Register No : _____

THE KAVERY ENGINEERING COLLEGE

(An Autonomous Institution)

UG/PG DEGREE END SEMESTER THEORY EXAMINATIONS, APRIL/MAY 2026

Third Semester

Civil Engineering

CE3301 – FLUID MECHANICS

Regulations - 2021

Duration : 3 Hrs *Maximum : 100 Marks*

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

Q.No	*Questions*	*BTL*	*CO*	*Marks*
1.	List any four fluid properties and mention their significance.	L2	1	2
2.	Identify the differences between system and control volume.	L2	1	2
3.	Indicate the units of pressure, density, and viscosity.	L2	2	2
4.	Define Rotational flow.	L2	2	2
5.	Illustrate Dimensional analysis.	L2	3	2
6.	State the advantages of Model analysis.	L1	3	2
7.	Draw Moody diagram and indicate all salient points.	L2	4	2
8.	Compare major and Minor losses.	L2	4	2
9.	Define Displacement function.	L1	5	2
10.	Write the Momentum integral equation.	L1	5	2

*PART – B (ANSWER ALL QUESTIONS) (Marks 5*16 = 80)*

Q.No			*Questions*	*BLT*	*CO*	*Marks*
11.	a	i	A rectangular plane surface 2 m × 3 m is submerged vertically in water with its top 1 m below the surface. Determine the hydrostatic force on the surface and location of the center of pressure.	L2	1	8
		ii	Mention the important fluid properties and explain their effect on laminar and turbulent flow.	L2	1	8
			Or			
	b	i	A curved dam surface with radius 5 m and height 4 m is submerged in water (depth at top 6 m). Determine: Horizontal and vertical components of hydrostatic force and Resultant force and its point of action.	L2	1	6
		ii	Exemplify the stability of floating bodies. Derive the expression for metacentric height and discuss conditions for stable, neutral, and unstable equilibrium.	L2	1	10
12.	a	i	Analyze the concepts of streamlines, pathlines, and streaklines. Illustrate with diagrams and explain their use in flow visualization experiment.	L2	2	8
		ii	Water flows steadily through a pipe. Using flow nets, determine the velocity distribution at points along the pipe. Discuss how flow net analysis is useful in seepage problems.	L2	2	8
			Or			

	b	i	Evaluate the Bernoulli's equation for real applications. Discuss its limitations and practical examples in velocity and discharge measurement.	L3	2	8
		ii	A pipe bend carries water at 4 m^3/s. The bend has a radius of 1.5 m and deflects the flow by 90°. Calculate the force exerted on the pipe bend using the momentum equation.	L3	2	8
13.	a	i	Distinguish between Rayleigh's method and Buckingham Pi theorem with examples. Explain how they are used to derive dimensionless parameters in fluid flow problems.	L2	3	8
		ii	Illustrate the fundamental dimensions used in fluid mechanics. Discuss why dimensional homogeneity is important in deriving physical relationships.	L2	3	8
			Or			
	b	i	Explain the concepts of geometric, kinematic, and dynamic similitude. Evaluate their importance in model testing of hydraulic structures.	L2	3	8
		ii	Discuss distorted and undistorted models. Analyze when distorted models can be used safely and the limitations in practical applications.	L2	3	8
14.	a	i	Water flows through a 0.1 m diameter pipe at 0.5 m/s. Determine the Reynolds number and classify flow as laminar or turbulent.	L4	4	6
		ii	Explain Reynolds experiment, derive velocity profile for laminar flow in a pipe, and discuss the significance of critical Reynolds number.	L4	4	10
			Or			
	b	i	Two pipes of diameters 0.2 m and 0.15 m are in series. Calculate the equivalent pipe diameter for the series combination if lengths are 100 m and 150 m.	L4	4	6
		ii	Discuss total energy line, hydraulic grade line, and siphons and their significance in pipe network design.	L4	4	10
15.	a		Explain boundary layer thickness and its types.	L2	5	16
			Or			
	b	i	Discuss the drag and lift forces in detail.	L2	5	8
		ii	Explain the separation of Boundary layer.	L2	5	8