



(The University of choice)

**MASINDE MULIRO UNIVERSITY OF
SCIENCE AND TECHNOLOGY
(MMUST)**

**UNIVERSITY EXAMINATIONS
2023/2024 ACADEMIC YEAR**

**YEAR TWO SEMESTER TWO EXAMINATIONS
(Main examination)**

**BACHELOR OF SCIENCE IN AGRICULTURAL ECONOMICS AND
RESOURCE MANAGEMENT**

COURSE CODE: AGR 202

COURSE TITLE: PRINCIPLES OF PRECISION AGRICULTURE

DATE: 9TH April, 2024

TIME: 3:00-5:00 PM

Instructions: This paper consists of 5 questions

Section A is compulsory, Answer any 2 questions from Section B

Observe the regulations governing clean drawing production

SECTION A
Question One (25 marks)

- (a) Briefly explain the difference between Geographical Positioning System (GPS) and Geographical Information System (GIS) **(4 marks)**
- (b) State and describe the 4Rs concept in nutrient management within an agricultural system **(6 marks)**
- (c) Outline how precision agriculture can be used to enhance agricultural productivity in the tropics **(7 marks)**
- (d) With the aid of a diagram, state the elements of a precision agriculture control system **(4 marks)**
- (e) With the aid of examples, differentiate between spatial and temporal sensing **(4 marks)**

SECTION B
Question Two (15 marks)

- (a) Outline how GPS can be used in the following agricultural operations
 - i. Tractor guidance
 - ii. Cropduster targeting
 - iii. Livestock tracking
 - iv. Yield monitoring
 - v. Soil sampling**(7.5 marks)**
- (b) Define Site Specific Land Management (SSLM), hence briefly discuss the five components of SSLM **(7.5 marks)**

Question Three (15 marks)

- (a) Outline and briefly discuss the components of a Site Specific Weed Management (SSWM) system **(5 marks)**
- (b) Differentiate between an open and closed loop feedback control system for precision crop production **(4 marks)**
- (c) Briefly describe the following processes in a precision irrigation system
 - i. data acquisition
 - ii. interpretation
 - iii. control
 - iv. evaluation.**(6 marks)**

Question Four (15 marks)

- (a) State and briefly discuss the challenges that would be faced when incepting a precision agriculture system **(8 marks)**
- (b) Describe the principle of remote sensing and hence state the categories of remote sensing **(7 marks)**

Question Five (15 marks)

- (a) With the aid of a sketch, describe the elements of a multilayer design framework for intelligent agricultural machines. **(6 marks)**
- (b) Define Site Specific Nutrient Management (SSNM) and hence briefly discuss its approaches **(9 marks)**

