Reg. No.

B. E / B. TECH.DEGREE EXAMINATION, MAY 2023
Sixth Semester
CE18602 – WASTE WATER ENGINEERING
(Civil Engineering)
(Regulation 2018)

TIME: 3 HOURS   **MAX. MARKS: 100**

CO1	Calculate sewage generation, classify the characteristics and composition of sewage and compute the sizes of sewerage system components.
CO2	Compute the sizes of the units and discuss the unit operations and processes that are used in primary treatment of sewage and onsite sanitation.
CO3	Compute the sizes of the units and explain the unit operations and processes that are involved in secondary treatment of sewage.
CO4	Describe the advanced sewage treatment technology and reuse of sewage.
CO5	Describe the self-purification process of streams and calculate the sludge generation and explain the sludge management.

PART- A (10x2=20Marks)
(Answer all Questions)

		CO	RBT LEVEL
1.	Differentiate dry weather flow and wet weather flow.	1	2
2.	What is trap? State its quality requirements.	1	2
3.	Define on-site sanitation. What are the methods of onsite sanitation?	2	2
4.	What is the function of primary settling?	2	2
5.	What is the function of aeration in Activated Sludge Process?	3	2
6.	What is meant by MLVSS?	3	2
7.	Discuss about MBR.	4	2
8.	What are the various processes involved in the constructed wetlands?	4	2
9.	What is meant by disposal by dilution?	5	2
10.	What are the steps involved in sludge treatment?	5	2

PART- B (5x 14=70Marks)

		Marks	CO	RBT LEVEL
11. (a)	Determine designed discharge for a combined system serving population of 50000 with rate of water supply of 135 LPCD. The catchment area is 100 hectares, the duration of rainfall is 30 minutes and the average coefficient of runoff is 0.60.	(14)	1	3

(OR)

(b) Enumerate and explain with neat sketches of the various sewer appurtenances. (14) 1 3

12. (a) Design and draw a grit chamber for population 50000 with water consumption of 135 LPCD. Assume, if any data required. (14) 2 3

(OR)

(b) Describe the steps involved in the design of septic tank. And also explain the working of a septic tank with neat sketch. (14) 2 3

13. (a) Design a complete mixed activated sludge process aeration tank for treatment of 4 MLD sewage having BOD concentration of 180 mg/L. The effluent should have soluble BOD of 20 mg/L or less. Consider the following: (14) 3 3
   i.   MLVSS/MLSS = 0.8
   ii. Return sludge SS concentration = 10000 mg/L
   iii. MLVSS in aeration tank = 3500 mg/L
   iv. Mean cell residence time adopted in design is 10 days

(OR)

(b) Summarize in detail with neat sketches about the trickling filters and state the various advantages and disadvantages of conventional trickling filter. (14) 3 3

14. (a) What are all the suitable conditions for adopting SBR and MBBR as a treatment units. Explain the process and application of SBR and MBBR. (14) 4 3

(OR)

(b) Explain with neat sketch the operations, functions, advantages and disadvantages of the UASB reactor. (14) 4 3

15. (a) Name the various actions involved in the self-purification process of a stream and explain them briefly. (14) 5 3

(OR)

(b) Describe briefly about the various types of sludge digestion tank with neat sketch. (14) 5 3

PART- C (1x 10=10Marks)

(Q.No.16 is compulsory)

		Marks	CO	RBT LEVEL

16. Design an oxidation ditch for a population of 2000 with per capita water supply of 125 lpcd. (10) 3 5

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