging of agricultural produce. [21]

END OF QUESTION PAPER