20

(University of Choice)

# MASINDE MULIRO UNIVERSITY OF SCIENCE AND TECHNOLOGY

## UNIVERSITY EXAMINATIONS

## 2021/2022 ACADEMIC YEAR

**SECOND SEMESTER MAIN EXAMINATION EXAMINATIONS FOR THE DOCTOR OF PHILOSOPHY IN SUSTAINABLE AGRICULTURAL SYSTEMS**

**COURSE CODE: SAS 906**

**COURSE TITLE: ADVANCES IN SUSTAINABLE AGRICULTURE**

**DATE: 25TH APRIL, 2022** **TIME: 2-5 PM**

**Instructions to candidates**

**Answer ANY Three (3) Questions**

*MMUST observes ZERO tolerance to examination cheating*

*This paper consists of TWO (2) printed pages. Please turnover.*

**Question 1**

a) Define a sensor **(2 marks)**

b) Differentiate between an analogue and a digital sensor **(2 marks)**

c) Name and describe any eight types of sensors **(16 marks)**

**Question 2**

a) Give five (5) advantages of digital sensors in Agriculture **(5 marks)**

b) Discuss the application of sensors in:

i. Crop production

ii. Animal production

iii. Soil management **(15 marks)**

**Question 3**

a) Define biotechnology **(2 marks)**

b) Give any contributions of biotechnology to Agriculture **(6 marks)**

c) Define and explain the applications of these three biotechnology tools in Agriculture

i. PCR

ii. Sequencing

iii. Gene editing **(12 marks)**

**Question 4**

a) Differentiate between traditional and modern irrigation **(2 marks)**

b) List any two (2) methods of:

i. Traditional irrigation

ii. Modern irrigation Traditional irrigation **(4 marks)**

c) Define variable rate irrigation (VRI) **(2 marks)**

d) Give three (3) reasons for adoption of VRI **(6 marks)**

e) List six (6) advantages of VRI **(6 marks)**