



TECHNICAL UNIVERSITY OF MOMBASA
**Faculty of Engineering &
Technology**

DEPARTMENT OF BUILDING & CIVIL ENGINEERING
DIPLOMA IN BUILDING & CIVIL ENGINEERING (DBCE 13J)

ECV 2305: HYDROLOGY

END OF SEMESTER EXAMINATION

SERIES: APRIL 2015

TIME ALLOWED: 2 HOURS

Instructions to Candidates:

You should have the following for this examination

- *Answer Booklet*

This paper consists of **FIVE** questions. Answer any **THREE** questions of the **FIVE** questions

Maximum marks for each part of a question are as shown

Use neat, large and well labeled diagrams where required

This paper consists of **THREE** printed pages

Question One

- a) Define precipitation (2 marks)
- b) Explain SIX main forms of precipitation (12 marks)
- c) Outline THREE methods used to adjust missing data in a gauging station (3 marks)
- d) Highlight THREE conditions under which isohyetal method is suitable (3 marks)

Question Two

- a) With the aid of sketch explain the working principle of a tipping bucket raingauge (5 marks)
- b) Outline FIVE sources of error in recording the measurement of precipitation (5 marks)
- c) Highlight FIVE factors affecting run off (5 marks)
- d) Outline FIVE factors considered when selecting a site for installing a gauging station (5 marks)

Question Three

- a) The following information was obtained from six rain gauge stations. Calculate the average rainfall. (5 marks)

Station	1	2	3	4	5	6
Precipitation	15.6	20.4	13.8	10.5	17.1	22.3

- b) Highlight FOUR merits of arithmetic mean method (4 marks)
- c) The normal annual rainfall at stations A, B, C and D in a basin are 80.97, 67.59, 76.28 and 92.01cm respectively. In the year 1995, the station D was inoperative and stations A, B and C recording annual precipitation of 91.11, 72.23 and 79.89cm respectively. Estimate the rainfall at station D in that year. (5 marks)
- d) State THREE classification of rainfall intensity (3 marks)
- e) Outline THREE types of aquifers (3 marks)

Question Four

- a) Outline the main factors contributing to floods (6 marks)
- b) Highlight SIX measures for reducing floods damages (6 marks)
- c) State FIVE factors affecting a flood hydrograph (5 marks)
- d) Define the following:
 - (i) Base flow

- (ii) Run off
- (iii) Quick flow

(3 marks)

Question Five

- a) Briefly explain how the coefficient of permeability can be determined and show that:

$$K = \frac{2.3031q(\log r_{0.2} / r_1)}{\pi(h_2^2 - h_1^2)}$$

(10 marks)

- b) Outline FIVE advantages of isohyetal method

(5 marks)

- c) Explain how the inconsistency of a gauging station can be corrected using the double mass curve

(5 marks)