CBCS SCHEME

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15CV71

Seventh Semester B.E. Degree Examination, June/July 2023
Municipal and Industrial Waste Water Engineering

Time: 3 hrs. Max. Marks: 80

Note: 1. Answer any FIVE full questions, choosing ONE full question from each module.
2. Draw neat sketches wherever necessary.
3. Assume suitable data wherever necessary.

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 need for Good sanitation. Describe types of sewerage system and their suitability. **(10 Marks)**

b. Explain factors affecting wet weather flow and the effects of flow variations on the design of sewerage system. **(06 Marks)**

OR

2 a. Define Sewer Appurtenances and explain with neat sketch construction and working of manhole. **(06 Marks)**

b. What do you understand by the term Low – cost treatment? **(04 Marks)**

c. Explain the following with sketches :
i) Septic tank ii) Oxidation pond. **(06 Marks)**

Module-2

3 a. A 3m diameter circular sewer discharges 3 m^3/s of sewage into a pump well. The waste water level in the pump well rises to full depth of 3 m above invert of incoming sewer.. Assuming Manning's value of 0.012 and gradient of 0.5/1000 determine the velocity of flow and ratio of discharge (q) to full discharge (Q_{full} = 10.856 m^3/s). **(05 Marks)**

b. Explain the self purification of streams with a Sag curve. **(05 Marks)**

c. Discuss the various flow-friction formulae used in design of sewers. **(06 Marks)**

OR

4 a. Find out where critical DO occurs in a fully saturated river (with DO) for the following data:
City discharge = 100 m^3/s
Minimum river discharge = 1250 m^3s ; Minimum velocity in river = 0.15 m/s
$BOD_{5d, 20°C}$ = 260 mg/L ; Coefficient of purification of river = 4.0
Coefficient of DO = 0.11
Ultimate BOD = 125% of BOD of mixture of sewage and river water. **(05 Marks)**

b. Explain the term "Zone of Purification" in a river. **(05 Marks)**

c. Derive the Streeter-Phelps Oxygen Sag equation in river analysis. **(06 Marks)**

Module-3

5 a. Draw a flow diagram of municipal waste water treatment plant with their operation units. **(08 Marks)**

b. Briefly explain characteristics of domestic waste water. **(08 Marks)**

OR

6 a. List the difference between activated sludge process and trickling filters. **(08 Marks)**

b. With sketch explain grit chamber and skimming tank. **(08 Marks)**

Module-4

7 a. Discuss the effect of effluent discharge on streams. **(05 Marks)**

b. Explain the terms volume reduction and strength reduction of industrial waste water. **(05 Marks)**

c. How is shock loading on treatment plants prevented using equalization and proportioning. **(06 Marks)**

OR

8 a. Explain the advantages and disadvantages of combined treatment of industrial waste with domestic waste water. **(05 Marks)**

b. Discuss the methods of removal of "inorganic solids" from industrial waste water. **(05 Marks)**

c. Explain the methods of maintaining quality in a stream using effluent and stream standards. **(06 Marks)**

Module-5

9 a. Explain with flow diagram, treatment option for distilleries plant. **(08 Marks)**

b. With the help of flow chart, mention sources and characteristics of waste water from tannery. **(08 Marks)**

OR

10 a. Explain with flow diagram, treatment option for sugar mills. **(08 Marks)**

b. With the help of flow chart, mention sources and characteristics of waste water from pharmaceutical industry. **(08 Marks)**

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