TECHNICAL UNIVERSITY OF MOMBASA

FACULTY OF ENGINEERING AND TECHNOLOGY

DEPARTMENT OF BUILDING & CIVIL ENGINEERING

UNIVERSITY EXAMINATION FOR:

BACHELOR OF SCIENCE IN CIVIL ENGINEERING

ECE 2413 : IRRIGATION ENGINEERING II

END OF SEMESTER EXAMINATION

SERIES: DECEMBER 2016

TIME: 2 HOURS

DATE: 18 Dec 2016

Instructions to Candidates

You should have the following for this examination

-Answer Booklet, examination pass and student ID

-Drawing instruments.

This paper consists of five questions.

Attempt question ONE (Compulsory) and any other TWO questions.

Do not write on the question paper

Question One (Compulsory)

a) Outline the advantages of using a submersible as a booster pump instead of a centrifugal **(2 marks)**
b) Under what situation are submersibles used as booster pumps in the suction lines of centrifugal pumps **(3 marks)**
c) Having a submersible in the suction line will change the head as the inlet of the centrifugal pump. Discuss **(3 marks)**
d) State what an irrigation system consists of **(5 marks)**
e) Outline the purpose of intake structures **(3 marks)**
f) Describe an open channel or canal in irrigation engineering **(4 marks)**
g) Describe field ditches in irrigation engineering **(5 marks)**
h) Enumerate the disadvantages of earthen canals in irrigation **(5 marks)**

Question Two

a) Describe the purpose of freeboard **(5 marks)**
b) With the aid of a well labelled diagram, describe the most commonly used pump in irrigation **(15 marks)**

Question Three

Describe the most commonly used canal cross-section in irrigation engineering **(20 marks)**

Question Four

a) Describe earthen canals **(5 marks)**
b) i. With the aid of diagrams, describe the parshall and cut-throat flumes **(8 marks)**

ii.Why is one preferred to the other? **(7 marks)**

Question Five

a) Describe two types of structures in irrigation engineering **(4 marks)**
b) How are pumps selected to make an irrigation system as efficient as possible? **(4 marks)**
c) Before selecting an irrigation pump a careful and complete inventory of the conditions under which the pump will operate must take place. Name 4 components that the inventory must include **(4 marks)**
d) What will determine the flow rate and total dynamic head in irrigation engineering? **(4 marks)**
e) Define the total dynamic head **(2 marks)**
f) Define total static head when pumping from an open water surface **(2 marks)**