Uva Wellassa University of Sri Lanka
Faculty of Science and Technology
Department of Science and Technology
300 level 2nd Semester Examination – December/January 2019
MRT 384-2 Water Supply Engineering

Uva Wellassa University

Instructions to candidates
Duration: 02 hours
Number of questions: 04 (Four)
Mark allocation: 100 Marks
Answer all questions

1.

a. State three (03) type of population forecasting methods. (2.5 Marks)

b. State four (04) factors which affect the population growth with necessary examples. (2.5 Marks)

c. A semi-urban township with a residential population of 60,000 requires finding a suitable raw water source to have a drinking water supply. Estimate the annual raw water requirement for this township in 25 years from now. Use the information given below.

i. Per-capita potable water demand 120 l/day
ii. NRW of 20%
iii. Treatment plant loss 10%
iv. Population growth rate estimated to increase at an annual ate of 0.8%
v. Assume industrial, institutional and commercial demand perccentage of domestic demand as 12%, 10% and 8%, respectively.

(20 Marks)

2.

a. List three (03) methods of laying out distribution systems. (3 Marks)

b. State two (02) advantages and two (02) disadvantages of one of above method. (4 Marks)

c. List (03) major requirements of a good distribution system. (3 Marks)

d. What are the components of a water intake? (4 Marks)

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e. List four (03) type of water intakes with necessary sketches.

(6 Marks)

f. List two (02) design considerations of an intake.

(5 Marks)

3.

a. List two (02) advantages and two (02) disadvantages of DI pipes.

(4 Marks)

b. List two (02) advantages and two (02) disadvantages of HDPE pipes.

(4 Marks)

c. List four (04) different type of valves.

(4 Marks)

d. What are the types of valves that can be used to regulate the flow?

(2 Marks)

e. Briefly explain the importance of having "Air valve" in pipelines.

(4 Marks)

f. Briefly explain the importance of having " Scoure valve" in pipelines.

(4 Marks)

g. Briefly explain the purpose of having distribution reservoirs in a distribution system.

(3 Marks)

4.

a. Write short notes on following topics

   i. Cavitation of a pump

   ii. Dissolved impurities (5 Marks)

b. Draw the pump performance curve and system curve in a diagram with static head and the pump operating point

(5 Marks)

c. The average water consumption of a city is 3,800 m3/day and in 4 hour intervals through out the day as fallows.

Time /(hr)	0-4	4-8	8-12	12-16	16-20	20-24
Demand Propotion	0.04	0.18	0.28	0.22	0.18	0.10

A service reservior has to be designed for an average day rquirement

i. If the two pumps of similar capacity have been installed to pump water to the service reservior, Determine the storage capacity of the service reservior.

ii. If the similar pumps are operated from 8 hrs to 16 hrs only and, during the balance period only one pump is used to supply water to the service reservior, Determine the storage capacity of the service reservior.

(15 Marks)

Important Equation

$$P_n = P\left(1 + \frac{I_a}{100}\right)^n$$

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