THE MOMBASA POLYTECHNIC UNIVERSITY COLLEGE

(A Constituent College of JKUAT)

(A Centre of Excellence)

Faculty of Engineering & Technology

DEPARTMENT OF BUILDING & CIVIL ENGINEERING

UNIVERSITY EXAMINATION FOR:
BACHELOR OF SCIENCE IN CIVIL ENGINEERING

ECE 2405: IRRIGATION ENGINEERING II

END OF SEMESTER EXAMINATION
SERIES: DECEMBER 2012
TIME: 2 HOURS

Instructions to Candidates:
You should have the following for this examination
- *Answer Booklet*

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
This paper consists of **TWO** printed pages

Question One (Compulsory)

a) Discuss the components of an irrigation system. **(2 marks)**
b) Discuss the most commonly pump used in irrigation with the aid of a diagram. **(4 marks)**
c) Discuss the differences between open canal/channel and field ditches. **(4 marks)**
d) Discuss the most commonly used canal cross-section in irrigation and drainage with the aid of a diagram full with labels.
e) Why is a free board of a canal required? **(2 marks)**
f) Discuss Earthen canals **(1 mark)**
g) What are the disadvantages of earthen canals? **(2 marks)**
h) Mention the importance of lining of canals in irrigation systems. **(1 mark)**
i) Mention the importance of canal structures. **(2 marks)**

j) What is meant by the term Alkaline soil? **(1 mark)**
k) Define a sodic soil **(1 mark)**

l) Discuss the important properties to be determined for the diagnosis of salt affected soils. **(1 mark)**

m) Express 6400ppm salt concentration in micromhos, millimhos and mhos/cm given salt concentration; mg/l = 640 x EC, mmhos/cm. **(1 mark)**

Where EC = Electricity Conductivity.

n) Express 1170 ppm sodium chloride salt concentration in meq/l given equivalent weight of Nacl = 58.45. **(3 marks)**

Question Two

a) Discuss **FOUR** types of structures available that make the flow of irrigation water in canals be under control. **(18 marks)**
b) What are they meant to achieve. **(2 marks)**

Question Three

a) Summarize the necessity of irrigation in **FOUR** points. **(1 mark)**
b) Summarize the steps to be done in lining of canals using plain cement concrete lining. **(1 mark)**
c) How is Brick lining of canals done? **(1 mark)**
d) Give the advantages and disadvantages of brick lining. **(4 marks)**
e) What are the factors which affect the type of canal lining? **(13 marks)**

Question Four

a) Outline **FOUR** positive points for the proper site for drainage crossing. **(8 marks)**

b) Give comparisons between a Barrage and a weir in irrigation systems. **(12 marks)**

Question Five

Calculate the crest level of main weir and under sluice for a gated diversion structure for the following data. **(20 marks)**

Q_{max} = 100cumecs
H.F.L = 100m
f = 0.1
Length of barrage, L = 200m