B.E.-Civil Engineering Sem IV

CE-402 - Environmental Engineering-I

P. Pages : 2 **GUG/S/18/3873**

Time : Three Hours

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Max. Marks : 80

Notes :
1. All questions carry equal marks.
2. Due credit will be given to neatness and adequate dimensions.
3. Assume suitable data wherever necessary.
4. Diagrams and Chemical equation should be given wherever necessary.
5. Use of calculator is permitted.

1. a) What is per capita water demand? What are the various factors affecting per capita demand? **8**

b) The following data shows the variation in population of a town from 1950 to 2000. Estimate the population of the town in the year 2020 by Geometrical increase Method & Incremental Increase method. **8**

YEAR	1950	1960	1970	1980	1990	2000
POPULATION	85,000	1,15,000	1,45,500	1,85,800	2,25,500	2,90,500

OR

2. a) What is per capita water demand? Suggest a suitable breakup of domestic water demand on different heads. Explain in brief, the daily variation in rate of demand. **8**

b) Explain with neat sketch reservoir intake. **8**

3. a) A town having a population of 1.2 lakhs is to be supplied with water from a reservoir 5km away. It is stipulated that half the daily supply of 200 l/c/d will have to be delivered in 8hrs; what should be the size of the supply main if the head available is 16metres. Take the value for C for the main as 100. **10**

b) What are the advantages and disadvantages of continuous supply and intermittent supply of water? **6**

OR

4. a) Determine the storage capacity of a service reservoir for daily requirement of 250000 liters. The pumping is to be done at uniform rate and the period of pumping to be from 7 am to 5 pm. The variation in demand is as follows. **10**

Period	7 am to 8 am	8 am to 5 pm	5 pm to 6.30 pm	6.30 pm to 7 am
Demand	30% of total	35% of total	30% of total	5% of total

b) Write about various water distribution layouts. **6**

5. a) For a sample of water with the ionic composition shown in table below. Calculate carbonate & total hardness in mg/l as $CaCO_3$. **8**

Ca^{++}	Mg^{++}	Na^{+}	HCO_3^-	SO_4^-	Cl^-
120mg/l	60	15	250	45	39

b) Write in brief about Water Borne Diseases and their protective measures. **8**

OR

6. a) Enumerate the various characteristics of water. Explain the significance and permissible limits of the following properties from the point of view of water quality. **8**

i) DO ii) Hardness.

iii) P^H value.

b) What do you understand by biological examination of water? Why is it necessary and how is it done? **8**

7. a) One million liters of water per day is passing through a sedimentation tank which is 6m wide. 15 cm long & having water depth of 3M (a) Find the detention time for the tank (b) what is the average flow velocity through the rank? (c) If 50 ppm is the concentration of suspended solids present in turbid raw water how much dry solids will be deposited per day in the tank assuming 70% removal in the basin, & average sp. Gr. of the deposit as 2. (d) Compute the overflow rate. **8**

b) Draw a neat flow diagram of conventional water treatment plant. State the function of each unit in treatment plant. **8**

OR

8. a) Design a cascade aerator to treat water for a town having a population of 50000 with a per capita demand of 150 l/d. Velocity on inlet pipe is 1.2 m/s. Assume necessary data if needed. **8**

b) Differentiate between process of coagulation and flocculation. List the commonly used coagulants. Explain any one in detail. **8**

9. a) Design rapid sand filters for a population on 100,000 to be served for per capita water supply 200 lpcd. Assume suitable data. **8**

b) Draw the diagram of slow sand filter and explain working & cleaning operations. **8**

OR

10. a) Write about the requirements for good disinfectant. With a neat sketch explain Break point chlorination. **8**

b) Calculate the quantity of bleaching powder required per day for disinfecting 15MLD of water. The dose of chlorine has to be 0.6 ppm and the bleaching powder contains 30% of available chlorine. **8**

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