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.

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
2. Any revealing of identification, appeal to evaluator and /or equations written eg, 42+8 = 50, will be treated as malpractice.

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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