



TECHNICAL UNIVERSITY OF MOMBASA

FACULTY OF ENGINEERING AND TECHNOLOGY
DEPARTMENT OF BUILDING & CIVIL ENGINEERING
UNIVERSITY EXAMINATION FOR:
BACHELOR OF SCIENCE IN CIVIL ENGINEERING

ECE 2513: WATER RESOURCES ENGINEERING II
SPECIAL/SUPPLEMENTARY EXAMINATION
SERIES: SEPTEMBER 2018
TIME: 2 HOURS

Instructions to Candidates

You should have the following for this examination

-Answer Booklet, examination pass and student ID

-Drawing instruments.

This paper contains FIVE questions

Answer question ONE and any TWO questions.

Marks for each question are indicated in the parenthesis.

Do not write on the question paper.

Question One (Compulsory) 30 MARKS

- Optimization models for hydraulic management for ground water have been developed based on three approaches: briefly describe them. **(10 marks)**
- Briefly describe the defects of riparian doctrine in modern society. **(4 marks)**
- Briefly describe TWO functions of an aquifer. **(5 marks)**
- Briefly describe how flood control is normally implemented. **(8 marks)**
- Briefly describe the “Hedging Rule”. **(3 marks)**

ANSWER ANY TWO QUESTIONS FROM THIS SECTION

Question Two (20 Marks)

- State the principle of optimality. **(2 marks)**
- Briefly describe the purpose of a simulation model. **(8 marks)**
- Describe the general format of dynamic programming. **(10 marks)**

Question Three (20 Marks)

- a) Demonstrate the Deficient Index = $(D_t - Q_t)$ if $Q_t < D_t$ (6 marks)
- b) Briefly describe the TWO purposes of the computed release policies in the management of reservoirs systems. (14 marks)

Question Four (20 Marks)

- a) Briefly describe the major challenges for a riparian farmer. (2 marks)
- b) Briefly describe the major criticism in the mass curve technique in computing reservoir yield. (8 marks)
- c) Briefly outline the essence of application of systems analysis to multi – purpose reservoir system. (10 marks)

Question Five (20 Marks)

- a) Define Drought? (2 marks)
- b) Outline major role played in the economic aspects of water development in water law (8 marks)
- c) Briefly describe the inter-relation between surface water and groundwater (6 marks)
- d) Briefly explain why the inter-relation in Qs. 5 (c) above pose a legal problem (4 marks)