



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:

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)