



TECHNICAL UNIVERSITY OF MOMBASA

Faculty of Engineering & Technology

DEPARTMENT OF BUILDING & CIVIL ENGINEERING

UNIVERSITY EXAMINATION FOR BACHELOR OF SCIENCE IN CIVIL
ENGINEERING
[Institutional Based Programmes]

ECE 2413: IRRIGATION ENGINEERING II

END OF SEMESTER EXAMINATION

SERIES: APRIL 2013

TIME: 2 HOURS

Instructions to Candidates:

You should have the following for this examination

- Answer Booklet
- Pocket Calculator

This paper consists of **FIVE** questions. Answer question **ONE** and any other **TWO** questions

Maximum marks for each part of a question are as shown

This paper consists of **TWO** printed pages

Question One

- a) Describe the components of an irrigation system. (5 marks)
- b) Name or describe the factors which govern the necessity of irrigation. (4 marks)
- c) Describe the merits and demerits of irrigation. (10 marks)
- d) Describe the **THREE** resources of irrigation. (3 marks)
- e) Describe the types of irrigation available to the farmer. (3 marks)

- f) Describe the objectives of canal lining. (5 marks)

Question Two

- a) Describe the factors affecting type of lining in irrigation canal systems. (5 marks)
- b) Describe the important considerations when suitability of cross-drainage works are being considered (15 marks)

Question Three

- a) Describe the factors affecting the water requirement of crops. (14 marks)
- b) Describe the types of consumptive use in irrigation. (6 marks)

Question Four

- a) 10m³/s of water is declined to a 32 hectare field, for 4 hours. Soil proving after the irrigation indicates that 0.3m of water has been stored in the root zone. Compute the water application efficiency. (5 marks)
- b) A stream of 130 litres/s was diverted from a canal and 100l/s were diameter to the field. An area of 1:6 hectares was irrigated in 8 hours. The effective depth of rootzone was 1.7m. The runoff loss in the field was 420m³. The depth of water penetration varied similarly from 1.7m at the head end of the field to 1.1m at the fail end. Available moisture holding capacity of the soil is 20cm per metre depth of soil. It is required to determine:
- (i) The water application efficiency (2 marks)
 - (ii) Water application efficiency (3 marks)
 - (iii) Water storage efficiency (5 marks)
 - (iv) Water distribution efficiency (5 marks)

Irrigation was started at a moisture extraction level of 50% of the available moisture.

Question Five

The monthly consumptive use values for Paddy are tabulated in the figure below:

- (i) Calculate the total consumptive use (8 marks)
- (ii) Calculate the average monthly consumptive use (10 marks)
- (iii) Calculate the peak monthly consumptive use (2 marks)

Date	Rice (Loan Soil) in cm ³
June 1 – 30	26.69
July 1 – 12	8.76
July 13 – 31	14.38
Aug 1 – 31	22.73
Sept 1 – 30	21.29
Oct 1 – 31	25.50
Nov 1 – 24	15.06