USN											Course Code		2	1	C	V	4	3

Fourth Semester B.E. Degree Examinations, September/October 2023
PUBLIC HEALTH ENGINEERING

Duration: 3 hrs   **Max. Marks: 100**

Note: *1. Answer any **FIVE** full questions, choosing **ONE** full question from each module.*
           2. Missing data, if any, may be suitably assumed

Q. No		*Question*	*Marks*	*(RBTL:CO: PI)*
		MODULE – 1		
1.	**a.**	List all the types of water demands and explain any four water demands.	**10**	(2 :1: 1.2.1)
	b.	List and explain the factors affecting the per capita demand	**10**	(2 :1: 1.2.1)
		OR		
2.	**a.**	In a town it has been decided to provide 200 Lpcd of water. Estimate the domestic water requirement of the town in the year 2040 by Incremental increase method with the following data	**10**	(3 :1: 1.3.1)

Year	1980	1990	2000	2010	2020
Population	250000	480500	550300	638600	695200

	b.	What is design period? Explain factors affecting governing design period	**10**	(2 :1: 1.2.1)
3.	**a.**	Explain the slow sand filter and rapid sand filter with a neat sketch.	**10**	(2 :2: 1.2.1)
	b.	With the help of unit flow diagram, explain each unit of water treatment plant.	**10**	(4 :2: 1.2.1)
		OR		
4.	**a.**	Explain the lime soda and zeolite process with neat sketches.	**10**	(2 :2: 1.2.1)
	b.	Design the rectangular sedimentation tank with the following data Volume of water to be treated per day=3 ML, Detention period=4 Hours, Velocity of flow=10cm /min	**10**	(4 :2: 1.3.1)
5.	**a.**	Define sanitation. Explain the need for good sanitation.	**04**	(2 :3: 1.1.1)
	b.	Define sampling. Explain the importance and types of sampling	**06**	(2 :3: 1.1.1)
	c.	Describe types of sewerage system and their suitability.	**10**	(2 :3: 1.1.1)
		OR		
6.	**a.**	The 5-day BOD at 30℃ of a sewage sample is 120 mg/L. Calculate 5 days BOD at 20℃.Assume de-oxygenation constant at 20℃, K=01/day.	**10**	(3 :3: 1.3.1)
	b.	Briefly explain the characteristic of waste water, with the aid of flow chart.	**10**	(4 :3: 1.2.1)
7.	**a.**	With help of the flow diagram explain the importance of each unit employed for a municipal wastewater treatment plant.	**10**	(4 :4: 1.2.1)

Note: (**RBTL - Revised Bloom's Taxonomy Level: CO - Course Outcome: PI - Performance Indicator**)

	b.	With neat sketch explain the skimming tank (oil and grease chamber) and grit chamber, functions and its types.	**10**	(3 :4: 1.2.1)

<div align="center">OR</div>

8.	**a.**	Explain the working of conventional activated sludge process (ASP) with flow diagram.	**10**	(4 :4: 1.2.1)
	b.	Explain the importance of screens and types of screens in the sewage treatment process.	**10**	(4 :4: 1.2.1)
9.	**a.**	Explain trickling filter with neat sketch.	**10**	(5 :5: 1.2.1)
	b.	Explain the rotational biological contactors and bio towers	**10**	(5 :5: 1.1.1)

<div align="center">**OR**</div>

10.	**a.**	Explain aerobic sludge digester and anaerobic sludge digesters	**10**	(5 :5: 1.2.1)
	b.	Determine the size of the High-rate Tricking Filters for the following data: i) Sewage flow = 4.5 MLD ii) Recirculation ratio = 1.5 iii) BOD of Raw sewage = 250 mg/L iv) BOD removal in primary tank = 30%. v) Final effluent BOD desired = 30 mg/L. (08 Marks)	**10**	(5 :5: 1.3.1)

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