Reg.No.:												

VIVEKANANDHA COLLEGE OF ENGINEERING FOR WOMEN
[AUTONOMOUS INSTITUTION AFFILIATED TO ANNA UNIVERSITY, CHENNAI]
Elayampalayam – 637 205, Tiruchengode, Namakkal Dt., Tamil Nadu.

Question Paper Code: 170005

B.E. / B.Tech. DEGREE END-SEMESTER EXAMINATIONS – NOV. / DEC. 2025
Third Semester
Civil Engineering
U23CE305 – WATER SUPPLY AND WASTE WATER ENGINEERING
(Regulation 2023)

Time: Three Hours | Maximum: 100 Marks

Answer ALL the questions

Knowledge Levels (KL)	K1 – Remembering	K3 – Applying	K5 - Evaluating
	K2 – Understanding	K4 – Analyzing	K6 - Creating

PART – A

(10 x 2 = 20 Marks)

Q.No.	Questions	Marks	KL	CO
1.	Distinguish between per capita demand and per capita consumption.	2	K2	CO1
2.	Name the major pollutants expected in surface water and subsurface water.	2	K1	CO1
3.	Mention the criteria based on which designing of screens is normally done.	2	K1	CO2
4.	Predict the need for defluoridation of water. Name any one method of doing it.	2	K2	CO2
5.	List any two requirements of a good distribution system.	2	K2	CO3
6.	Infer components of a house service connection.	2	K2	CO3
7.	What do you mean by population equivalent? State its application.	2	K1	CO4
8.	Sewer inner surface is expected to appear black in colour. Is it true or false? Justify your answer.	2	K2	CO4
9.	Recall SVI. Write its significance.	2	K2	CO5
10.	Cite two major differences between the standard rate and high rate trickling filters	2	K2	CO5

PART – B

(5 x 13 = 65 Marks)

Q.No.		Questions	Marks	KL	CO
11.	a)	Population data observed for a town in the past decades is given below. Adopt a design period 50 years, per capita demand as 155 lpcd. Estimate the water demand of the water supply system of the town proposed by using any two most suitable methods of population forecasting.	13	K3	CO1

Year	1971	1981	1991	2001	2011	2021
Population	40000	46500	54000	63000	74000	89000

(OR)

	b)	What are indicator organisms? Why they are called so? Name the methods of their estimation. Describe any one method in detail.	13	K3	CO1
12.	a)	Design the rapid sand filter beds, under drain system and wash water trough for the rapid sand filter, for the supply of water to a town having 60,000 population providing water supply at the rate of 120 lpcd.	13	K2	CO2

(OR)

	b)	What are the different desalination process? Point out the method implemented for domestic water supply system. Describe the working mechanism, operation and management of that water treatment system.	13	K2	CO2
13.	a)	Design a service reservoir for the details shown below if the inflow of water to the service reservoir is maintained at a uniform rate throughout the period of 10 hours pumping during 06 – 10 and 14 – 20 hours.	13	K3	CO3

Time (hours)	00 – 04	04 – 06	06 – 10	08 – 12	12 – 14	14 – 20	20 – 24
Demand (10^6 litres)	0.26	0.45	1.53	0.49	0.38	1.60	0.29

(OR)

	b)	Explain the different conventional methods of detecting leakages in water supply pipe and also leakage detection by AI techniques.	13	K3	CO3
14.	a)	A town has a population of 1,40,000 persons and provides water supply at the rate of 135 lpcd. Adopting a peak factor of 2.5, sewer slope of 1 in 450 and N as 0.013, design a circular sewer, which runs 0.70 times full at the maximum flow condition. Also do the necessary velocity check on the sewer section designed.	13	K3	CO4

(OR)

	b)	What are basic requirements taken care in designing of a house drainage system? Describe the various plumbing systems with neat sketches.	13	K3	CO4
15.	a)	Describe the construction and working of a conventional ASP and list out and brief the construction and working of modified forms of ASP.	13	K3	CO5

(OR)

	b)	Determine the dimensions of a single stage high rate trickling filter for the following data.	13	K3	CO5

Flow rate	= 1.5 MLD
Recirculation ratio	= 1.3
BOD of raw sewage	= 280 mg/lit
BOD removal in PST	= 35 %
BOD of final effluent required	= 25 mg/lit

PART – C

(1 x 15 = 15 Marks)

Q.No.		Questions	Marks	KL	CO
16.	a)	Draw the layout diagram of a treatment plant showing the conventional treatment given to treat wastewater generated in a town. Make a brief note on each treatment unit referring to the i. Working mechanism. ii. Design criteria adopted in their design and iii. Impurity removed in each.	15	K3	CO5

(OR)

	b)	Find the flow values in the pipes BCD and BED. Take C = 100.	15	K3	CO3