THE MOMBASA POLYTECHNIC UNIVERSITY COLLEGE

(A Constituent College of JKUAT)
Faculty of Engineering and Technology

DEPARTMENT OF BUILDING AND CIVIL ENGINEERING

HIGHER DIPLOMA IN BUILDING & CIVIL ENGINEERING

EBC 3221: HYDROLOGY

END OF SEMESTER EXAMINATION

SERIES: DECEMBER 2011

TIME: 2 HOURS

Instructions to Candidates:

You should have the following for this examination

- *Answer booklet*
- *Calculator*

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 clearly shown
This paper consists of **THREE** printed pages

SECTION A (COMPULSORY)

Question 1

a) Explain the role of various factors that influence evaporation from a water body and soil surface and transpiration from plants (26 marks)

b) State the general equation for total evaporation and explain the terms (4 marks)

SECTION B (Answer any TWO questions from this section)

Question 2

a) State the Darcy's equation and explain the terms (5 marks)

b) State the importance of the extension of Darcy's Law to ground water flow (5 marks)

Figure 1

For the arrangement above;

(i) Calculate the velocity (5 marks)
(ii) Calculate the Discharge (3 marks)
(iii) Calculate Transmissivity (2 marks)

Question3

a) Define the Instantaneous Unit Hydrograph: (6 marks)

b) Define the Unit Hydrograph (5 marks)

c) State the general equation for the unit hydrograph and explain (3 marks)

d) Outline **THREE** assumptions that give the unit Hydrograph simple properties assisting in its application (6 marks)

Question 4

a) A well of radius 0.5m completely penetrates an unconfined aquifer with K = 30m/day and H = 50m. The well is pumped so that the water level in the well remains at 40m above the bottom.

Assuming that pumping has essentially no effect on water table height at r = 500m and that well losses are zero. Calculate the steady state well discharge (10 marks)

b) Using the Gumbel approach with $\bar{x}$ = 700

=288, T = 113.3

(i) Calculate the theoretical recurrence interval for a flood flow 700,000 cfs (8 marks)
(ii) Calculate the probability P (2 marks)

Question 5

a) State the commonly accepted measures for reducing flood damage (10 marks)

b) Explain the catchment response to a storm (10 marks)