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TECHNICAL UNIVERSITY OF MOMBASA

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

BACHELOR OF SCIENCE IN CIVIL ENGINEERING
ECV4317 HYDROLOGY 1

SPECIAL/SUPPLEMENTARY EXAMINATION
SERIES: JULY 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)

(30marks)

- a) Using illustrations, explain the components of the hydrologic cycle. **(8marks)**
- b) Explain Evapo-transpiration. **(4marks)**
- c) Describe the factors affecting evaporation. **(8marks)**
- d) Explain the following: i) Hyetograph ii) Frontal precipitation iii) Cyclonic precipitation **(10marks)**

ANSWER ANY TWO QUESTIONS FROM THIS SECTION

QUESTION TWO

(20 Marks)

- a) Briefly discuss types of runoff. **(6marks)**
- b) Using illustrations, describe a rain gauge as a rainfall measurement tool. **(10marks)**
- c) A swimming pool has a water temperature of 25° and a saturation humidity ratio of 0.02kg/kg . With an air temperature of 25° and 50% relative humidity, the humidity ratio in the air is 0.0098 kg/kg . For a $25\text{m} \times 20\text{m}$ swimming pool and 0.5 m/s air velocity above the surface. Calculate; -

- i) The rate of Evaporation.
- ii) The Evaporation heat supply required to maintain the temperature of the water. (Evaporation heat of water $h_{we} = 2257 \text{ kJ/kg.}$) **(4marks)**

QUESTION THREE (20 Marks)

- a) With the aid of sketches, describe Two (2) types of evaporimeters. **(8marks)**
- b) Describe rating curves. **(4marks)**
- c) Using illustrations, discuss TWO (2) modes of presenting rainfall data. **(8marks)**

QUESTION FOUR (20 Marks)

- a) Explain the following terms and their significance in watershed management;
i) Form factor ii) Circulatory/Circularity ratio iii) Elongation ratio iv) Drainage density. **(8marks)**
- b) Outline five (5) climatic and five (5) physiographic runoff factors. **(10marks)**
- c) Describe surface runoff. **(2marks)**

QUESTION FIVE (20 Marks)

- a) Outline the watershed characteristics used for watershed management. **(10marks)**
- b) For a rectangular basin with a single drainage channel centrally located and flowing along the longer side of the basin, (length = 22km. width = 14km.). Compute
 - i) Form factor. **(3marks)**
 - ii) Circularity ratio. **(3marks)**
 - iii) Elongation ratio. **(4 marks)**

