# MERU UNIVERSITY OF SCIENCE AND TECHNOLOGY

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**University Examinations 2024/2025**

SECOND YEAR, FIRST SEMESTER EXAMINATION FOR THE DEGREE OF BACHELOR OF SCIENCE IN AGRICULTURE, BACHELOR OF SCIENCE IN AGRICULTURAL EDUCATION AND EXTENSION, BACHELOR OF SCIENCE IN EDUCATION SCIENCE

**AAA 3200: PRINCIPLES OF CROP PRODUCTION**

**DATE: DECEMBER 2024** **TIME: 2 HOURS**

**INSTRUCTIONS:**

1. Answer Question ONE, and any other TWO

**QUESTION ONE (30 MARKS)**

a) Outline the key constraints of the following farming systems:
   i. Irrigated farming system (3 marks)
   ii. Rainfed farming systems (3 marks)
   iii. Urban farming systems (3 marks)
b) Describe the biological characteristics that are used to define soil health (5 marks)
c) Explain the importance of the following tillage practices in crop production:
   i. Primary tillage (3 marks)
   ii. Secondary tillage (3 marks)
d) Explain the necessity of using certified planting materials for crops that are vegetatively propagated (5 marks)
e) List the portable equipment that are used to measure soil moisture, chlorophyll index, light, soil pH, salinity of soil (5 marks)

**QUESTION TWO (20 MARKS)**

Designing appropriate irrigation during crop production requires a clear understanding of crop responses under varying soil moisture.

a) Outline the soil and plant based methods of measuring water stress in crops (10 marks)
b) Using examples, explain how moisture sensitive stages of crops influence irrigation timing

(10 marks)

**QUESTION THREE (20 MARKS)**

There is a concerted effort globally to move towards precision crop production where crops are provided with nutrient amounts that they require.

a) Discuss how this can be achieved for nitrogen in Kenya (15 marks)
b) Explain how fertilizer use efficiency can be increased under high rainfall conditions (5 marks)

**QUESTION FOUR (20 MARKS)**

a) Define the following terms and explain how they influence flowering of crops:
   i. Photoperiodism (10 marks)
   ii. Vernalization (5 marks)
b) How can excessive solar radiation be reduced during field crop production? (5 marks)