



*(University of Choice)*

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

**MAIN CAMPUS**

**UNIVERSITY SPECIAL/SUPPLEMENTARY  
EXAMINATIONS  
2019/2020 ACADEMIC YEAR**

**FOURTH YEAR FIRST SEMESTER EXAMINATIONS**

**FOR THE DEGREE  
OF  
BACHELOR OF TECHNOLOGY EDUCATION  
(CIVIL AND STRUCTURAL ENGINEERING)**

**COURSE CODE: TEB 403**

**COURSE TITLE: WATER SUPPLY TECHNOLOGY**

**DATE: THURSDAY 28<sup>TH</sup> JANUARY 2021 TIME: 8.00–10.00AM**

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**INSTRUCTIONS:**

1. This paper contains FIVE Questions
2. Answer FOUR Questions only
3. Marks for each question are indicated in the parenthesis.
4. It is in the best interest of the candidate to write legibly
5. Examination duration is **2 Hours**

MMUST observes ZERO tolerance to examination cheating

*This Paper Consists of 3 Printed Pages. Please Turn Over.*

**QUESTION ONE**

- a) Explain how economics influence the amount of water consumed in a household [5 marks]
- b) Explain the relevance of understanding the source of water by a technologist [5 marks]
- c) Why is it necessary to treat water [4 marks]
- d) Define fluoridation and defluoridation, and explain the circumstances for each case [3.5 marks]

**QUESTION TWO**

A rock catchment water system in Kakamega County is to be designed for Butere Township. Given the following established demands and climate data. Determine the reservoir capacity [17.5 marks]

Mean monthly rainfall amounts in mm

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
8.1	13	28	87.4	9.5	18	33	30	13	218	64.6	27.2

Established demands

Category	Number of Users	Rate (L/C/d)
Hospital	100	8
Sub-County headquarters	10	5
Schools	500	5
Chief's camp	3	

Assume one month to be equal to 30.4 days

Monthly evaporation = 8 mm

Area of exposed rock catchment = 1.5 ha

**QUESTION THREE**

- a) Describe the following intake structures [9 marks]
- i) Lake intake ii) River intake iii) canal intake
- b) Differentiate between confined and unconfined aquifer [4 marks]
- c) A tube well of 30 cm penetrates fully an artesian aquifer. The strainer length is 15m. Determine the yield from the well under a drawdown of 3 m. The aquifer consists of sand of effective size of 0.2 mm having coefficient of permeability of 50 m/day. Assume radius of drawdown is 150 m. [4.5 marks]

**QUESTION FOUR**

- a) Explain the role of coagulants in water treatment [3 marks]

- b) At a water treatment plant, 12 million litres of water is treated daily using alum dosage of 10 mg/l. Find the total quantity of alum used daily and the amount of carbon dioxide [7.5 marks]
- c) Outline the factors that affect the efficiency of sedimentation tank [7 marks]

**QUESTION FIVE**

- a) Describe the operation and maintenance of slow sand filters [7.5 marks]
- b) Outline the advantages of pre-chlorination in water treatment [5 marks]
- c) A pumping station, situated at an elevation of 600 m uses pumps which require 30 kPa NPSH when delivering water. Determine the allowable suction lift of these pumps if the entrance and friction losses are 10 kPa. Take barometric pressure at 600 m altitude as 90 kPa and vapour pressure of water as 2.30 kPa. [5 marks]

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