U.S.N.										

B.M.S. College of Engineering, Bengaluru-560019

Autonomous Institute Affiliated to VTU

September / October 2023 Supplementary Examinations

Programme: B.E **Semester: IV**
Branch: Civil Engineering **Duration: 3 hrs.**
Course Code: 19CV4PCWSE **Max Marks: 100**
Course: Water Supply Engineering **Date: 27.09.2023**

Instructions: 1. Answer any FIVE full questions, choosing one full question from each unit.
2. Missing data, if any, may be suitably assumed.

UNIT - I

1 a) Define per capita demand. List the factors that affect per capita demand. **06**

b) Describe fire demand. Calculate the fire demand of a city having a population of 2,50,000 using various formulae. **06**

c) The census data for population of a town are as follows. Estimate the population in the year 2011 by Geometric increase method, AIM, IIM. **08**

Year	1951	1961	1971	1981
Population	93,000	111,000	132,000	161,000

UNIT - II

2 a) Compare surface and underground sources of water with regard to quantity and quality. **06**

b) Explain the factors governing the selection of a particular source of water. **06**

c) Water has to be supplied to a Town with one lakh population at the rate of 150 l/capita/day from a river 2000m away. The difference in elevation between the lowest water level in the sump and the reservoir is 36m. If the demand has to be supplied in 8 hours, determine the size of the main and the brake horse power of the pumps required. Assume maximum demand as 1.5 times the average demand. Assume f=0.0075, velocity in the pipe=2.4m/sec & efficiency of the pump is 80 percent. **08**

UNIT - III

3 a) Write drinking water quality standards for the following parameters as per IS 10500-2012 and discuss their effects when they are not in their limits. **06**
(i) Fluoride (ii) Nitrate (iii) Hardness

b) Discuss the physical, chemical and microbiological characteristics of water. **10**

c) Enumerate various water borne diseases and suggest preventive measures employed. **04**

OR

4	a)	Explain the objectives of water quality Management. With the help of a flow diagram, explain briefly the complete sequence of water treatment plant.	**10**
	b)	Illustrate the importance of sampling water for examination. Explain the sampling of water from a lake.	**10**

UNIT - IV

5	a)	A circular sedimentation tank fitted with standard mechanical sludge removal equipment is to handle 3.5 million liters per day of raw water. If the detention period of the tank is 5 hours, and the depth of the tank is 3m, what should be the diameter of the tank?	**10**
	b)	A coagulation- sedimentation plant clarifies 50 million litres of water every day. The quantity of filter alum required at the plant is 20 mg/lit. If the raw water is having an alkalinity equivalent to 4 mg/lit of $CaCo_3$, determine the quantity of filter alum and the quick lime (containing 85% of Cao) required per year by the plant. Take molecular weights as Al=27; S=32; O 6;H=1;Ca=40;C=12.	**10**

UNIT - V

6	a)	Differentiate between a slow sand filter and Rapid sand filter.	**06**
	b)	With the help of neat sketch explain working and cleaning of rapid sand filter.	**08**
	c)	Calculate the quantity of bleaching powder required per day for disinfecting 4 MLD water. Dose of chlorine is 0.5 ppm and bleaching powder contains 30% of available chlorine.	**06**

OR

7	a)	With the help of neat sketch, explain ground water recharge and Roof top harvesting.	**10**
	b)	Explain the following methods of treatment of water. (i) Reverse osmosis: (ii) Membrane filter technique	**06**
	c)	Illustrate the various types of Chlorination.	**04**

****