Reg. No.										

MANIPAL INSTITUTE OF TECHNOLOGY

MANIPAL

(A constituent unit of MAHE, Manipal)

VII SEMESTER B.TECH (CIVIL) END SEMESTER EXAMINATIONS DECEMBER 2020

SUBJECT: INDUSTRIAL WASTE TREATMENT [CIE 4008]

Date of Exam: /12/2020 Time of Exam: 9:00 AM to 12 NOON Max. Marks: **50**

Instructions to Candidates:

- Answer ALL the questions & missing data may be suitably assumed

1A.	What are the sources of industrial wastewater? Discuss the effect of the following parameters on receiving water bodies. (i) Inorganic salts (ii) Color (iii) Microorganism	**5**
1B.	Explain stream standards. What are its applications?	**3**
1C.	Differentiate between in-vivo and in-vitro methods of Bioassay test.	**2**
2A.	Define the following. (i) Toxicity Factor (ii) Slug discharge (iii) Priority pollutants (iv) Oxygen deficit (iv) Effective concentration	**5**
2B.	Explain the implications of following environmental regulations on industries. (i) Environmental protection Act (ii) Hazardous waste Rule	**5**
3A.	What are the three major classifications of industrial wastes at an industrial plant? What are the implications of those three types of wastes?	**4**
3B.	Give any two classic examples for the following to reduce the strength of wastewater. (i) Equipment modification (ii) Segregation	**3**
3C.	Mention any six measures that can be taken to reduce the likelihood of accidents and severity in industries.	**3**
4A.	Explain the process of self-purification of a stream. What are the factors helping self-purification of stream	**3**
4B.	Explain the manufacturing process involved in textile industry with a neat process flow diagram.	**4**
4C.	What are the options to reduce the strength and volume of wastewater generated from the dairy industry?	**3**
5A.	The population of the town is 5,00,000 and the domestic sewage discharge is 250 l/capita /day having per capita BOD of 80 g/day. The Diary waste of the town is 2×10^6 litres/day with BOD of 5000 mg/l and waste from other industry is 2×10^6 litres /day with BOD of 500 mg/l. An overall expansion factor of 15% is to be provided. The wastewater is discharged in the natural stream having a minimum discharge of $0.35 m^3/s$. The saturation dissolved oxygen content of 9.0 mg/l. It is necessary to maintain a dissolved oxygen content of 4 mg/l in the stream. Determine the degree of treatment required to the wastewater prior to its discharge into the stream. Assume deoxygenation constant of 0.1/day (base 10) and reoxygenation constant 0.3/day (base 10). Also assume temperature of natural stream and wastewater is 20^0C.	**5**

5B.	What is neutralization and equalization?	**2**
5C.	Define hazardous waste. Explain the characteristics of hazardous waste.	**3**