MASENO UNIVERSITY

UNIVERSITY EXAMINATIONS 2016/2017

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

MAIN CAMPUS

NES 304: WATER SUPPLY AND SANITATION

Date: 8th December, 2016 Time: 12.00 - 3.00 pm

INSTRUCTIONS:

- Answer question ONE and any other TWO questions.

1. (a) Explain the following:
   (i) Reasons for testing raw sewage. (3mks)
   (ii) How to obtain per capita demand of water. (3mks)
   (iii) Theory of filtration. (4mks)
   (iv) Sludge disposal by drying bed method. (6mks)

(b) With suitable illustrations, describe the:
   (i) breakpoint chlorination method. (6mks)
   ii) theory, construction & operation of an oxidation pond. (8mks)

2. (a) (i) Explain the factors that influence the settling processes of a discrete particle in a sedimentation tank. (6mks)
(ii) Write on the use of Aluminum Sulphate as a coagulant. (5mks)

(b)Design a sedimentation tank for water supply scheme which $1.5x10^6$ litres/day to Maseno University. Assume detention period as 5 hours, velocity flow as 20cm/min, depth of the tank as 3m and allowance for sludge deposition as 50cm. (9mks)

3. (a) Explain the construction and working of a septic tank. (8mks

(b) (i) Distinguish between non-scouring velocity and self-cleansing velocity. (5mks)
(ii) Calculate the velocity of flow and the discharge through sewer of diameter 1m laid at a gradient of 1 in 500. Assume the sewer running full. (*Use Mannings formula with* η =0.012) (7mks)

4. (a) Critically examine the advantages and disadvantages of sewage reuse on farm crops. (8mks)

(b)Discuss the preventive strategies for diseases associated with inadequate supply of safe water and poor sanitation. (12mks)

5. (a) Discuss plausible water supply arrangements applicable to most rural communities in Kenya. (6mks)
(b) How would you establish a sanitary project for a newly developing town like Salgaa? (14mks)