Roll No:

BTECH
(SEM VI) THEORY EXAMINATION 2021-22
ENVIRONMENTAL ENGINEERING

Time: 3 Hours   *Total Marks: 100*

Note: Attempt all Sections. If you require any missing data, then choose suitably.

SECTION A

1.   **Attempt *all* questions in brief.**   **2*10 = 20**

Qno	Questions	CO
(a)	Define "per capita demand"?	1
(b)	Define "Design Period"?	1
(c)	Explain the function of distribution reservoir.	2
(d)	What is 'Reservoir yield'?	2
(e)	What guidelines EPA has set for suspended solids?	3
(f)	Define 'dissolved material'?	3
(g)	Differentiate between Unit Operation & Unit Process?	4
(h)	What is the difference between "Disinfection" & "Sterilization"	4
(i)	Explain Aerobic decomposition?	5
(j)	Define wastewater treatment?	5

SECTION B

2.   **Attempt any *three* of the following:**   **10*3 = 30**

Qno	Questions	CO
(a)	Explain the suitability of any four population forecasting methods?	1
(b)	Explain with neat sketch any one type of surface reservoir?	2
(c)	Explain in detail about organics in wastewater?	3
(d)	A rectangular settling tank is to treat 1.8 million litres per day of raw water. The sedimentation period is to be 4 hours, the velocity of flow 8 cm/minute, and the depth of the water and sediment 4.2 m. If an allowance of 1.2 m for sediment is made, what should be Length and Width of the basin.	4
(e)	Briefly explain the working of Trickling Filter?	5

SECTION C

3.   **Attempt any *one* part of the following:**   **10*1 = 10**

Qno	Questions	CO
(a)	The population of a city obtained from the census report is as given below:	1

Year	1960	1970	1980	1990	2000
Population	80000	120000	168000	228000	250000

Calculate the population of the city for the year 2030 by Arithmetical increase method, geometric increase method and by Incremental Increase method.

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(b)	Estimate the hydraulic gradient in 2 m dia. Smooth concrete pipe carrying a discharge of 3 cumecs at 10^0C temperature by (a) Darcy-Weisbach formula (b) Hazen-William's formula. Assume all suitable data

4. **Attempt any *one* part of the following:** 10 *1 = 10

Qno	Questions	CO
(a)	Illustrate with sketches the different types of layouts of pipe systems in distributing water?	2
(b)	Differentiate between gravity and pressure conduits? Pressure conduits are commonly used for conveying water from distant sources to the town for supply, explain why?	2

5. **Attempt any *one* part of the following:** 10*1 = 10

Qno	Questions	CO
(a)	A sample of wastewater has a 4- day 20^0C BOD value of 75% of final. Find the reaction constant per day?	3
(b)	For a wastewater sample, 5 -day BOD at 20^0C is 200 mg/lt and is 67% of the ultimate. What will be 4-day BOD at 30^0C	3

6. **Attempt any *one* part of the following:** 10*1 = 10

Qno	Questions	CO
(a)	Determine the quantity of alum required in order to treat 13 million litres of water per day at a treatment plant, where 12 ppm of alum dose is required. Also determine the amount of gas CO_2 which will be released per litre of water treated.	4
(b)	It is required to supply water to a population of 20,000 at a per capita demand of 150 lpcd. The disinfection used for the chlorination is bleaching powder which contains 30% available chlorine. Determine how much of bleaching powder is required annually at the water works of 0.3 ppm of chlorine dose is required for disinfection	4

7. **Attempt any *one* part of the following:** 10*1 = 10

Qno	Questions	CO
(a)	Discuss Activated Sludge process with suitable diagram.	5
(b)	Explain "Vermicomposting" in brief. Also explain advantages of Vermicomposting	5