MASENO UNIVERSITY

UNIVERSITY EXAMINATIONS 2013/2014

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

(MAIN CAMPUS)

NGA 405: DAMS AND HYDRAULIC STRUCTURES

Date: 7th April, 2014 Time 11.15 a.m. – 1.30 p.m.

INSTRUCTIONS:

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

NGA 405: DAMS AND HYDRAULIC STRUCTURES

1. a)) Examine the storage zones of a reservoir. (10 marks)

   b) Explain the importance of carrying out feasibility studies for proposed hydraulic structures. (10 marks)

   c) The table below shows evaporation loss measured by a pan evaporimeter (pan coefficient = 0.7) placed near an area of 5.2 km^2. After a year the surface area of the reservoir reduces to 2.2km^2. Determine the quantity of water lost from the reservoir through evaporation over the year. (10marks)

Month	Evaporation loss (cm)	Month	Evaporation loss (cm)
January	11.5	July	14.1
February	11.0	August	11.2
March	13.2	September	10.2
April	12.8	October	12.0
May	13.2	November	12.4
June	16.2	December	11.6

2. Examine the impacts of small dams on the livelihoods of rural communities. (20 marks)

3. Discuss types of reservoirs. (20 marks)

4. 'Large dams in Africa can cause significant environmental problems'. Discuss. (20 marks)

5. a) Examine the impacts of reservoir sedimentation. (10 marks)

   b) Explain how reservoir sedimentation can be controlled. (10 marks)

6. The following table gives the mean monthly runoff of a river.

Month	Runoff (Mm^3)	Month	Runoff (Mm^3)
January	1.4	July	7.7
February	2.1	August	2.8
March	2.8	September	2.52
April	8.4	October	2.24
May	11.9	November	1.96
June	11.9	December	1.68

i) Draw amass curve and find the storage capacity of the reservoir for utilization of water at a constant regulated flow. (14 marks)

ii) Comment on the shape of the curve. (6 marks)