CBCS SCHEME

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17CV71

Seventh Semester B.E. Degree Examination, July/August 2022
Municipal and Industrial Wastewater Engineering

Time: 3 hrs. Max. Marks: 100

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

1 a. Explain the different types of sewerage systems with their merits, demerits and suitability. **(10 Marks)**

b. A city with a population of 1,80,000 has an area of 200 hectares. Average rate of water supply for the city is 150 lpcd. Average run-off co-efficient for the entire area of drainage is 0.45 and the time of concentration is 60 min. Assume 80% of water supplied to the city reaches sewer. Find the ratio of Dry Weather Flow to Wet Weather Flow (DWF/WWF) in cumecs. Assume peak factor as 1.8 for estimating DWF. **(10 Marks)**

OR

2 a. Explain with a neat sketch working of Drop manhole? **(08 Marks)**

b. Write the basic principles of house drainage systems? **(06 Marks)**

c. Explain with a neat sketch the working of septic tank. **(06 Marks)**

Module-2

3 a. Explain the process of self purification phenomenon with a neat sketch showing oxygen sag curve. **(08 Marks)**

b. Calculate the velocity of flow in a sewer of diameter 1.20m. The sewer is laid at a gradient of 1 in 400. What will be discharge through this sewer when running half full? Assume $\eta = 0.012$. Use Manning's formula. **(06 Marks)**

c. Explain the different zones of purification occurring during self purification process. **(06 Marks)**

OR

4 a. The sewage of a town is being discharged into a river. The quantity of sewage is 5 mLD and its BOD is 300 mg/L. If the flow of the river is 100 lit/sec. and if the BOD of river is 7 mg/L. Find the BOD of the diluted sewage. What should be the discharge of the river if it is desired to reduce the BOD of mixture to 30 mg/L? **(08 Marks)**

b. List the different methods of sewage farming? Explain any 2 in detail with sketches. **(06 Marks)**

c. What is meant by sewage sickness? What are the methods of preventing sewage sickness? **(06 Marks)**

Module-3

5 a. Write the flow diagram employed for municipal waste water treatment plant? Indicate the importance of each unit in the flow diagram. **(10 Marks)**

b. List the significant physical, chemical and biological characteristics of waste water. Explain the importance of BOD and COD in detail. **(10 Marks)**

OR

6 a. Determine the size of high rate trickling filter for the following data:
   i) Sewage flow = 5 mLD
   ii) Recirculation ratio = 1.5
   iii) BOD of raw sewage = 230 mg/L
   iv) BOD removal in primary classifier = 30%
   v) Final effluent BOD desired = 25 mg/L
   vi) Assume depth of filter as = 1.8m **(10 Marks)**

b. Explain with a neat sketch working of activated sludge process & sequential batch reactor process for treating waste water. **(10 Marks)**

Module-4

7 a. State the difference between domestic and industrial waste water. **(08 Marks)**

b. What are the effects of industrial effluent discharge on streams? **(06 Marks)**

c. What are the principles of industrial waste water treatment methods? Explain them. **(06 Marks)**

OR

8 a. List the various chemical methods of treating industrial waste water. Explain any two in detail. **(10 Marks)**

b. What are the advantages and disadvantages of combined treatment of industrial waste water and domestic waste water? **(10 Marks)**

Module-5

9 a. With a neat flow diagram explain the process of treating waste water from textile and cotton industry. **(10 Marks)**

b. With the process flow diagram explain the origin of waste water in tanneries. **(10 Marks)**

OR

10 a. With the typical characteristics explain the process of treating distillery effluent with a flow diagram. **(10 Marks)**

b. With the typical characteristics explain the process of treating paper and pulp mill wastes with a flow diagram. **(10 Marks)**

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