Reg. No. | | | | | | | | | | |

MANIPAL INSTITUTE OF TECHNOLOGY

MANIPAL

VII SEMESTER B.TECH. (CHEMICAL ENGINEERING)

MAKE UP EXAMINATIONS, DECEMBER 2017

SUBJECT: PROJECT ENGINEERING [CHE 4023]

REVISED CREDIT SYSTEM

Time: 3 Hours MAX. MARKS: 50

Instructions to Candidates:

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

1A What is the importance of scheduling in Project Engineering? Explain Project Networks 5

1B Discuss the importance of pump curves and define Best Efficiency point 5

2A What are the factors to be considered for selection of engineering material? 5

2B List the preliminary Procurement data required for a Project 5

3A Outline the structure of a Material Safety Data Sheet 5

3B Justify the statement "Heat must not be transferred across the pinch" 5

4A Describe the Line designation standards followed in a Piping and Instrumentation Diagram 6

4B For a case of a nominal annual interest rate of 18% per year, determine the total amount to which Rs. 100 of initial principal would accumulate after one year and the effective interest rate with,

a) Annual compounding

b) Monthly compounding

c) Daily compounding

d) Continuous compounding 4

5 A refinery has two crudes available that have yields shown in the following table. Because of equipment and storage limitation, production of gasoline, kerosene and fuel oil must be limited as shown in the table. There are no plant limitations on the other products. The profit on processing crude 1 and 2 are Rs. 50/bbl and Rs. 100/bbl respectively. Find the optimum daily processing time of the two crudes of this plant using simplex method to maximize the profit. 10

	Crude 1 (hours)	Crude 2 (hours)	Max. Allowable time/week
Gasoline	10	5	2500
Kerosene	4	10	2000
Fuel oil	1	1.5	450

3B.	Mention any four differences between slow sand and rapid sand filters	(2 marks)
4A.	What do you mean by sloughing and bulking?	(2 marks)
4B.	A mechanically cleaned bar screen has bars of 8 mm thick and 30 mm clear spaces between the bars. If the flow rate is 0.20 m^3/s, velocity through the bars is 0.90 m/s, determine the approach velocity, head loss through the screen and effective cross-sectional area.	(3 marks)
4C.	A river is having discharge of 22 m^3/s receives wastewater discharge of 0.5 m^3/s. The initial DO of the river water is 6.3 mg/L, and DO content in the wastewater is 0.6 mg/L. The five day BOD in the river water is 3 mg/L, and the wastewater added to river has five day BOD of 130 mg/L. Consider saturation DO of 8.22 mg/L and deoxygenation and reaeration constant values of 0.1 and 0.3 per day, respectively. Find critical DO deficit and DO in the river after one day. The average velocity of flow in the stream after mixing of wastewater is 0.18 m/sec.	(5 marks)
5A.	Explain about the following: (i) Stern layer and Zeta potential for colloids in solution (ii) Concept of zero liquid discharge (iii) Mechanism of photo catalysis with a neat sketch (iv) Rate limiting steps of adsorption process. (v) Working principle of bundle of hollow fiber membrane with a neat sketch	**(5 * 2 = 10 marks)**