



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

MAIN CAMPUS

**UNIVERSITY EXAMINATIONS
2021/2022 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: WEDNESDAY 27TH APRIL 2022 TIME: 8.00 – 10.00 AM

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) It is imperative that Water resources availability and demand assessment be carried out as a management instrument for IWRM. Discuss. [10 Marks]
- (b) You are responsible for managing water resource at a catchment level. The catchment is known for generation of runoff due to different land use, water withdrawal upstream from a river for irrigation and domestic use, severe land degradation in the upper catchment affecting downstream users through storm surface runoff causing erosion, and a serious reduction in base flow hence waters scarcity downstream. As an Engineer, your task is to map out the current water use and users, runoff generation and organize the stakeholders through forum for common management of water resources, mostly focusing on the downstream plight e.g. flooding, water scarcity, drying of wetlands etc. Describe the steps you would use in carrying out the survey and mobilizing stake holders for common sharing of water resources. [20 Marks]

[Hint: For the mapping, think in terms of how you would go about mapping different land use types and what factors (parameters) you would be most interested to assess' runoff generation etc]

QUESTION 2 (20 Marks)

- (a) Highlight some of the most important necessary data for water resources management [8 Marks]
- (b) Briefly discuss the current and future issues in Water Resources Management and development in Kenya [12 Marks]

QUESTION 3 (20 Marks)

- (a) Briefly discuss the institutional roles as a tool in IWR programs [10 Marks]
- (b) Describe the paradigm shift that has taken place in the management of water resources from the 19th Century to date [10 Marks]

QUESTION 4 (20 Marks)

Discuss the direct and economic Instruments that are commonly used as management instrument in IWRM [20 Marks]