TECHNICAL UNIVERSITY OF MOMBASA

Faculty of Engineering & Technology

DEPARTMENT OF BUILDING & CIVIL ENGINEERING

DIPLOMA IN BUILDING & CIVIL ENGINEERING (DBCE)

EBC 2310: HYDROLOGY

END OF SEMESTER EXAMINATION
SERIES: APRIL 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
This paper consists of **THREE** printed pages

Question One

a) Outline the importance of hydrology in civil engineering. **(6 marks)**

b) With the aid of a sketch, explain the hydrologic cycle. **(8 marks)**

c) With the aid of a sketch, explain the precipitation measurement using non-recording rain gauge. **(6 marks)**

Question Two

a) With the aid of a sketch explain the process of stream flow measurement by using a current meter. **(8 marks)**

b) Calculate the discharge of a river given the following measurement made with a flow meter. **(8 marks)**

Distance from one bank (m)	0	10	20	30	40	50	60	70
Depth of bed (m)	0	0.7	1.2	1.5	1.8	1.5	0.9	0
Average velocity V, (m/s)	0	0.15	0.24	0.3	0.36	0.33	0.24	0

c) Outline FOUR factors which affect evaporation. **(4 marks)**

Question Three

a) With the aid of a sketch, explain the measurement of evaporation by using U.S.A weather bureau class "A" pan. **(10 marks)**

b) Outline FOUR factors that affect run off. **(4 marks)**

c) Explain the following methods of estimating run off **(6 marks)**
- **(i)** Rainfall-Run off coefficient
- **(ii)** Infiltration method

Question Four

a) Define the following:
- (i) Hydrograph
- (ii) Precipitation
- (iii) Run off
- (iv) Unit hydrograph **(4 marks)**

b) With the aid of a sketch, explain the procedure of constructing a unit hydrograph. **(8 marks)**

c) Explain the roles of a hydrologist in engineering. **(6 marks)**

d) List FOUR forms of precipitation. **(2 mark**

Question Five

a) Using the table below, derive and plot a 6-hour duration unit hydrograph.

Time (hrs)	0	6	12	18	24	30	36	42	48	54	60	66	72
Flow m^3/s	17	111.2	254.5	198	150	113.2	87.7	67.9	53.8	42.5	31.1	2064	17

- Drainage area = $316km^2$
- Base flow = $17m^3/s$
- Assume any other necessary information **(12 marks)**

b) Outline the importance of the following when designing water power project:

(i) Maximum flood discharge

(ii) Total run off **(6 marks)**

c) Differentiate infiltration capacity from infiltration rate. **(2 marks)**