TECHNICAL UNIVERSITY OF MOMBASA.

FACULTY OF ENGINEERING AND TECHNOLOGY

DEPARTMENT OF BUILDING AND CIVIL ENGINEERING

UNIVERSITY EXAMINATION FOR

BACHELOR OF SCIENCE IN CIVIL ENGINEERING.

ECE 2410: HYDROLOGY II

SEPT 2017

Question One (Compulsory)

a)   Explain the Synthetic Unit Hydrograph concept.   **(4marks)**

b)   With the aid of a sketch, show; rainfall peak, peak discharge, lag time, rising limb, recession limb
     and base flow. Give a brief description of each.   **(12marks)**

c)   Distinguish between a Unit hydrograph and a Synthetic Unit hydrograph.   **(4marks)**

d)   Explain Flow Routing.   **(2marks)**

e)   Outline **FOUR** activities that could influence base flow.   **(8 marks)**

Question Two

a)   Briefly describe the **THREE** sets of factors that determine the nature of a stream hydrograph.
                                                                                                                          (10marks)

b)   For a rectangular basin with a single drainage channel centrally located and flowing
     along the longer side of the basin, (length = 20km. width = 12km.). Define and compute
     i)   Form factor.
     ii)   Circularity ratio.
     iii)   Elongation ratio.   **(10 marks)**

Question Three

a)   Briefly describe the concept of Reservoir routing or Level pool routing   **(8marks).**

b)   A reservoir detaining flood flows is 4.356 ha in horizontal area, has vertical sides and has 5m
     diameter reinforced concrete pipe as an outlet structure. The headwater discharge relation for

the outlet pipe is given in table 1 below. Use the level pool routing method to calculate the storage – outflow function value. **(8marks)**

Table 1.

Elevation (m)	0	0.5	1	1.5	2	2.5	3	3.5	4	4.5	5	5.5	6	6.5	7	7.5	8
Discharge m³/s	0	3	8	17	30	43	60	78	97	117	137	156	173	190	205	218	231

8.5	9	9.5	10
242	253	264	275

Table 2.

Time(min)	0	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150
Inflow m³/s	0	60	120	180	240	300	360	320	280	240	200	160	120	80	40	0

Plot the results. **(4marks)**

Question Four

a) Define a flood. **(2marks)**

b) Outline the THREE dimensions that define a flood. **(6marks)**

c) Outline the main factors initiating and modifying floods. **(6marks)**

d) Briefly describe the flood forecasting methods. **(6marks)**

Question Five

a) Write short notes on the following;
  i) Design storm. **(3marks)**
  ii) Design Precipitation Intensity. **(7marks)**
b) Outline measures for mitigating flood damage. **(10marks)**