



**NAMIBIA UNIVERSITY
OF SCIENCE AND TECHNOLOGY**

FACULTY OF HEALTH, NATURAL RESOURCES AND APPLIED SCIENCES

DEPARTMENT OF AGRICULTURE AND NATURAL RESOURCES SCIENCES

QUALIFICATION : BACHELOR OF HORTICULTURE	
QUALIFICATION CODE: 07BHOR	LEVEL: 7
COURSE CODE: PPT720S	COURSE NAME: POSTHARVEST PHYSIOLOGY AND TECHNOLOGY
DATE: NOVEMBER 2022	
DURATION: 3 HOURS	MARKS: 100

FIRST OPPORTUNITY EXAMINATION QUESTION PAPER	
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INSTRUCTIONS
<ol style="list-style-type: none">1. Answer ALL the questions.2. Write clearly and neatly.3. Number the answers clearly.

PERMISSIBLE MATERIALS

1. Examination question paper
2. Answering book

THIS QUESTION PAPER CONSISTS OF 4 PAGES (Excluding this front page)

Section A: Multiple choice questions (15 marks)

1. Which of the following is a non-Climacteric fruit?
 - A. Pineapple
 - B. Litchi
 - C. Grape
 - D. All of these

2. Which statement about postharvest losses is true for fruit and vegetables?
 - A. Postharvest losses are caused by what happens to the crop before, during and after harvest
 - B. Postharvest losses are only caused by how the fruits and vegetables are handled after harvesting
 - C. Postharvest losses are caused by lack of refrigeration facilities at the farm
 - D. Postharvest losses are caused by failure by the farmer to treat the produce with ethylene

3. The texture of fruits and vegetables is controlled by
 - A. Nitrogen
 - B. Calcium
 - C. pH
 - D. Phosphorous
 - E. None of the above

4. For better post-harvest quality, the cut flowers should be harvested during
 - A. Evening hours
 - B. Early morning hours
 - C. Noon time
 - D. Mid-day

5. Waxing of fruits is done mainly to reduce
 - A. Transpiration
 - B. Respiration
 - C. Ripening
 - D. Transpiration and respiration

6. The browning of fresh potato cut surface is due to
 - A. Non-enzymatic browning
 - B. Mallard reaction
 - C. Fermentation
 - D. Enzymatic browning

7. Symptoms associated with chilling injury are
 - A. Surface pitting

- B. Internal discoloration
 - C. Water-soaked tissues
 - D. Failure to ripen
 - E. All of the above
8. The major indicator and a useful guide to predict the potential storage life of the fruits and vegetables is
- A. Water uptake rate
 - B. Rate of ascorbic acid loss
 - C. Rate of mineral uptake
 - D. Respiration rate
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. In most fruits and vegetables, changes in colour is due to degradation of chlorophyll. Which of the following factors is not responsible for degradation of chlorophyll?
- A. pH
 - B. Oxidation
 - C. Enzymes
 - D. Malic acid
11. Which pigments are responsible for the red colour in fruits and vegetables?
- A. Chlorophyll
 - B. Carotenoids, Anthocynins, Batalains
 - C. Tannins, carotenoids
 - D. Xanthones, Batalains, chlorophyll
 - E. Carotenoids alone
12. When can a fruit or vegetables be harvested
- A. At physiological maturity
 - B. Ripening
 - C. Senescence
 - D. After 3 months
13. 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 much auxins in the plant
 - B. Fungal infection
 - C. Harvesting too early
 - D. Enzymatic browning

14. In pre-cooling, heat is mostly removed by;
- Convection
 - Conduction
 - Radiation
 - None of these
15. Bitterness in citrus juice is due to
- Sugar
 - Acid
 - Glucosides
 - Vitamins

Section B: Answer all questions (85 MARKS)

- Differentiate between the following terms, giving examples
 - Maturity and ripeness, in development of fruits and vegetables. (4)
 - Controlled atmosphere and modified storage atmosphere (4)
 - With the help of a graph (s), distinguish between climacteric and non-climacteric fruits in terms of growth, respiration and ethylene production (8)
- Using a named fruit or vegetable, explain the pre-harvest and harvest factors affecting its quality after harvest (15)
- Mention two main physiological activities that take place in growing plants and harvested produce which have implication on how long they can be kept? (2)
- Explain briefly six (6) strategies of controlling post-harvest losses in fruits and vegetables produce. (12)
- A Food Safety Manager at Namibia Fresh Produce Manager is reviewing the shipment that came in late yesterday. She noticed that the strawberries have decayed. What should she do? (1)
- Assume you have been appointed as a manager to oversee the operations of Mashare Irrigation Scheme responsible for production of spinach. Make your best recommendation for harvesting and handling harvested spinach assuming the irrigation scheme lack refrigerated storage facilities? (4)
- Temperature control has been mentioned throughout the course as the number one tool that the postharvest horticulturist has at his disposal to maintain the quality of fresh flowers, fruits and vegetables. Briefly describe how temperature management relates to the following.
 - Postharvest pathogens: (2)
 - Physiological disorders: (2)
 - Water loss: (2)
 - Respiration: (2)

8. a. List four (4) parameters that are used to determine the quality of fruits and vegetables. (4)
b. Describe the factors that determine the quality fruits, vegetables, and flowers? (6)
9. Describe the biochemical changes that occur in fruits during ripening that are responsible for
 - a. Texture (3)
 - b. Taste (3)
 - c. Colour (3)
10. Every year, at Mashare Irrigation Scheme, tomatoes that are produced get spoiled by postharvest pathogens making them unfit for the market or human consumption. Imagine yourself as a horticulturalist responsible for production of tomatoes and you are tasked with the responsibility of ensuring the reduction of post-harvest losses of tomatoes produced at the scheme
 - a. List at least two pathogens and the postharvest diseases they cause on tomatoes (2)
 - b. Design an integrated management strategy that can be used to address post-harvest disease problems in a supply chain? (6)