CBCS SCHEME

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15CV71

Seventh Semester B.E. Degree Examination, Jan./Feb. 2021
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. Any missing data can be assumed.

Module-1

1   a. Define Dry Weather Flow. Explain the factors influencing DWF.   **(05 Marks)**
    b. Differentiate between conservancy system and water carriage system.   **(05 Marks)**
    c. Calculate the quantity of sewage for separate and partially separate system for a town given the following data:
        i)   Area of the town – 250 hectares
        ii)   Intensity of rain fall – 50mm/hr
        iii) Population density – 300 person/hectare
        iv)   Rate of supply – 250/pcd
        v)   Peak factor – 2.0
        vi)   Surface classification

Type of surface	Y Area	Run off coefficient
Roofs	50%	0.9
Paved surface	20%	0.85
Non paved surface	30%	0.30

Assume 80% of the water supplied reaches the sewer.   **(06 Marks)**

OR

2   a. Explain the desirable characteristics of a sewer material.   **(05 Marks)**
    b. Write a note on ventilation of sewers.   **(05 Marks)**
    c. Develop a relationship between a diameter of the circular section of a sewer and a side of the rectangular sewer section having width as twice its depth the three sides are wetted.
                                                                                      (06 Marks)

Module-2

3   a. Explain self purification phenomenon with a neat sketch of oxygen sag curve. **(05 Marks)**
    b. Explain self cleaning velocity and non sourcing velocity.   **(05 Marks)**
    c. Design a sewer to a population of 60,000 the rate of water supply is 135/pcd. The slope available for the sewer to be laid is 1 in 625 and the sewer should be designed to carry four times the DWF when running full. What would be the velocity of flow? Take N = 0.012.
                                                                                      (06 Marks)

OR

4   a. Explain: i) Sewage farming   ii) Sewage sickness.   **(08 Marks)**
    b. Explain the methods of sewage disposal i) By dilution   ii) By land treatment.   **(08 Marks)**

Module-3

5   a. Derive an expression for first stage BOD with usual notations.   (06 Marks)
    b. Define the terms BOD and COD.   (04 Marks)
    c. The 5 day BOD @ 20°C of a sewage sample was found to be 100mg/lt. Calculate 2 day BOD at 30°C for the same sample, K_{20} = 0.1/day.   (06 Marks)

OR

6   a. Write a detailed flow diagram of a sewage treatment plant for a large city. Indicate the components.   (06 Marks)
    b. With a neat sketch, explain working principle of activated sludge process.   (06 Marks)
    c. Mention the operational problems of trickling filter process.   (04 Marks)

Module-4

7   a. Discuss in detail the impact of industrial wastewater on water bodies.   (08 Marks)
    b. Briefly explain strength reduction strategy for an industrial effluent concerned with waste treatment.   (08 Marks)

OR

8   a. List the techniques applied in removal of suspended solids. Explain any two methods.   (08 Marks)
    b. Briefly explain the circumstances under which joint treatment of domestic wastewater and industrial wastewater is recommended.   (08 Marks)

Module-5

9   Explain briefly the characteristics and treatment of cane sugar mill effluent with the aid of a flow chart.   (16 Marks)

OR

10 a. Explain the sources and characteristics of tannery wastewater with the help of flow diagram.   (10 Marks)
    b. Explain in brief the effect of dairy waste in receiving streams. Also propose a treatment for dairy wastewater.   (06 Marks)

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