



MASEÑO UNIVERSITY
UNIVERSITY EXAMINATIONS 2013/2014

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

(MAIN CAMPUS)

NGA 402: DRINKING WATER TECHNOLOGY

Date: 22nd November, 2013

Time: 11.00 a.m. - 1.00 p.m.

INSTRUCTIONS:

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

NGA 402 DRINKING WATER TECHNOLOGY

1 (a) A 25mm diameter pipe forks, the branches being 12mm and 16mm in diameter respectively. If the velocity in the 12 mm pipe is 0.25 m/s and in the 16mm pipe is 0.50m/s, calculate the velocity in m/s and the rate of flow in cm^3/s in the 25mm diameter pipe.

10 marks

(b) Discuss methods used in population projections.

12 marks

(c) Write concise notes on water meters used for domestic water distribution.

8 marks

2. (a) Explain the importance of water demand forecasting.

8 marks

(b) Examine processes used for desalination.

12 marks

3. (a) Explain the use of Jack well in a water supply system.

6 marks

(b) The population of 5 decades from 1930 to 1970 is given below in the table. Find out the population of 1, 2, 3 decade beyond the last known decade by using arithmetic increase method.

YEAR	1930	1940	1950	1960	1970
POPULATION	25000	28000	34000	42000	47000

14 marks

4. (a) Differentiate between slow and rapid sand filter.

10 marks

(b) (i) A pump lifts 45,000 lts/hr against total head of 18 m. If the pump has an efficiency of 65%, compute the water horsepower and the size of prime mover required to operate the pump.

6 marks

(ii) If a direct driven electrical motor, having an efficiency of 80% is used to operate the pump in (b) (i) for 8 hours daily for 30 days. Compute the

cost of electrical energy in the month given that the cost of electrical energy is Kshs. 1.45 per unit KWh.

4 marks

5. (a) Discuss methods used in aeration of water.

12 marks

(b) A new well has just been constructed and properly protected in the village. It is required that the well water should be disinfected with 50 ppm of chlorine before it is passed for community use. The well is circular, and its dimensions are diameter of 2m and level of water 7m. The available chlorine in the Sodium hypochlorite solution is 5%. Find the dose of sodium hypochlorite solution needed for disinfection.

8 marks

6. (a) Examine 3 types of pumps that are used in lifting water from the source to the supply area.

12 marks

(b) Explain how electrochemical corrosion takes place in water pipes.

8 marks