MASENO UNIVERSITY

UNIVERSITY EXAMINATIONS 2013/2014

THIRD YEAR FIRST SEMESTER EXAMINATIONS FOR THE
DEGREE OF BACHELOR OF SCIENCE IN EARTH SCIENCE WITH
INFORMATION TECHNOLOGY

(MAIN CAMPUS)

NGA 301: SURFACE WATER HYDROLOGY I

Date: *18th November, 2013*   Time: *2.30 - 4.30 p.m.*

INSTRUCTIONS:

- **Answer Question ONE and any other TWO questions.**
- **Sketch maps and diagrams should be used whenever appropriate.**

NGA 301: SURFACE WATER HYDROLOGY I

1. a). Describe formulae for discharge calculation. (8 marks)

   b). The following velocities were recorded in a stream with a current meter. Depth of flow at the point was 5m. Find the discharge per unit width of a stream near the point of measurement using the three point method. (4 marks)

Depth above bed (m)	0	1	2	3	4
Velocity (m/s)	0	0.5	0.7	0.8	0.8

   c). Distinguish between the following:
      i. Drippage and stemflow (3 marks)
      ii. Intermittent stream and ephemeral stream (4 marks)
      iii. Influent stream and effluent stream (4 marks)

   d). Explain the main infiltration scenarios. (7 marks)

2. Examine the types of open channel flow. (20 marks)

3. a). Explain the importance of rainfall interception. (6 marks)

   b). Examine meteorological factors that influence interception. (14 marks)

4. Discuss the influence of landuse on the volume of runoff from a catchment. (20 marks)

5. a). Examine major indicators of soil erosion in a river catchment. (10 marks)

   b). Explain the main methods used to measure soil erosion on short term basis. (10 marks)

6.   a). Discuss the importance of discharge measurements.

(8 marks)

b). The data from a gauging exercise of a certain river in Kenya are given in the table below. Compute the discharge and mean velocity of flow in the river.

(12 marks)

Distance(m)	Depth (m)	Velocity (m/s)	Distance (m)	Depth (m)	Velocity (m/s)
0	0	0	300	3.6	0.52
50	1.7	0.27	350	2.4	0.42
100	2.5	0.40	400	1.6	0.38
150	3.3	0.38	450	1.6	0.26
200	4.1	0.51	470	0	0
250	4.4	0.54			