Register No : _____

THE KAVERY ENGINEERING COLLEGE

(An Autonomous Institution)

B.E/B.TECH DEGREE END SEMESTER THEORY EXAMINATIONS, NOV/DEC 2025

Third Semester

Chemical Engineering

CH3352 / UCHT24304 – Fluid Mechanics for Chemical Engineers

Regulations – 2021 & 2024

Duration : 3 Hrs *Maximum : 100 Marks*

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

Q.No	*Questions*	*BLT*	*CO*	*Marks*
1.	What is meant by "fluid as continuum"?	L2	1	2
2.	Mention any two non-Newtonian fluids.	L2	1	2
3.	Write the equation of continuity for incompressible fluids.	L2	2	2
4.	State Pascal's law.	L2	2	2
5.	Define Reynold's number?	L2	3	2
6.	What do you mean by similitude in model studies?	L2	3	2
7.	Give any two differences between friction drag and pressure drag.	L1	4	2
8.	Formulate the Darcy-Weisbach equation for head loss due to friction.	L1	4	2
9.	Name any two variable head flow meters.	L2	5	2
10.	Differentiate compressors from fans.	L2	5	2

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

Q.No			*Questions*	*BLT*	*CO*	*Marks*
11.	a	i	Distinguish between ideal fluids and real fluids. Explain the importance of compressibility in fluid flow.	L4	1	10
		ii	Explain in detail about Newtonian and non-Newtonian fluids.	L4	1	6
			Or			
	b		Explain the classification of fluid motion with suitable diagrams.	L4	1	16
12.	a		Demonstrate the working principle of a U-tube monometer with a neat sketch and also derive its expression for (P_1-P_2) in terms of measurable quantities.	L2	2	16
			Or			
	b		Derive the Navier – Stokes equation for a Newtonian fluid. State its significance in fluid mechanics.	L2	2	16

13.	a		Discuss the principle of dimensional homogeneity and its importance in model studies.	L5	3	16
			Or			
	b	i	Derive an expression for drag force by dimensional analysis using the variable controlling the motion of the floating vessel through the water namely, the drag force F, Speed V, length L, density ρ, and dynamic viscosity μ and acceleration due to gravity, g.	L5	3	8
		ii	Explain briefly about Buckingham method of dimensional analysis.	L5	3	8
14.	a		Explain boundary layer theory. Derive expression for boundary layer thickness and separation under laminar and turbulent conditions.	L4	4	16
			Or			
	b		Derive expression for head loss due to friction in laminar and turbulent flow through pipes.	L4	4	16
15.	a	i	Explain with a neat diagram the working principle of Venturi meter.	L2	5	10
		ii	Derive the volumetric flowrate for the Venturi meter.	L2	5	6
			Or			
	b		Explain in detail about the construction and working of Centrifugal pump with a neat diagram and also explain its performance characteristics.	L2	5	16