CBCS SCHEME

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15CV71

Seventh Semester B.E. Degree Examination, Dec.2019/Jan.2020
Municipal and Industrial Wastewater Engineering

Time: 3 hrs. Max. Marks: 80

Note: 1. *Answer any FIVE full questions, choosing ONE full question from each module.*
2. *Assume any suitable missing data.*

Module-1

1 a. Explain briefly the different types of sewerage system. **(06 Marks)**

b. Explain the various factors affecting the dry weather flow. **(04 Marks)**

c. The drainage area of one sector of a town is 20 hectares. The classification of the surface of this area is as follows :

% Total surface area	Type of surface	Run – off coefficient
25	Hard pavements	0.85
25	Roof surface	0.80
15	Unpaved street	0.30
25	Gardens and Lawns	0.15
10	Wooded area	0.10

If the time of concentration for the area is 30 minutes. Find the maximum run off. Use the following formula for intensity of rainfall $R = 900/(t + 60)$. **(06 Marks)**

OR

2 a. Briefly explain the essential requirements of a good sewer material. **(04 Marks)**

b. Explain with a neat sketch, working of an "oxidation pond". **(06 Marks)**

c. Explain with a neat sketch, construction and working of a manhole. **(06 Marks)**

Module-2

3 a. Briefly explain self cleaning velocity and non scouring velocity. **(04 Marks)**

b. State the hydraulic formulas for velocity which are commonly adopted in the design of sewers. Explain any one in brief. **(06 Marks)**

c. A stone – ware sewer having 30cm in diameter is laid at a gradient of 1 in 100 use N = 0.013 in Manning's formula. Calculate the velocity, discharge and Chezy's co-efficient when the sewer is running full. **(06 Marks)**

OR

4 a. Explain the phenomenon of self – purification of natural streams subjected to pollution with the help of oxygen – sag curve indicating the salient features. **(10 Marks)**

b. The sewage of a town is to be discharged into a river. The quantity of sewage produced per day is 8 million liters and its BOD is 250 mg/ℓ. If the discharge in the river is 200 ℓ/s and if its BOD is 6mg/ℓ, find the B.O.D of the diluted water. **(06 Marks)**

Module-3

5 a. Write the flow diagram employed to treat municipal waste water and indicate the importance of each treatment unit. **(08 Marks)**

b. With a neat sketch, explain the working of a grit chamber and skimming tank. **(08 Marks)**

OR

6 a. Explain with a neat sketch, the working principles of a trickling filer. **(08 Marks)**

b. Briefly explain the terms : i) Suspended growth ii) Activated sludge iii) Sludge digester iv) Sequential batch reactors. **(08 Marks)**

Module-4

7 a. Explain the effects of effluent discharge on the stream water quality. **(08 Marks)**

b. What is meant by strength reduction? Explain the various methods of strength reduction being adopted in the industries. **(08 Marks)**

OR

8 a. List and explain the methods of removal of colloidal solids from wastewater. **(08 Marks)**

b. Explain the principles of raw and partially treated wastes before discharged into streams. **(08 Marks)**

Module-5

9 a. With the help of a flow diagram, explain the treatment units suggested to treat wastewater from a tanning industry along with wastewater characteristics. **(08 Marks)**

b. State the sources and characteristics of the wastewater from dairy industry. **(08 Marks)**

OR

10 a. With the help of a line diagram, explain the process of paper and pulp industry highlighting the sources of wastewater generation. **(08 Marks)**

b. Discuss the characteristics and treatment of waste water from a pharmaceutical industry. **(08 Marks)**

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