



# UNIVERSITY OF EMBU

2021/2022 ACADEMIC YEAR

SECOND SEMESTER EXAMINATIONS

FOURTH YEAR EXAMINATION FOR THE DEGREE OF BACHELOR OF SCIENCE  
IN AGRICULTURE/ HORTICULTURE

AWM 304: IRRIGATION AND WATER MANAGEMENT

DATE: APRIL 7, 2022

TIME: 11.00 – 1.00PM

INSTRUCTIONS:

Answer Question ONE and ANY Other TWO Questions

QUESTION ONE ( 30 MARKS)

- a) Explain how the soil texture is related to water infiltration. (5marks)
- b) Explain the relationship between the root zone, water table and drainage. (5 marks)
- c) A 20 m by 30 m plot of land is to be irrigated with 14 mm of water. How many litres of water are required? (5marks)
- d) Explain the effect of rainfall distribution over a period of days on the amount of water in the soil? (5marks)
- e) With the use of a diagram explain the water take up from a canal for a furrow irrigation water system. (5marks)
- f) Discuss three factors that affect the evapotranspiration of a planted area. (5marks)

QUESTION TWO (20 MARKS)

- a) The water in a rice field must be maintained at a certain depth during flooding. By considering infiltration and evaporation, discuss how this is managed. (10 marks)
- b) The 142day rice variety is to be grown in Mwea irrigation scheme. Through close scrutiny of the developmental stages of rice and its requirements, determine the amount of water required for the entire cycle from land preparation to harvesting. (10marks)



ISO 27001:2013 Certified

Knowledge Transforms



ISO 9001:2015 Certified

**QUESTION THREE (20 MARKS)**

- a) Discuss the three main components of a sprinkler irrigation system (9 marks)
- b) A plot of land measuring 15m by 30 m is to be irrigated with 6 mm of water. The effectiveness of water application is 0.7 and the diameters of the main and laterals are 25 and 13 mm, respectively.
- i) Calculate the quantity of water that must be supplied to the plot. (4 marks)
  - ii) The velocity of water in both pipes if irrigation is completed in one hour. (4 marks)
  - iii) Explain the advantages of irrigating early in the morning or late in the evening. (3 marks)

**QUESTION FOUR (20 MARKS)**

- a) Discuss two advantages and two disadvantages of furrow irrigation schemes. (10 marks)
- b) Discuss furrow irrigation system design with respect to;
- i) Furrow spacing (3 marks)
  - ii) Furrow slopes (3 marks)
  - iii) Furrow length (4 marks)

**QUESTION FIVE (20 MARKS)**

- a) Discuss the factors that cause the rate of evapotranspiration of a region to be different from those of another region other than the soil and crop factors. (12 marks)
- b) Explain the processes of percolation, infiltration and run-off with respect to water application rates during rainfall or irrigation period. (8 marks)

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