

Time: 3 Hours

Max. Marks: 75

Note: This question paper contains two parts A and B.

Part A is compulsory which carries 25 marks. Answer all questions in Part A.

Part B consists of 5 Units. Answer any one full question from each unit. Each question carries 10 marks and may have a, b, c as sub questions.

PART- A (25 Marks)

- 1.a) What is industrial wastewater? How is it different from domestic sewage? [2]
- b) What is BOD? Write the procedure to estimate BOD of an industrial wastewater sample? [3]
- c) Define volume reduction of wastes and give one example? [2]
- d) What are the objectives of proportioning of industrial wastewaters? [3]
- e) Explain the process of Electrodialysis with the help of a sketch [2]
- f) Differentiate between dissolved air floatation and dispersed air floatation. [3]
- g) Draw the flow sheet of sugar manufacturing industry? [2]
- h) Write the major chemical composition of wastewater obtained from steel industry. [3]
- i) What are the possible hazardous substances that can be present in a wastewater obtained from mining industry? [2]
- j) Write the limitations and drawbacks of CETPs? [3]

PART-B (50 Marks)

2. What are the important chemical parameters of the industrial wastewater? Write the methods of estimation for any three parameters. [10]
- OR**
3. Can all industrial wastes be treated in municipal sewage treatment plants? What are the limitations to treat the industrial wastes along with domestic wastewater? [10]
 4. Name seven major methods of neutralizing both acid and alkali wastes? Explain any two methods. [10]
- OR**
5. What is meant by Equalization? What is the purpose of equalization? What are the methods of equalization and explain any two methods of mixing? [10]
 6. Why has removal of organic dissolved solids long been the most important and most difficult phase of industrial waste treatment? Explain different methods employed for the removal from wastewaters? [10]

OR

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7. Describe the principles and problems in using ion exchange and its major use for industrial wastewater? [10]
 8. What are the major chemical constituents in wastewater obtained from sugar industry? Discuss the treatment technologies to remove the contaminants? [10]
- OR**
9. Discuss the optimized design of wastewater treatment systems applied to petroleum industry. [10]
 10. Differentiate between high level and low level radioactive wastes, indicating the methods of safe disposal of these types of wastes. How are radioactive wastes being disposed in India? [10]
- OR**
11. Discuss the most common operational problems along with their trouble shooting methods in CETPs. [10]

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