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

B.E. / B.TECH. DEGREE EXAMINATIONS, MAY 2024
Second Semester
CH22201 – INTRODUCTION TO CHEMICAL ENGINEERING
(Chemical Engineering)
(Regulation 2022)

TIME: 3 HOURS   MAX. MARKS: 100

COURSE OUTCOMES	STATEMENT	RBT LEVEL
CO 1	Analyze the history and future prospects of Chemical Engineering.	4
CO 2	Apply the basic Chemical Engineering Principles.	3
CO 3	Construct the Concepts of Momentum Transfer.	3
CO 4	Explore the Heat Transfer concepts and understand the working principle of Heat Transfer equipments.	3
CO 5	Explain the Mass Transfer operations and its role in Chemical process industries.	3

PART- A (20 x 2= 40 Marks)
(Answer all Questions)

		CO	RBT LEVEL
1.	List any four important roles of a Chemical Engineer.	1	2
2.	Write a short note on the 'Transport Phenomena' paradigm of Chemical Engineering.	1	2
3.	Highlight the role of petroleum refining in the development of Chemical Engineering.	1	2
4.	Annotate the scope of a Chemical engineer in fertilizer industry.	1	2
5.	Write a brief note on Rayleigh's method.	2	2
6.	A certain quantity of Chlorine gas is contained in a closed vessel of 2 m^3 at a temperature of 300 K and pressure of 120 kPa is to be heated such that the temperature attained by the gas is 850 K. Calculate the pressure attained by the gas.	2	2
7.	Enumerate the factors affecting the rate of a reaction.	2	2
8.	Compare plug flow reactor and mixed flow reactor.	2	2
9.	Explicate on the Newton's law of viscosity and its significance.	3	2
10.	Differentiate variable head meters and variable area meters used in flow measurement.	3	2
11.	Write the working principle and application of Pitot tube.	3	2
12.	Classify the pumps used in process industries.	3	2
13.	Differentiate the three modes of heat transfer.	4	2
14.	Distinguish between natural and forced convection with examples.	4	2
15.	Write the governing law for radiation heat transfer.	4	2
16.	Compare the different types of evaporators.	4	2

17.	Elucidate the Fick's law of diffusion.	5	2
18.	Differentiate absorption and adsorption with suitable examples.	5	2
19.	Illustrate the necessity for dehumidification.	5	2
20.	Differentiate stripping and drying.	5	2

PART- B (5x 10=50 Marks)

		Marks	CO	RBT LEVEL
21. (a)	Analyze the paradigm shifts in chemical engineering.	(10)	1	4
	(OR)			
(b)	Evaluate the role chemical engineering in our day to day life with suitable examples.	(10)	1	4
22. (a)	Derive an expression for drag force on a smooth sphere of diameter 'D' with a uniform velocity 'v' in a fluid of density 'ρ' and dynamic viscosity 'μ' by Buckingham π method.	(10)	2	3
	(OR)			
(b)	Explain the concepts of chemical kinetics and the formulation of rate equation. Write the different forms of the rate equation for the formation of a product species 'i'.	(10)	2	3
23. (a)	Decipher the pressure difference measurement in fluid flow operations using a venturimeter highlighting the significance of co-efficient of discharge.	(10)	3	3
	(OR)			
(b)	Discuss the applications and the working principle of weirs and notches.	(10)	3	3
24. (a)	Describe the flow arrangements and the working of shell-tube heat exchangers.	(10)	4	3
	(OR)			
(b)	Explain the working of a short-tube vertical evaporator with a neat sketch.	(10)	4	3
25. (a)	Explain the classification, construction, working and applications of cooling towers.	(10)	5	3
	(OR)			
(b)	Discuss the construction, working and application of an absorption tower with suitable illustrations.	(10)	5	3

PART- C (1x 10=10 Marks)
(Q.No.26 is compulsory)

		Marks	CO	RBT LEVEL
26.	Evaluate the opportunities and future prospects in the field of chemical engineering.	(10)	1	5

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