



TECHNICAL UNIVERSITY OF MOMBASA
**Faculty of Engineering &
Technology**

DEPARTMENT OF BUILDING & CIVIL ENGINEERING

UNIVERSITY EXAMINATION FOR DECREE IN:

BACHELOR OF SCIENCE IN CIVIL ENGINEERING (BSCE IV S2)

ECE 2413: IRRIGATION ENGINEERING II

END OF SEMESTER EXAMINATION

SERIES: APRIL 2015

TIME ALLOWED: 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 (COMPULSORY)** and any other **TWO** questions

Maximum marks for each part of a question are as shown

Use neat, large and well labeled diagrams where required

This paper consists of **TWO** printed pages

Question One (Compulsory)

- a) To make an irrigation system as efficient as possible, the heart of most irrigation systems must be selected to match 3 requirements, outline them **(5 marks)**
- b) Before selecting an irrigation pump, a complete inventory of the conditions under which the pump will operate must take place. Outline the inventory. **(5 marks)**
- c) Describe as to how the flow rate and total dynamic head are determined **(5 marks)**
- d) Describe the total head. What is suction head **(10 marks)**
- e) What is cavitation? **(5 marks)**

Question Two

- a) Describe the operating characteristics of deep well turbine pumps:
- b) Define water salinity
- c) (i) Define sodicity in the soil and
(ii) Describe how sodic soils are characterized by.
- d) Describe how to improve saline soils

Question Three

- a) (i) Define a freeboard in irrigation systems.
(ii) Describe the purpose of a freeboard
- b) Describe a trapezoidal cross-section complete with a diagram
- c) Describe the materials mostly used for canal lining **(11 marks)**

Question Four

- a) Describe what are drop structures complete with a diagram **(5 marks)**
- b) Describe the most commonly used water measuring structures in irrigation systems **(15 marks)**

Question Five

Describe canal erosion in irrigation system and describe what is required to reduce the same **(20 marks)**