

USN

10CV835

Third Semester B.E. Degree Examination, Dec.2019/Jan.2020

**Industrial Wastewater Treatment**

Time: 3 hrs.

Max. Marks:100

**Note: Answer any FIVE full questions, selecting at least TWO questions from each part.****PART - A**

- 1 a. Differentiate between domestic wastewater and industrial wastewater. Explain the effects of industrial wastewater on sewage treatment plants. (10 Marks)
- b. List and explain the factors to be considered for stream sampling. (10 Marks)
- 2 a. With a neat sketch, explain Dissolved oxygen sag curve in stream. Also write down stream – Phelps equation along with usual notations. (10 Marks)
- b. A town discharges  $80\text{m}^3/\text{sec}$  of sewage into a stream having a rate of flow of  $1200\text{m}^3/\text{sec}$  during lean days. The 5 day BOD of sewage at the given temperature is  $250\text{mg/L}$ . Find the amount of critical D.O deficit and its location in the downstream portion, if the velocity of flow of stream is  $0.12\text{m/sec}$ . Assume deoxygenation coefficient  $K$  as  $0.1$  and coefficient of self purification as  $3.5$ . Assume saturation  $D_0$  at the given temperature as  $9.2\text{ mg/L}$ . (10 Marks)
- 3 a. Explain the strength reduction as applied to industrial wastewater. (10 Marks)
- b. What are different ways the neutralization of industrial wastes is achieved? Explain. (10 Marks)
- 4 Explain briefly the following methods.
  - i) Sedimentation      ii) Floatation      iii) Ion exchange method
  - iv) Reverse osmosis      v) Sludge drying beds. (20 Marks)

**PART - B**

- 5 a. What are the advantages of combined treatment of industrial wastewater with domestic wastewater? (06 Marks)
- b. List the various effects of discharging raw industrial waste to the streams. Briefly explain them. (14 Marks)
- 6 a. With process flow diagram, explain the origin of waste from sugar mill. (10 Marks)
- b. Explain briefly with the help of process flow diagram, the origin of waste from tannery industry. (10 Marks)
- 7 a. Explain the sources of wastes origin from a typical dairy industry. List the composition of the wastewater. (10 Marks)
- b. How are the wastes from the following units in a steel plant treated :
  - i) Coal washery      ii) Coke ovens      iii) Blast Furnace      iv) Scale – pit effluent. (10 Marks)
- 8 a. With a flow diagram, explain the treatment units adopted in the treatment of typical pulp and paper mill. (10 Marks)
- b. Explain briefly with the help of flow diagram, the treatment of large synthetic drug plant. (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.

