



# PRESIDENCY UNIVERSITY

BENGALURU

Roll No.																			
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## End - Term Examinations - MAY 2025

Date: 31-05-2025

Time: 09:30 am - 12:30 pm

<b>School:</b> SOE	<b>Program:</b> B. Tech-CIV		
<b>Course Code :</b> CIV3035	<b>Course Name:</b> WASTEWATER TREATMENT AND DISPOSAL SYSTEMS		
<b>Semester:</b> VI	<b>Max Marks:</b> 100	<b>Weightage:</b> 50%	

CO - Levels	C01	C02	C03	C04	C05
Marks	22	44	34	-	-

### Instructions:

- (i) Read all questions carefully and answer accordingly.
- (ii) Do not write anything on the question paper other than roll number.

### Part A

Answer ALL the Questions. Each question carries 2marks.

10Q x 2M=20M

1.	Name the biological characteristics of sewage.	2 Marks	L1	C01
2.	Write the objectives of sanitary engineering.	2 Marks	L1	C01
3.	List the types of screens based on size of openings used in wastewater treatment.	2 Marks	L1	C02
4.	Activated sludge is probably the most versatile of the biological treatment processes capable of producing an effluent with any desired BOD. Name are the factors affecting activated sludge process.	2 Marks	L1	C02
5.	The sewer pipes carry sewage as gravity conduits, and are therefore laid at a continuous gradient in the downward direction up to the outfall point, from where it will be lifted up, treated and disposed of. List the important factors considered for selecting material for sewer.	2 Marks	L1	C01
6.	All forms of liquid waste produced by the community is sewage. It includes domestic wastewater, industrial wastewater and storm water. In relation to this define sullage.	2 Marks	L1	C01
7.	Anaerobic digestion is defined as being biological oxidation of degradable organic sludge by microbes under anaerobic condition. List the advantages of anaerobic digestion.	2 Marks	L1	C03
8.	Outline the factors affecting natural forces in self-purification of natural streams.	2 Marks	L1	C03

9.	Sewerage system is the infrastructure of collecting, treating and disposal of sewage. It includes network of sewers used in collection, conveyance and disposal of sewage. List the factors affecting dry weather flow.	2 Marks	L1	CO1
10.	For safe disposal of the sewage generated from a locality efficient collection, conveyance, adequate treatment and proper disposal of treated sewage is necessary. To achieve this, what all conditions should be satisfied?	2 Marks	L1	CO1

### Part B

#### Answer the Questions.

Total Marks 80M

11.	a.	A town having a population of 36000, the daily per capita water supply allowance being 135 liters, of which 80% finds its way to sewer. The slope available for the sewer to be laid is 1 in 625 and sewer should be designated to carry four times the dry weather flow when running full. Compute the velocity and diameter of the sewer when running full. Assume manning's coefficient $n = 0.012$ .	10 Marks	L2	CO1
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Or

12.	a.	Sampling is used every day at water and wastewater treatment plants to determine the characteristics of the water. Sampling may be used to test the finished water for regulatory purposes to ensure that the treatment plant is treating the water in compliance with regulations. Explain the various sampling techniques to collect water and wastewater.	10 Marks	L2	CO1
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13.	a.	Design a screen device for a flow of 25MLD with approach velocity 1 m/sec. Assume depth of flow as 0.9 m, size of opening is 25 mm and diameter of bars = 10 mm. Calculate the head loss through screen device. The bars are provided with an inclination $60^\circ$ to horizontal.	10 Marks	L3	CO2
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Or

14.	a.	A modern trickling filter consists of a bed of highly permeable media to which micro-organism are attached and sewage percolates or trickle down and hence the name trickling Filter. Sketch the trickling filter.	10 Marks	L3	CO2
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15.	a.	Disposal by dilution is the simple method of discharging wastewater into a surface water such as a river, lake, ocean, estuaries or wetlands. This results in the pollution of the receiving water. The degree of pollution depends on the dilution, volume and composition of the wastewater as compared to the volume and quality of the water with which it is mixed. Summarize the conditions which are favorable for the disposal of raw or untreated sewage by dilution.	10 Marks	L2	CO3
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Or

16.	a.	The term sludge refers to the solids that are settled and separated during wastewater treatment. Paraphrase about primary sludge.	10 Marks	L2	CO3
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17.	a.	Municipal wastewater generated from Hebbal, Bangalore is primarily organic in nature with little amount of oil and grease produced from automobile industries and contains high concentration of floating, grit and suspended particles. Depict the flow chart of various treatment units required for the treatment of wastewater produced from the town.	10 Marks	L2	CO2
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**Or**

18.	a.	Wastewater generated from residential area near Jayanagar, Bangalore contains high concentration of oil and grease which will interfere with removal of organic matter in secondary treatment. Suggest a suitable preliminary treatment unit which can be used to oil and grease from waste water. Demonstrate the suggested treatment unit with the help of neat diagram	10 Marks	L2	CO2
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19.	a.	A town having a population of 30000 persons is producing the following sewages 1) Domestic sewage at 120 lpcd having 200 mg/l of BOD 2) Industrial sewage at 300000 lpd having 800 mg/l of BOD Design high rate single stage tricking filters for treating above sewage. Assuming that the primary sedimentation removes 35% of BOD. Allow an organic loading of 10000 kg/ha-m/day (excluding recirculation sewage). The recirculation ratio is 1.0 and surface loading should not exceed 170 ML/ha/day (including recirculation sewage). Also calculate the efficiency of the filter and BOD of the effluent.	20 Marks	L3	CO2
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**Or**

20.	a.	Activated sludge refers to biological treatment processes that use a suspended growth of organisms to remove BOD and suspended solids. Demonstrate the design criteria's of Activated Sludge Process.	20 Marks	L3	CO2
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21.	a.	When sewage is discharged into the river, the receiving water gets polluted due to waste products present in sewage effluent. But the conditions do not remain same forever, because the natural forces of purification go on acting up on the pollution elements and bring back the water into its original condition. This automatic purification in due course of time is called the 'Self Purification' phenomena. Illustrate the actions involved in 'Self Purification' phenomena.	20 Marks	L3	CO3
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**Or**

<b>22.</b>	<b>a.</b>	The quantity of sludge generated depends upon the degree of treatment or quality of treated effluent. Illustrate the specifications for preparation of sludge drying beds.	<b>20 Marks</b>	<b>L3</b>	<b>C03</b>
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