



**MACHAKOS UNIVERSITY**  
University Examinations for 2022/2023 Academic Year

**SCHOOL OF AGRICULTURE, ENVIRONMENT AND HEALTH SCIENCES**  
**DEPARTMENT OF AGRICULTURAL SCIENCES**  
**SECOND YEAR FIRST SEMESTER EXAMINATION FOR**  
**BACHELOR OF SCIENCE AGRICULTURAL EDUCATION AND EXTENSION**  
**BACHELOR OF EDUCATION (SCIENCE)**  
**BACHELOR OF EDUCATION (SPECIAL NEEDS)**  
**HOR 211: PRINCIPLES OF HORTICULTURAL PRODUCTION**

**DATE:**

**TIME:**

---

**INSTRUCTIONS:** Answer **Question ONE (Compulsory)** and Any other **Two** Questions.

**QUESTION ONE (COMPULSORY) (30 MARKS)**

- a) Distinguish phase I and phase II of vernilization (2 marks)
- b) Explain the two types of agricultural inputs that are excluded in organic horticultural farming (2 marks)
- c) Explain the relationship between porosity and bulk density of a growing media (2 marks)
- d) Explain four chemical characteristics that affect quality of irrigation water (4 marks)
- e) Describe four ways in which rhythm is achieved during landscaping (4 marks)
- f) Explain four benefits of growing horticultural crops in a greenhouse (4 marks)
- g) Describe the modified leader system of training horticultural crops (4 marks)
- h) Explain four principles of pruning (4 marks)
- i) Explain four characteristics of commercial horticultural farming (4 marks)

**QUESTION TWO (20 MARKS)**

- a) Describe the experiment that was conducted by Garner and Allard (1920) that led to the discovery of the effect of photoperiodism on crop production. (10 marks)
- b) Explain five advantages of using perlite in production of horticultural crops (10 marks)

**QUESTION THREE (20 MARKS)**

- a) Discuss four ways in which temperature control is achieved in the greenhouse (10 marks)
- b) With the aid of a well-labelled diagram, describe the recovery system of drip irrigation (10 marks)

**QUESTION FOUR (20 MARKS)**

- a) Discuss the requirements of the following EU directives that govern exports of fresh horticultural produce to the European Union
  - i. Regulation 1107/2009/EEC (5 marks)
  - ii. Regulation 396/2005/EC (5 marks)
- b) Discuss four factors that affect orientation of a greenhouse (10 marks)

**QUESTION FIVE (20 MARKS)**

- a) Describe five features of market gardening (10 marks)
- b) Discuss five farm-based requirements by Global-GAP (10 marks)