Total number of printed pages: 2 **PG/1st/PCEW1113**

2023

INDUSTRIAL WATER POLLUTION CONTROL

Full Marks : 100

Time : Three hours

The figures in the margin indicate full marks for the questions.

*Answer **any five** questions.*

1. a) Explain the significance of joint treatment of industrial waste and domestic sewage in municipal wastewater treatment systems. How does it impact the design and cost-effectiveness of treatment processes? 10

   b) Discuss the advantages municipalities have in implementing joint treatment policies, including the flexibility in utilizing pricing strategies and pretreatment requirements. Provide examples of how these policies can encourage or discourage joint treatment. 10

2. a) Describe natural methods of wastewater disposal and highlight the environmental considerations associated with each. 10

   a) Explain the key steps involved in artificial methods of wastewater disposal, focusing on screening, sedimentation, and biological treatment. Discuss the significance of each step in ensuring the effective treatment of sewage. 10

3. a) Given a wastewater's BOD_6 as 400 mg/L at 20°C with a known k value of 0.23 per day, calculate the expected BOD_8 if the tests were conducted at 15°C. Explain the impact of temperature on BOD values and the significance of the k value in the BOD calculation. 5

   b) In a standard BOD bottle, 6 ml of wastewater is diluted to 300 ml with distilled water. The initial dissolved oxygen (DO) is 8.5 mg/L, and after 5 days at 20°C, it drops to 5 mg/L. Determine the BOD_5 of the wastewater and calculate the ultimate BOD_x. Discuss the implications of the BOD values obtained in assessing the organic pollution level in the wastewater. 5

   c) Explain the importance of the BOD test in assessing the quality of wastewater. Discuss the factors influencing the rate constant (k value) and how temperature variations impact the BOD values. Provide insights into why the BOD_8 is estimated based on a known k value when tests are conducted at a different temperature. 10

4. a) Describe the purpose and key components of the preliminary, primary, secondary, and tertiary levels of treatment in an Effluent Treatment Plant (ETP). Explain the treatment mechanisms involved in each of these levels and provide examples of the processes used to achieve water purification. 10

b) Write short notes on any two of the following 5x2=10

i) Energy Industries

ii) Rubber Industry

iii) Leather and Tanning

5. a) Define and differentiate between Biological Oxygen Demand (BOD), Chemical Oxygen Demand (COD), and Total Organic Carbon (TOC) in terms of their underlying principles, measurement techniques, and significance in assessing water quality. Highlight specific scenarios where each parameter is particularly useful in environmental monitoring. 10

b) Elaborate on the distinctions among Total Solids (TS), Dissolved Solids (DS), and Suspended Solids (SS) in water analysis. Discuss the practical implications of measuring each type of solids and their importance in evaluating water quality. Provide examples of industrial or environmental contexts where these measurements are crucial for effective pollution control. 10

6. a) Describe the purpose and key components of the preliminary, primary, secondary, and tertiary levels of treatment in an Effluent Treatment Plant (ETP). Explain the treatment mechanisms involved in each of these levels and provide examples of the processes used to achieve water purification. 10

b) Categorize water pollution into four main categories, detailing examples of pollutants within each category. Explore the significance of understanding these categories for effective water quality management. 10

7. a) Discuss effluents treatment process with different stages 10

b) Discuss classification of water pollutants 10

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