



**MASINDE MULIRO UNIVERSITY OF
SCIENCE AND TECHNOLOGY
(MMUST)**

MAIN CAMPUS

**UNIVERSITY MAIN EXAMINATIONS
2023/2024 ACADEMIC YEAR**

FOURTH YEAR SEMESTER ONE

**FOR THE DEGREE
OF
BACHELOR OF SCIENCE IN CIVIL AND STRUCTURAL
ENGINEERING**

COURSE CODE: CSE 451

COURSE TITLE: WATER RESOURCES MANAGEMENT

DATE: 11TH DECEMBER, 2023

TIME: 3 P.M - 5 P.M

INSTRUCTIONS:

1. This paper contains FOUR questions
2. Answer question ONE (compulsory) and any other TWO question
3. Marks for each question are indicated in the parenthesis.
4. Examination duration is **2 Hour**

MMUST observes ZERO tolerance to examination cheating

This Paper Consists of 2 Printed Pages. Please Turn Over.

QUESTION 1 (30 Marks)

- (a) A multitude of regulatory instruments is at the disposal of water authorities in setting up appropriate management structures and procedures. Discuss the direct Instruments that are used as management instrument in IWRM [9 Marks]
- (b) Briefly discuss some of the current issues in Water Resources Management and development in Kenya [9 marks]
- (c) The Kenya Water Act 2016 clearly spelt out the function of the NINE institution involved in water resources management. Highlight the function for every institution. [12 Marks]

QUESTION 2 (20 Marks)

- (a) Briefly discuss the THREE main key factors that are required for the successful implementation of IWRM in a river basin [12 Marks]
- (b) Briefly describe the sources of sediments in rivers and their effects in Water Resources Management [8 Marks]

QUESTION 3 (20 Marks)

Water allocation, security and conflict resolution are important factor in Integrated Water Resource Management. Briefly explain by giving various examples:

- (a) Causes of Water Insecurity at national and international levels [8 marks]
- (b) Methods of water resources conflict resolution at various levels (national, transboundary and international) [12 Marks]

QUESTION 4 (20 Marks)

- (a) Discuss how water resources are managed at different levels in Kenya by the various management institutions [12 Marks]
- (b) A central problem in water resources management lies in finding ways to deal with the uncertainty and complexity of the water problem solutions. Discuss. [8 Marks]