



## TECHNICAL UNIVERSITY OF MOMBASA

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FACULTY OF ENGINEERING AND TECHNOLOGY

DEPARTMENT OF BUILDING & CIVIL ENGINEERING

**UNIVERSITY EXAMINATION FOR:**

BACHELOR OF SCIENCE IN CIVIL ENGINEERING

ECE 2503 : WATER RESOURCES ENGINEERING I

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) State why the need of reservoirs (4 marks)
- b) Define reservoir yield and state its dependency (8 marks)
- c) With the aid of a well labelled illustration, describe the zones of storage in a reservoir (7 marks)
- d) How are outlets of dams designed to discharge water (6 marks)
- e) Describe with diagrams sluiceways shapes (5 marks)

### Question Two

- a) Enumerate the steps involved in water resources planning (12 marks)
- b) Define reliability of a reservoir (4 marks)
- c) State and describe the equation Einstein presented for the calculation of bed load movement on the basis of the size distribution of the bed material and stream flow rates (4 marks)

### Question Three

- a) Describe reservoir sedimentation (10 marks)
- b) Discuss the types of dams available (10 marks)

### Question Four

- a) Write the weir equation for the discharge of an overflow spillway and define the terms (4 marks)
- b) Given the ogee spillway with  $C_w = 3.8$  . Find the total force of the water on the curved section  $h = 5ft$  (16 marks)

### Question Five

Describe in details sediment transport by streams (20 marks)