Register No : _____

THE KAVERY ENGINEERING COLLEGE
(An Autonomous Institution)

B.E/B.TECH DEGREE END SEMESTER THEORY EXAMINATIONS, NOV /DEC 2024

Second Semester

Chemical Engineering

CH3251 - Introduction to Chemical Engineering

Regulations - 2021

Duration : 3 Hrs *Maximum : 100 Marks*

*PART – A (ANSWER ALL QUESTIONS) (Marks 10*2=20)*

Q.No	*Questions*	*BLT*	*CO*	*Marks*
1.	What is chemical engineering?	RE	1	2
2.	Recall the roots of chemical engineering in history.	UN	1	2
3.	State the modes of heat transfer.	RE	2	2
4.	Define mass transfer.	UN	2	2
5.	State law of conservation of mass and energy.	RE	3	2
6.	List the types of viscosity and its units.	UN	3	2
7.	Interpret the use of computers in problem solving.	UN	4	2
8.	List any four chemical engineering software and its application.	UN	4	2
9.	What is the primary role of a process control/automation engineer in chemical engineering?	UN	5	2
10.	How does a commissioning engineer contribute to the overall project lifecycle in chemical engineering?	UN	5	2

*PART – B (ANSWER ALL QUESTIONS) (Marks 5*13 = 65)*

Q.No		*Questions*	*BLT*	*CO*	*Marks*
11.	a	Write a brief note on Origin and growth of chemical Engineers in chemical process industries	UN	1	13
		Or			
	b	Recall any seven-unit operation concepts with an example.	UN	1	13
12.	a	Organize modes of heat transfer with illustration and example.	AP	2	13
		Or			
	b	Salty water is prepared by mixing salt (NaCl, Molecular weight = 58.5) in water (H_2O, Molecular weight = 18). A solution is prepared by adding 20 kg of salt to 100 kg of water, to make a liquid of density 1323 kg/m3. Calculate the concentration of salt in this solution as a (a) weight/ weight fraction, (b) weight/ volume in kg/L and (c) mole fraction.	AP	2	13

13.	a	The efficiency of η of a fan depends on density ρ, dynamic viscosity μ of the fluid, angular velocity ω, diameter D of the rotor and the discharge Q. Deduct η in terms of dimensionless parameters.	AP	3	13
		Or			
	b	Explain the characteristic curves of centrifugal pumps.	AP	3	13
14.	a	Analyze the role of computers and software's impacted the field of process control.	AN	4	13
		Or			
	b	What are the common challenges faced when integrating CAD software with process simulation tools, and how can these challenges impact project outcomes?	AN	4	13
15.	a	Construct the importance of specialization in chemical engineering and how it affects career advancement and job opportunities.	AP	5	13
		Or			
	b	Examine the challenges faced by chemical manufacturing engineers in maintaining production efficiency while adhering to environmental regulations.	AP	5	13

*PART – C (Marks 1*15 = 15)*

Q.No		*Questions*	*BLT*	*CO*	*Marks*
16.	a	Derive on the basis of dimensional analysis suitable parameters to present the thrust developed by a propeller. Assume that the thrust P depends upon the angular velocity ω, speed of advance V, diameter D, dynamic viscosity μ, mass density ρ, elasticity of the fluid medium which can be denoted by the speed of sound in the medium C.	AP	3	15
		Or			
	b	Using Buckingham's π-theorem, prove that the velocity through a circular orifice is given by $V = \sqrt{2gH}\,\Phi\left[\frac{D}{H}, \frac{\mu}{\rho VH}\right]$, where H is head causing flow, D is the diameter of the orifice, μ is co-efficient of viscosity, ρ is the mass density and g is the acceleration due to gravity.	AP	3	15