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10CV835

Eighth Semester B.E. Degree Examination, June/July 2019
Industrial Wastewater Treatment

Time: 3 hrs.

Max. Marks:100

Note: Answer any FIVE full questions, selecting atleast TWO questions from each part.

PART - A

- 1 a. Enumerate the effect of discharge of raw industrial wastewater into the municipal wastewater treatment plant. (10 Marks)
- b. What do you understand by stream standards and effluent standards? What are the advantages and disadvantages of stream standards? (10 Marks)
- 2 a. Enumerate in brief the stream sampling programme. (04 Marks)
- b. Discuss the process of self purification of rivers, with oxygen sag curve. (06 Marks)
- c. A City discharges 20000 m³/day of sewage into a river whose rate of flow is 0.7m³/sec. Determine D.O deficit at 20km and critical DO deficit from the following data :

River	Sewage effluent from STP
5 day BOD at 20 ⁰ C = 3.4 mg/L	5 day BOD at 20 ⁰ C = 45 mg/L
Temperature 23 ⁰ C	Temperature 26 ⁰ C
D.O = 8.2 mg/L	D.O = 2.0 mg/L

Take $R' = 0.4$, $K' = 0.23$ and velocity of mix as 0.25 m/sec. (10 Marks)

- 3 a. Give the classification of wastewater generated in industries. Discuss how it will help in volume reduction of industrial wastewater. (10 Marks)
- b. Discuss with examples how by – product recovery helps in strength reduction of industrial wastewater generated. (10 Marks)
- 4 a. Discuss the importance of removal of dissolved organic matter from the industrial wastewater. Explain the biodegradable organics removal by activated sludge process. (10 Marks)
- b. Discuss the methods adopted for treatment and disposal of sludge solids of industrial wastewater treatment. (10 Marks)

PART - B

- 5 a. What are the options of disposal of industrial wastewater? Enumerate the advantages of joint treatment of industrial and municipal wastewater treatment. (10 Marks)
- b. Discuss the discharge guidelines of industrial effluents into public sewers. Give the BIS standards for the industrial effluent discharge into public sewers. (10 Marks)
- 6 a. With the help of process flow diagram, explain the sources of wastewater generated in cane sugar industries. (10 Marks)
- b. Justify the need for pulp and paper industrial process wastewater recycle and reuse. Give the typical characteristics of combined wastewater. (10 Marks)
- 7 a. Write the process flow diagram indicating the sources of wastewater in a dairy industry. Give the combined wastewater characteristics of a dairy industry. (10 Marks)
- b. Discuss the treatment alternatives for a fruit canning industry with the flow diagram and indicate the removal efficiency of each unit. (10 Marks)
- 8 a. Discuss the alternate treatment facilities of wastewater from a cotton textile mill, with the flow diagram. (10 Marks)
- b. Write the process flow diagram of penicillium antibiotic manufacturing and indicate the sources of waste generation. Also give the composition of combined wastewater. (10 Marks)

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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.