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 1

SPECIAL/SUPPLEMENTARY EXAMINATION
SERIES: MARCH 2025
TIME: 2 HOURS

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) Outline the global challenges facing water resources and their solutions (10 marks)
b) Explain uncontrolled spillway and sketch the following
   I. Ogee spillway
   II. Chute spillway
   III. Shaft spillway (10 marks)
c) Outline the importance of outlet works(sluice valves) in reservoirs (6 marks)
d) Outline the side effects of dams to environment (4 marks)

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

a) Outline the following
   I. Unconfined aquifer
   II. Confined aquifer
   III. Perched aquifer (8 marks)
b) Explain the significance of dams in water resources (6 marks)

c) Sketch and a cross section of a dam and indicate the various storage zones in the reservoir (6 marks)

QUESTION THREE (20 Marks)

a) Explain the factors to consider when selecting a site for the construction of a dam (10 marks)
b) Explain the importance and need of new technologies in water resource (6 marks)
c) NEMA has roles in dam and reservoirs. Outline the roles (4 marks)

QUESTION FOUR (20 Marks)

a) Explain the steps in the process of planning a reservoir (6 marks)
b) Explain trap efficiency in reservoirs (4 marks)
c) Explain the challenges and threats in water resources (10 marks)

QUESTION FIVE (20 Marks)

a) Explain the dimensions of water resources management in engineering (10 marks)
b) With the aid of a sketch explain reservoir sedimentation (6 marks)
c) Outline controlled spillway) and sketch the following
   I. Radial gate
   II. Drum gate (4 marks)