



# **MACHAKOS UNIVERSITY**

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

**SCHOOL OF AGRICULTURE, ENVIRONMENT AND HEALTH SCIENCES**

**DEPARTMENT OF AGRICULTURAL SCIENCES**

**THIRD YEAR SECOND SEMESTER EXAMINATION**

**BACHELOR OF SCIENCE (AGRICULTURAL EDUCATION AND EXTENSION)**

**AGR422: PRINCIPLES OF ORGANIC FARMING AND CONSERVATION**

**AGRICULTURE**

**DATE:**

**TIME:**

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**INSTRUCTION:** Answer Question One (Compulsory) and Any Other Two Questions.

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

- a) Distinguish between the following terms
- i. Traditional agriculture and conservation agriculture (2 marks)
  - ii. Permaculture and biodynamic agriculture (2 marks)
  - iii. Nutrient efficiency ratio (NER) and Agro-physiological efficiency (APE) (2 marks)
- b) Explain four policy initiatives that the International Federation of Organic Agriculture Movements (IFOAM), needs to consider to ensure the successful implementation of organic and conservation agriculture (4 marks)
- c) Explain four benefits a farmer stands to gain by adopting conservation agriculture (2 marks)
- d) Explain four reasons why Nutrient Use Efficiency (NUE) in crops is important in organic and conservation agriculture (2 marks)

- e) With a specific example, explain two reasons why farmers are encouraged to use Arbuscular mycorrhizal fungi (AMF) when planting crops (2 marks)
- f) Explain two limitations in each of the following cropping systems in a conservation agriculture
- i. Alley cropping (2 marks)
  - ii. Silvopasture (2 marks)
- g) Citing specific two examples in each case, explain three principles of conservation agriculture (6 marks)
- h) Explain four principles of organic agriculture that are crucial to its success in Kenya (4 marks)

### **QUESTION TWO (20 MARKS)**

- a) Explain the impacts of the three crucial historical steps in development of organic agriculture (12 marks)
- b) Explain four solutions to challenges faced by farmers in certification of organic crop farming (8 marks)

### **QUESTION THREE (20 MARKS)**

Explain five reasons each why farmers are encouraged to adopt the following cropping systems in organic and conservation agriculture farming

- i. Relay farming (5 marks)
- ii. Agroforestry (5 marks)
- iii. Composting (5 marks)
- iv. Urban and peri-urban farming (5 marks)

### **QUESTION FOUR (20 MARKS)**

- a) Explain five ways in which farmers can enhance Nutrient Use Efficiency (NUE) in crop production for high yield under conservation agriculture (10 marks)
- b) Explain five reasons why farmers would be advised to adopt crop-livestock systems in their farms (10 marks)

**QUESTION FIVE (20 MARKS)**

- a) Citing specific examples of practices, explain five environmentally sustainable strategies in crop protection (10 marks)
- b) Discuss five challenges faced by farmers while converting from conventional farming to organic and conservation agriculture (10 marks)