Reg. No.										

MANIPAL INSTITUTE OF TECHNOLOGY

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A Constituent Institution of Manipal University

II SEMESTER M.TECH. (CHEM.ENGG)

END SEMESTER EXAMINATIONS, MAY 2023

SUBJECT: INDUSTRIAL WASTE WATE ENGINEEIRNG [CHE 5005]

REVISED CREDIT SYSTEM

Time: 3 Hours MAX. MARKS: 50

Instructions to Candidates:

- Answer **ALL** the questions.
- Missing data may be suitable assumed.

1A.	Mention the general classification of bar screens and briefly explain any two categories	**3**
1B.	Explain the factors affecting sedimentation process in wastewater treatment plant	**3**
1C.	Discuss the key parameters that describe the quality of wastewater	**4**
2A.	Explain the compartments in a grit chamber with a neat and labelled diagram.	**3**
2B.	Illustrate the bacterial growth pattern in a batch reactor with the help of a schematic	**4**
2C.	Define food to microorganism ratio and solid retention time. Establish a relation between them	**3**
3A.	Distinguish facultative partially mixed lagoons from anaerobic lagoon with solid recycle	**3**
3B.	An UASB reactor is to be designed to treat an industrial wastewater. Elucidate the important design considerations.	**3**
3C.	Illustrate the working of rotating biological contactors with the help of a schematic	**4**
4A.	A saline water having total dissolved solid concentration of 3000 g/cm^3 is to be processed using TFC membrane having flux rate coefficient of $1.5*10^{-6}$ s/m and a mass transfer coefficient of $1.8*10^{-6}$ m/s. The permeate is to have a TDS not more than 200 g/m^3. Flow rate is to be 0.010 m^3/s. The net operating pressure will be 2500 kPa. Assume recovery rate of 90%. Estimate rejection rate and the concentration of the concentrate stream assuming $Q_p=rQ_f$	**3**
4B.	Explain any four membrane process classifications.	**3**
4C.	List and explain any four factors influencing the action of disinfectants	**4**
5A.	Compare any three methods of waste water neutralization and mention the purpose of neutralization	**3**
5B.	Describe the design considerations for dissolved air floatation systems.	**3**
5C.	A floatation thickener with pressurized recycle is to be desinged to thicken the solids in activated sludge mixed liquor from 0.3 to 0.4%. Following data is given : Optimum A/S	**4**

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	ratio = 0.008 ml/mg; Temp =20° C; Air solubility = 18.7 mlL; surface loading rate = 8 L/m2 min; recycle system pressure = 275kPa; Fraction of saturation =0.5; sludge flowrate=400m3/d; influent suspended solids= 3000mg/L;	