THE MOMBASA POLYTECHNIC UNIVERSITY COLLEGE

(A Constituent College of Jkuat)

Faculty of Engineering and Technology

DEPARTMENT OF BUILDING AND CIVIL ENGINEERING

BACHELOR OF SCIENCE IN BUILDING & CIVIL ENGINEERING

ECE 2402 : HYDROLOGY I

END OF SEMESTER EXAMINATION
SERIES: AUGUST/SEPTEMBER 2011
TIME: 2 HOURS

Instructions to Candidates:
You should have the following for this examination
- *Answer booklet*

This paper consists of **FIVE** questions in **TWO** sections **A & B**
Answer question **ONE (COMPULSORY)** and any other **TWO** questions
Maximum marks for each part of a question are as shown
This paper consists of **THREE** printed pages

SECTION A (COMPULSORY)

Question 1

The following table presents field data from a small lake

Table 1 : field data on water loss from a small lake

Fall in water level (cm/day) (E_o)	Wind speed(u) (Km/day)	es – ea (MB)
0.30	40	5.2
0.41	130	5.9
0.51	115	9.1
0.48	81	15.3
0.50	151	10.7
0.55	70	15.9
0.78	230	11.8

0.81	140	17.0
0.90	170	12.0
0.99	97	12.5

a) Determine the mass-transfer coefficient (N) (20 marks)

b) Determine the rate of seepage(s) (10 marks)

SECTION B (*Answer any TWO questions from this section***)**

Question 2

a) Describe THREE common methods of calculating areal precipitation for an area (6 marks)

b) Explain the formula for estimating a missing rainfall record at a station (A) using data from three other surrounding stations B C and D (10 marks)

c) Describe **FOUR** common methods of checking the consistency of precipitation records (4 marks)

Question 3

Fig 3 presents the annual precipitation data in (mm) for weather stations

*20

Fig 3.0

a) Calculate the average areal precipitation using the arithmetic average method (4 marks)

b) Calculate the average areal precipitation using the Thiessen-weighted average method (14 marks)

c) Calculate the error between the two methods in percentage (2 marks)

Question 4

a) Sketch and show the main dimensions of a class A evaporation pan (2 marks)

b) What is the standard class A pan coefficient factor (2 marks)

c) State the **THREE** types of recording rain gauges (6 marks)

d) Briefly describe the **FIVE** lifting mechanisms for air masses under dynamic cooling conditions (10 marks)

Question 5

a) Explain the **THREE** types of evaporation pans (6 marks)

b) Describe the **FOUR** main factors on the evaporation pan coefficient (8 marks)

c) Define the following terms: (6 marks)
   (i) Evaporation
   (ii) Transpiration
   (iii) Evapotranspiration