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Total No. of Questions : 09

B.Tech. (CE) (2011 Onwards)   (Sem.–5)
ENCIRONMENTAL ENGINEERING
Subject Code : BTCE-505
Paper ID : [A2082]

Time : 3 Hrs.   Max. Marks : 60

INSTRUCTIONS TO CANDIDATES :
1. **SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.**
2. **SECTION-B contains FIVE questions carrying FIVE marks each and students has to attempt any FOUR questions.**
3. **SECTION-C contains THREE questions carrying TEN marks each and students has to attempt any TWO questions.**

SECTION A

1. **Write briefly :**

   a) Define per capita demand. How does it differ with different areas as per Indian manual?

   b) What is meant by fluctuations in demand? How is this information used in water supply system design?

   c) What are Intakes? What are the component parts of an Intake structure?

   d) What is meant by economical diameter of a rising main?

   e) List any four factors on which the coagulant dose depends

   f) Differentiate between desalination and demineralization.

   g) The groundwater available for domestic water consumption was found to have problems of taste, odour and excessive iron present. Suggest any two household level methods of purification this water.

   h) What is the basic principle in the base-exchange process of water softening?

   i) Give any four methods of waste prevention in water supply distribution system

   j) What is meant by 'rain water harvesting'?

SECTION B

Q2 "*Source selection is an important activity in water supply system design*". Elucidate.

Q3 Draw a typical treatment flow diagram for water drawn from a lake. Indicate the importance of each unit of treatment.

Q4 List the different types of pumps used in water supply. Give the suitability and criteria for choosing the pumps

Q5 Discuss the various corrosion theories as applied to water supply pipes.

Q6 A Water works treating 4.5 million litres per day (MLD) is provided a sedimentation tank of size 50 × 15 × 4 m. Determine (i) Detention time (ii) settling velocity of the slowest particle which will be 100% removed.

SECTION C

Q7 a) The population figures of a town for the last four decades are as follows : Predict the population for 2021 using an appropriate method, give reasons on the choice of the method

Year	1981	1991	2001	2011
Population	11093	13751	15206	19723

b) Water has to be supplied to a town with one lakh population at a rate of 135 lpcd from a river 2 km away. The difference in elevation between the lowest water level in the sump and the reservoir is 35 m. If the pumping is proposed to be done in 8 hours, determine the size of the main and BHP of the pumps required. Assume maximum demand as 1.5 times the average demand, f = 0.0075, velocity in pipe is 2.5 m/s, efficiency of the pump and motor 80 % and 90%, respectively.

Q8 a) What are the common impurities found in natural water and explain its effect on the quality?

b) Distinguish clearly between water quality criteria and standards. Critically examine the use of MPN as bacteriological water quality standard.

Q9 Write short notes clearly differentiating the following terms as applied to water treatment:

i) Coagulation and flocculation

ii) Fluoridation and de- fluoridation

iii) Double Filtration and In-depth Filtration

iv) Water Softening and Stabilisation