



KIBABII UNIVERSITY

**UNIVERSITY EXAMINATIONS
2022/2023 ACADEMIC YEAR**

**THIRD YEAR SECOND SEMESTER
MAIN EXAMINATIONS**

**FOR THE DEGREE OF
BACHELOR OF SCIENCE AGRICULTURE BIOTECHNOLOGY**

COURSE CODE: AEN 322

COURSE TITLE: IRRIGATION AND DRAINAGE

DATE: 25TH APRIL 2023

TIME: 2 – 4 PM

INSTRUCTIONS TO CANDIDATES

Answer **Question 1 (Compulsory)** and any other **TWO** questions

This paper consists of **3** printed pages. Please Turn Over



KIBU observes ZERO tolerance to examination cheating

QUESTION ONE 30 MARKS COMPULSORY

- a) Define following irrigation terms (6 marks)
 - i. Irrigation scheduling
 - ii. Evaporation
 - iii. Transpiration
- b) State four ways of applying water to crops (4marks)
- c) Outline five sources of excess water on the farm (5marks)
- d) Illustrate two types of sub-surface irrigation techniques (4marks)
- e) Highlight four riparian rights and responsibilities(4marks)
- f) Explain the main functions of the Hooghoudt equation (4marks)
- g) A soil is sampled from the field and weighed 180 g. The soil is then dried and the weight is 130 g. Calculate the gravimetric water content. (3 marks)

QUESTION TWO: 20 MARKS

- a. Describe the different types of irrigation efficiency (10 marks)
- b. A stream size of 180 lit /sec was released from the diversion headwork to irrigate a land of area 1.8 hectares. The stream size when measured at the delivery to the field channels is 150lit/sec. The stream continued for h hours. The effective root zone depth is 1.80m. The application losses in the field are estimated to be 450m³. The depth of water penetration was 1.80m and 1.20m at the head and tail of the run respectively. The available water holding capacity of the soil is 21cm/m and irrigation was done at 60% depletion of Am. The stream size delivered to the plot was 100 lit/sec. Calculate various efficiencies of the system (10marks)

QUESTION THREE: 20 MARKS

- a. Discuss five factors to be considered when estimating irrigation water (10marks)
- b. Explains five goals of the National Water Services Strategy in Kenya (10 marks)

QUESTION FOUR: 20 MARKS

- a. Describe five methods of sub-surface drainage (10 marks)
- b. Discuss the positive and negative environmental aspects of subsurface drainage.

(10 marks)

QUESTION FIVE: 20 MARKS)

- a. Discuss the different components of water requirement equation for the crop **(10 mark)**
- b. What measures are recommended to reduce the impact of drained water from farmland on the environment? **(10 marks)**