



# TECHNICAL UNIVERSITY OF MOMBASA

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FACULTY OF ENGINEERING AND TECHNOLOGY

DEPARTMENT BUILDING AND CIVIL ENGINEERING

**UNIVERSITY EXAMINATION FOR:**

**BSC IN CIVIL ENGINEERING**

**ECE 2405: IRRIGATION ENGINEERING I**

**END OF SEMESTER EXAMINATION**

**SERIES: APRIL 2016**

**TIME: 2 HOURS**

**DATE: 10 May 2016**

## **Instructions to Candidates**

You should have the following for this examination

*-Answer Booklet, Drawing Instruments, Scientific calculator, examination pass and student ID*

This paper consists of five questions. Attempt question ONE (Compulsory) and any other TWO questions.

## **Question One**

- a) Enumerate or outline the four stages of irrigation Engineering **(5 marks)**
- b) Outline three factors which govern the necessity of irrigation **(7 marks)**
- c) Give three reasons why charges must be levied on the farmers in an irrigation scheme **(5 marks)**
- d) A stream of 135 l/s was diverted from a canal and 100 l/s were delivered to the field. An area of 1.6 ha was irrigated in eight hours. The effective depth root zone was 1.8 m. The runoff loss in the field was 4.32 cm. The depth of water penetration varied linearly from 1.8 m at the head end to 1.2 m at the tail end. Available moisture holding capacity of the soil is 20 cm per metre depth of soil

Determine:

- i. The water conveyance efficiency **(3 marks)**

- ii. Water application efficiency (3 marks)
- iii. Water storage efficiency (3 marks)

iv. Water distribution efficiency

Irrigation was started at a moisture extraction level of 50% of the available moisture.  
(4 marks)

### Question Two

- a) Outline three possibilities of conservation of rain water under unirrigated conditions (5 marks)
- b) Outline three factors which the amount of water infiltrating into the soil is a function of. (4 marks)
- c) Describe inundation canals (11 marks)

### Question Three

- a) Describe three types of lining that are available (5 marks)
- b) Describe the four merits of canal lining (15 marks)

### Question Four

- a) Describe three demerits of irrigation (6 marks)
- b) Outline the three resources of irrigation (6 marks)
- c) Describe three types of irrigation (8 marks)

### Question Five

- a) Outline the three types of lining in irrigation canals (6 marks)
- b) A stream of 135l/s was diverted from a canal and 100 l/s were delivered to the field. An area of 1.6ha was irrigated in eight hours. The effective depth root zone was 1.8m. The runoff loss in the field was 432m<sup>3</sup>.the depth of water penetration varied linearly from 1.8m at the head end to 1.2m at the tail end. Available moisture holding capacity of the soil is 20cm per metre depth of soil

Determine:

- v. The water conveyance efficiency (4 marks)
- vi. Water application efficiency (4 marks)
- vii. Water storage efficiency (6 marks)

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