



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

MAIN CAMPUS

**UNIVERSITY EXAMINATIONS
2022/2023 ACADEMIC YEAR**

THIRD YEAR SECOND SEMESTER EXAMINATIONS

MAIN EXAMINATION

**FOR THE DEGREE
OF
BACHELOR OF SCIENCE IN GEOSPATIAL INFORMATION SCIENCE**

COURSE CODE: DPG 308

COURSE TITLE: WATER RESOURCES MANAGEMENT

DATE: 14/4/2023

TIME: 3-5 PM

INSTRUCTIONS TO CANDIDATES

This paper contains **four (4)** questions

Question one (1) is compulsory {total = 30 Marks}

Attempt any other two (2) {total = 40 Marks} from the remaining questions

Be brief and to the point

TIME: 2 Hours

MMUST observes ZERO tolerance to examination cheating

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

SECTION I: COMPULSORY {30 MARKS}

Question ONE

- Discuss how a river basin management scheme is dependent upon the gauging network. Illustrate with examples (10 Marks)
- To what extent does river basin management involve a compromise between conflicting demands for water in a developing country? (10 Marks)
- Briefly discuss the factors affecting evaporation (10 Marks)

SECTION II: ATTEMPT ANY OTHER TWO (2) QUESTIONS {40 MARKS}

Question TWO

An experimental plot 5 m wide and 12 m long was irrigated using a rain simulator. At a certain moment, the runoff from the plot reached a constant value of 0.6 lit/s. The intensity of water application amounted to 60mm/h.

- What is the runoff in mm/hr ? (5 Marks)
- What was the infiltration capacity, f_c in mm/hr ? (5 Marks)
- What was the retention storage, in mm depth at the moment of cessation if the runoff decreased as follows? (10 Marks)

Time (min) after cessation of rainfall	Runoff (mm/s)
0	0.60 l/s
5	0.30 l/s
10	0.15 l/s
15	0.06 l/s
25	0.00 l/s

N.B. It can be assumed that all the runoff after cessation of rainfall (residual runoff) is derived from detention storage, and that the runoff rate to infiltration rate ratio throughout the residual period remains as it was at the moment of cessation of rainfall.

Question THREE

- What are the considerations for 1) dam type and 2) dam site selection? (10 Marks)
- Explain using neat sketches, the types of dams and the advantages and disadvantages of each type (10 Marks)

Question FOUR

- The High Aswan Dam was designed based on a mean flow of $92 \times 10^9 \text{ m}^3/\text{year}$ and standard deviation $S = 18 \times 10^9 \text{ m}^3/\text{year}$, for a period of 93 years. Calculate the required storage to give a safe yield of $84 \times 10^9 \text{ m}^3/\text{year}$ (10 Marks)
- The new data available since the construction of the dam gives a mean flow of only $88.8 \times 10^9 \text{ m}^3/\text{year}$, and $S = 17.3 \times 10^9 \text{ m}^3/\text{year}$, for a period of 126 years. Calculate the safe yield based on the new data available. (10 Marks)