



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) 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)
- c) Outline the advantages of using a submersible as a booster pump instead of a centrifugal (2 marks)
- d) Under what situation are submersibles used as booster pumps in the suction lines of centrifugal pumps (3 marks)
- e) State what an irrigation system consists of (5 marks)

Question Two

- a) How are pumps selected to make an irrigation system as efficient as possible? (4 marks)
- b) 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)
- c) Describe an open channel or canal in irrigation engineering (4 marks)
- d) Describe field ditches in irrigation engineering (4 marks)
- e) Enumerate the disadvantages of earthen canals in irrigation (4 marks)

Question Three

- a) With the aid of a well labelled diagram, describe the most commonly used pump in irrigation (15 marks)
- a) Enumerate the disadvantages of earthen canals in irrigation (5 marks)

Question Four

- a) Having a submersible in the suction line will change the head as the inlet of the centrifugal pump. Discuss (3 marks)
- b) Outline the purpose of intake structures (3 marks)
- c) Describe the purpose of freeboard (5 marks)
- d) Describe two types of structures in irrigation engineering (4 marks)
- e) What will determine the flow rate and total dynamic head in irrigation engineering? (4 marks)
- f) Define the total dynamic head (1 marks)
- g) Define total static head when pumping from an open water surface (1 marks)

Question Five

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