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P.E.S. College of Engineering, Mandya - 571 401

(An Autonomous Institution affiliated to VTU, Belagavi)

Eighth Semester, B.E. - Civil Engineering

Semester End Examination; May/June - 2018

Industrial Wastewater Treatment

Time: 3 hrs *Max. Marks: 100*

***Note**: Answer **FIVE** full questions, selecting **ONE** question from each unit.*

UNIT - I

1 a. Discuss the effects of suspended solids, organic matter, acids and alkalis, floating and colour materials and metals on the receiving surface water body. 10

b. Bring out differences between domestic wastewater and industrial wastewater. 5

c. Define self-purification of stream and mention the factors affecting on processes. 5

2 a. Explain the DO sag curve for stream to derive Streeter-Phelps equation for river analysis. 10

b. Using the following data, find out the DO at the end of 182 days

Parameters	River	Industrial Effluent
Flow m^3/s	25	2
DO mg/l	9.1	0
5 day BOD mg/l	2	200

10

Take De-oxygenation constant 0.1 day^{-1} and Re-oxygenation constant 0.3 day^{-1}. Also take saturation level of DO = 9.1 mg/l.

UNIT - II

3 a. Describe the environmental standards for industrial effluent. 10

b. Write an explanatory note on the treatment of industrial effluent by:

i) Equalization ii) Neutralization 10

4 a. Explain in brief methods of strength reduction of industrial wastewater. 10

b. Discuss the various steps to be adopted for reducing volume of wastewater. 10

UNIT - III

5 a. Design a high rate trickling filter for the following data :

i) Wastewater Flow = 5MLD ii) Recirculation ratio = 1.5

iii) BOD of raw wastewater = 230 mg iv) BOD removal of primary clarifier = 30% 10

v) Final effluent BOD desired = 25 mg/l

b. An average operating data for conventional activated sludge treatment is as follows :

i) Wastewater flow = 50000 m^3/d ii) Volume of aeration tank = 15500 m^3

iii) Influent BOD = 200 mg/l iv) Effluent BOD = 25 mg/l 10

v) MLSS = 3000 mg/l

Based on the information above, determine Aeration period, F/M ratio and efficiency of BOD removal.

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6 a. Discuss the feasibility of treating industrial wastewater along with the municipal wastewater. 10

b. Discuss the advantages and disadvantages of combined wastewater treatment. 10

UNIT - IV

7 a. With a flow diagram, indicate the source of pollution in a sugar mill and explain same. Give the characteristics of combined effluent. 10

b. Give main characteristics of cotton textile industrial wastewater. Also explain the wastewater treatment unit operation and process along with flow diagram. 10

8 a. With the help of flow diagram, discuss briefly treatment of dairy industrial wastewater. 10

b. Discuss the effects of disposal of cotton textile industrial wastewater on water bodies. 10

UNIT - V

9. Give main characteristics of wastewater from pulp and paper industry and distillery industry. With flow diagram, explain the treatment of distillery industrial wastewater. 20

10 a. Discuss briefly effects of disposal of pulp and paper and plating industrial wastewater on water bodies. 10

b. With flow diagram, explain wastewater treatment for the pulp and paper industry. 10

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