MGM University, Jawaharlala Nehru Engineering College
Mid Semester Examination – March 2024

Course: B. Tech in Chemical Engineering | Sem: VI
Subject Name: Transport Phenomena | Subject Code: 20UCH604D
Max Marks: 20 | Date: 09/03/2024 | Duration:- 1 Hr.

Instructions to the Students:
1. Illustrate your answers with neat sketches, diagram etc., wherever necessary.
2. If some part or parameter is noticed to be missing, you may appropriately assume it and should mention it clearly.

All Questions Compulsory

		CO	BL	Marks
Q. 1	Attempt **Any TWO** Questions by choosing option			
	A. Which Transport process is not a part of chemical processes a.Momentum b.Heat c. Mass d. Radiation	CO1	Remember	1 Mark
	B. Viscosity of the stagnant fluid is 1 poise, what will be viscosity of the same fluid set in motion? a. 1 poise b. 0.5 poise c. 1.5 poise d.None of these	CO1	Apply	1 Mark
	C. Which of the following is not considered in Navier Stoke's Equation a. Gravity force b.Surface tension force c. Pressure force d. Viscous force	CO2	Understand	1 Mark
	D. Which law is the basis for understanding energy transport a. Kirchoff's Law b. Fourier Law c. Darcy's law d. Newton's Law of Cooling	CO3	Remember	1 Mark
Q.2	Solve any two of the following.			
(A)	A plastic panel of area $A = 929cm^2$ and thickness Y = 0.64 cm was found to conduct heat at a rate of .7170 Cal/sec at steady state with temperatures T_0= 24.00°C and T_1, = 26°C imposed on the two main surfaces. What is the thermal conductivity of the plastic in cal/cm. s K at 25°C?	CO3	Apply	5 Marks
(B)	A 15 cm cylindrical metal rod slides inside a tube filled with glycerine. The inner diameter of the tube is 5 cm and the clearance is 0.5 mm. The mass of the bar is 0.5 kgwhen immersed in the glycerine. What is the viscosity of the glycerine, if steady state velocity of the rod is 0.1 m/s?	CO1	Apply	5 Mark
(C)	Describe convective heat transfer	CO3	Understand	5 Mark
Q. 3	Answer any one			
(A)	Derive velocity distribution profile for the case of flow through vertical tube	CO2	Analyze	8 Mark
(B)	Derive expression for thermal conductivity of gases at low density	CO3	Analyse	8 Mark

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MGM University
Jawaharlal Nehru Engineering College, Chh. Sambhajinagar
Mid Semester Examination – March 2024

Course: B. Tech in Chemical Engineering **Semester:** VI
Subject Name: **Chemical Reaction Engineering-II**
Subject Code: 20UCH602D
Max Marks: 20 **Date:-07-03-2024** **Duration:-** 1 Hr.

Instructions to the Students:

1. Answer all the questions. Write down all parts of the question in same place.
2. Data book (clean copy) and calculator are allowed. Exchange of data book and calculator are not permitted.
3. Missing data may be suitably assumed, if any

		CO	BL	Marks
Q. 1				6x1
	1. The area under the curve of exit age distribution integrated between time, t = 0 and t = ∞ is ___ (a) 0 (b) 1 (c)2 (d)Infinity	CO2	2	1
	2. Which of the following factors control the design of a fluid-solid reactor? (a) Reaction kinetics for single particle (b) Size distribution of solids being treated (c) Flow patterns of solids and fluid in the reactor (d) all (a), (b) and (c)	CO2	2	1
	3. For a packed bed reactor, the presence of a long tail in the residence time distribution curve is the indication of (a) Ideal plug flow (b) Bypass (c) Dead Zone (d) Channeling	CO1	2	1
	4. In solid gas non-catalytic reaction occurs at very high temperature,the rate of controlling step is (a) Film diffusion (b) Ash layer diffusion (c)Pore diffusion (d)none of these	CO1	2	1
	5. The value of the Dispersion coefficient for plug flow is ____ (a) 0 (b) 1 (c)2 (d)Infinity	CO1	2	1
	6. The single parameter model proposed for describing non-ideal flow is the _____ model (a) Tank in series (b) Dispersion (c)Both a and b (d)None	CO1	3	1
Q.2	**Solve Any Two of the following.**			3 X 2
(A)	Explain the relation between E, F and C curve	CO1	3	3
(B)	Write down the step of progressive conversion model reactors for fluid particle non catalytic reaction.	CO2	3	3
(C)	Explain fluid-particle non catalytic reaction progressive conversion model with examples.	CO2	3	3
Q. 3	**Solve Any One of the following.**			8x1
(A)	Explain mathematics of chemical reaction control shrinking-core model for fluid particle non catalytic reaction.	CO2	3	8
(B)	Derive the rate equation for the following gas-liquid instantaneous reaction with low C_{B_l} in the liquid mass transfer and reaction terms in the rate equations. $$A(g) + B(l) \rightarrow Product(l)$$	CO3	3	8

***** Best of Luck*****

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MGMU, Chhatrapati Sambhajinagar

Department of Chemical Engineering

Course: Chemical Equipment Design
Test: MSE
Class: T. Y. Chemical

Date: 05/03/2024
Max. Marks: 20
Time: 01 Hr.

Note: Solve any four questions. All questions carry equal marks.

		Level	CO
Q.1	How material of construction is selected for process equipment? Describe the factors affecting selection of material.	L1	CO1
Q.2	How weld joint efficiency factor decide in design? What are different test done to ensure the weld joint?	L2	CO2
Q.3	Why different agitators are used in process industries? Explain the different types of agitators with neat sketches.	L3	CO3
Q.4	Explain the different pressure test done for pressure vessel in details.	L1	CO1
Q.5	What is different loss mechanism in storage tank? How to prevent these losses in storage tank?	L2	CO2

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MGM University, Chhatrapati Sambhajinagar

Jawaharlal Nehru Engineering College

MSE Examination

Course: B. Tech in chemical engineering final year **Sem: VI** **Date:- 06 .03.2024**

Subject Name: Process Dynamics and control **Subject Code: 20UCH603D**

Max Marks: 20 **Duration:- 1 Hr.**

Instructions to the Students:

1. Question 1 is compulsory and carries 6 marks
2. Figures to right indicate marks
3. If any data is missing, you may assume it and mention it in your answer sheet 4. Usual symbols apply

		CO	BL	Marks
Q. 1	**Select correct option**			**1X6**
1	the dynamics of the first order system is represented by the following order of differential equation a. second b. first c. third d. none	1,2	Understand	
2	The difference between the set point and measured value of the controlled variable is known as a. error b. manipulated variable c. load variable d. controlled variable	1,2	Understand	
3	the dynamics of the second order system is represented by the following order of differential equation a. second b. first c. third d. none	1,2,3	Understand	
4	the mixing process has the following order of system a. second b. first c. third d. none	1,2	Understand	
5	The amplitude ratio of first order system is always less than----- a. 1 b. 2 c. 3 d. 4	1,2	Apply	
6	In a control system, if the measured value of controlled variable is returned to the comparator , the system is known as a. closed loop b. open loop c. feed forward d. none	1,2	Understand	
Q.2	**Solve Any Two of the following.**			**3 X 2**
(A)	Derive an transfer function equation for mercury bulb system.	1,21	Remember	
(B)	Explain the terms a) overshoot b) Decay ratio and c) rise time for under damped second order system	1,2,3	Remember	
(C)	Distinguish between interacting and non interacting system	1,2,3	Understand	
Q. 3	**Solve Any One of the following.**			**1X 8**
(A)	The manometer is being used to determine the pressure difference between two instrument taps on an air line. The working fluid in the manometer is water. Determine the response of the manometer to a step change in pressure across the legs of the manometer. Data. L=200 cm g=980 cm/s2 μ= 0.01g/(cm*s) ρ=1 g/cm3 dp/ (ρ *g) = 10 cm, D= 0.31	1,2,3	Apply	
(B)	Explain the following forcing function with example a)Step function b)impulse function c) Ramp function d)Sinusoidal function	1,2	Understand	
	***** End *****			

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CA – Chemical

MGMU, Chhatrapati Sambhajinagar
Department of Chemical Engineering

Class: T. Y. Chemical Course: Chemical Process Equipment Design Course Code: 20UCH505D
Time: 45 Min Marks 20 Date: 02/02/2024

Note: Solve any five from the following, all questions carry equal marks.

Q. 1. Define and explain Design codes or standards.	CO1
Q. 2. Define and explain Design pressure.	CO1
Q. 3 Define and explain Design temperature.	CO1
Q. 4. Define and explain Design stress and factor of safety.	CO1
Q. 1. Define and explain weld joint factor.	CO1
Q. 1. Define and explain corrosion allowance.	CO1

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