TECHNICAL UNIVERSITY OF MOMBASA

SCHOOL OF ENGINEERING AND TECHNOLOGY
DEPARTMENT OF BUILDING & CIVIL ENGINEERING
UNIVERSITY EXAMINATION FOR:

BACHELOR OF SCIENCE IN CIVIL ENGINEERING
ECV 4504 : WATER RESOURCES ENGINEERING I

END OF SEMESTER EXAMINATION
SERIES: JANUARY 2025
TIME: 2 HOURS

PAPER A
Instructions to Candidates
You should have the following for this examination
-Answer Booklet, examination pass and student ID
This paper consists of **five** questions.
Attempt question ONE (Compulsory) and any other TWO questions.
Do not write on the question paper.

QUESTION ONE (COMPULSORY) 30 Marks

a) State the challenges facing water resources management and the outline the potential solutions to the challenges (10 marks)
b) Spillways are parts of dams.
   i) Differentiate the two types
   ii) Use sketches to identify, Ogge,Chute and Shaft spillways (10 marks)

c) Explain the importance of outlet works in dams (6 marks)
d) Dams are structures in water resources. Outline their side effects (4 marks)

ANSWER ANY TWO QUESTIONS FROM THIS SECTION
QUESTION TWO (20 Marks)

a) Outline the following
   i) Un confined aquifer
   ii) Confined aquifer
   iii) Perched aquifer (8 marks)

b) Water resources managers regard dams as useful structures. Outline the need for dams in water resources management (6 marks)
c) With the aid of sketches outline the different water storage zones in dams (6 marks)

QUESTION THREE (20 Marks)

a) Explain the factors to consider when locating a site for water reservoirs (10 marks)
b) Explain how new technologies have benefited water resources management sector (6 marks)
c) State the roles of NEMA in water resources management (4 marks)

QUESTION FOUR (20 Marks)

a) Explain the procedure for planning water reservoirs (6 marks)
b) Explain the trap efficiency in trapping sediments in water storage facilities (4 marks)
c) Explain the major threats and challenges in water resources (6 marks)

QUESTION FIVE (20 Marks)

a) Explain the water resource management concept and in relation to climate change (4 marks)
b) With the aid of a sketch explain reservoir sedimentation (10 marks)
c) With the aid of sketches outline the radial gate and drum gate spillways (6 marks)