



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

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

ECV 2305: HYDROLOGY

END OF SEMESTER EXAMINATION
SERIES: DECEMBER 2014
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

All questions carry equal marks

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 the term precipitation. **(2 marks)**
- b) Describe the following types of precipitation. **(10 marks)**
 - (i) Hail
 - (ii) Ice pellets
 - (iii) Snow
 - (iv) Sleet
 - (v) Diamond dust **(10 marks)**
- c) With a detail illustration describe the hydrologic cycle. **(8 marks)**

Question Two

- a) What is hydrology **(1 mark)**
- b) Describe the sources of errors in a rain gauge measurement. **(8 marks)**
- c) What factors would you consider in selecting a site for a rain-gauge station. **(6 marks)**
- d) Describe the following types of rainfall: **(5 marks)**
 - (i) Frontal rain
 - (ii) Orographic rain
 - (iii) Convective rain

Question Three

Monthly rainfall measurements were recorded at six rain gauge stations as shown in table 1:1. The coordinates of each gauge are given in terms of Easting (x) and Northing (y) values in table 1.2. If the June reading of gauge 5 (G5) is missing, calculate an estimate for this value using two different methods. Uniform weighting and inverse-distance weighting **(20 marks)**

Table 1

Year	Month	G.1	G.2	G.3	G.4	G.5	G.6
1994	1	4.4	3.4	4.7	7.6	4.0	3.8
1994	2	1.5	0.6	2.8	4.5	1.3	1.0
1994	3	2.1	4.3	5.1	4.7	2.4	2.7
1994	4	7.0	1.1	5.5	7.0	5.2	6.1
1994	5	3.4	7.8	4.6	8.0	3.8	5.0
1994	6	10.0	8.8	6.1	5.9	?	8.8
1994	7	9.2	7.7	10.8	6.0	10.7	12.0
1994	8	3.3	3.0	2.8	3.3	1.7	7.2
1994	9	3.6	10.3	3.6	4.6	6.2	9.8
1994	10	9.5	3.3	4.4	3.8	2.7	6.5

1994	11	1.3	4.1	2.3	1.2	1.9	0.8
1994	12	5.8	2.6	3.5	3.2	3.1	4.5

Table 2

Gage #	Easting (m)	Northing (m)
GI	761257	326310
G2	719842	3275040
G3	807849	3276620
G4	748650	3298200
G5	714621	3296010
G6	765282	3321970

Question Four

The contour map of a basin is subdivided into a number of square grids of equal size by drawing horizontal and vertical lines as shown in the figure below. The contour interval is 25m.

The number of contour intersections by vertical lines is 75 and by horizontal lines is 126. The total length of the vertical grid segments (after multiplying by the scale) is 53260m and of the horizontal grid segments 55250m. Determine the mean slope of the basin. **(20 marks)**

Question Five

- a) Define a hydrograph. **(1 mark)**
- b) With a clear diagram, show the components of a stream flow hydrograph. **(5 marks)**
- c) Describe the following terms:
 - (i) Influent streams and effluent streams
 - (ii) Intermittent and perennial streams
 - (iii) Isochrones
 - (iv) Unconfined aquifer

- (v) Confined aquifer
- (vi) Aquiclude
- (vii) Aquifuge

(14 marks)