

BENGAL ENGINEERING AND SCIENCE UNIVERSITY, SHIBPUR
M.E. (Civil) 2nd SEMESTER EXAMINATIONS, May, 2013
Management in Water Supply and Sanitation (CE 1038)

Full Marks: 70

Time: 3 hrs

PART – I

Answer any 2 (TWO) questions.

1. Differentiate between 'piped' and 'un-piped' water supply system. Briefly discuss about different types of water distributed over the sub-surface. State the role of modified stream bed for ground water recharge. How the concurrent development of groundwater and surface water is possible? What are the criteria of developing a water distribution system?

(4+4+3+4+2 1/2 = 17 1/2)

2. How can a water distribution system be constructed? Write the utility of Hardy-Cross method in designing a water supply network. Briefly discuss about the role of 'metallic coatings' and 'chemical coatings with paints' to prevent corrosion. What are the possible mechanisms of groundwater contamination? How would you go for 'Extraction method' for renovating a contaminated groundwater?

(3+4+4+4+2 1/2 = 17 1/2)

3. How would you undertake maintenance work in a water distribution system? Why pumping is required in a water distribution system?

A pump with following characteristic curve (*head-discharge curve*) is operated in a water supply network. The length and diameter of the distribution main are 200 m and 350 mm respectively.

Head (m)	Discharge (m ³ /s)
36.0	0.00
32.2	0.40
28.0	0.52
24.3	0.68
18.1	0.80

The friction factor of the same water main is already estimated as 0.04. Determine the operating head of the pump considering the suction and delivery losses negligibly small.

(4+2 1/2 +9+2 = 17 1/2)

4. Briefly highlight on various steps generally followed prior to designing a water treatment plant. Write the utility of 'hydraulic profile' of water treatment plant. List the issues relevant to management of Water Works and comment on them. What is the 'optimal design' of water treatment system? Write the basic approach of 'dynamic programming' in water treatment.

(5+3+3 1/2 +3+3 = 17 1/2)

PART – II

Answer any 2 (TWO) questions

5. Why proper sanitation is essential for a civic community? Differentiate between 'on-site' and 'off-site' disposal method of sanitation. List various on-site methods of sanitation without water carriage and comment on their applicability. What are the objective and scope of 'off-site' disposal method of sanitation? Illustrate the concept of 'Decentralized' and 'Centralized' wastewater management system.

$$(3+4+5+2\frac{1}{2}+3 = 17\frac{1}{2})$$

6. How can the sanitation be extended for slum and shanty areas of a town? Write the economic consideration for sewerage system in the underdeveloped areas. Comment on role of vermin-culture in wastewater treatment. What are the basic considerations for providing a sewerage system in a town? Briefly discuss about different types of sewerage system that can be provided in a town.

$$(3+3\frac{1}{2}+3+4+4 = 17\frac{1}{2})$$

7. Specify the role of 'inspection chamber' and 'LS/MPS' in a typical sewerage system. What are the requirements for construction of sewer? What are the 'shoring' and 'tunneling' in the context of sewer construction? Briefly highlight on the general method of laying sewer pipes. How would you conduct 'water test' in a sewer pipe?

$$(4+3+4+3+3\frac{1}{2} = 17\frac{1}{2})$$

8. Write the purpose of sewer maintenance. Name various equipments used for cleaning a sewer segment and comment on their basic function. Why inspection is necessary for a sewer? Write the design considerations of wet well in a sewage pumping station. List the common operating problems associated with a 'Grit chamber'.

$$(3+5\frac{1}{2}+3+3+3 = 17\frac{1}{2})$$