



MASENO UNIVERSITY
UNIVERSITY EXAMINATIONS 2015/2016

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

MAIN CAMPUS

NGA 307: SURFACE WATER HYDROLOGY II

Date: 21st April, 2016

Time: 8.30 - 10.30 am

INSTRUCTIONS:

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



NGA 307: SURFACE WATER HYDROLOGY II

1. a) Distinguish between annual maximum series and partial duration series. (8 marks)
b) i) Determine the risk that a design flood will be equalled or exceeded in the first two years on a frontage of a road culvert designed for a 25-year flood. (4 marks)
ii) What is the probability that at least one 50-year flood will occur during the 30-year lifetime of a flood control project? (3 marks)
iii) What is the probability that a 100-year flood will not occur in 20 years? (3 marks)
c) Explain the rational formula and its application in urban catchments. (12 marks)
2. Examine the methods of processing of hydrological data (20marks)
3. Discuss methods of transposing data from gaugingstations to ungauged sites. (20 marks)
4. Examine flow spell analysis (20 marks)
5. a) Maximum values of 24 hour precipitation in mm at a raingauge station are 140, 113, 132, 115, 130, 118, 125, 127,103, 105. Determine probability of exceedance, non exceedance and return period. (10 marks)
b) i) Plot precipitation against return period and estimate maximum precipitation having return periods of 5 and 15 years. (8 marks)
ii) Estimate the return periods of 121mm and 135mm precipitation. (2 marks)
6. Examine the assumptions and the limitations of the unit hydrograph. (20 marks)