Register No : _____

THE KAVERY ENGINEERING COLLEGE

(An Autonomous Institution)

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

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.	State Newton's law of viscosity.	L 2	1	2
2.	Briefly explain the term centre of buoyancy.	L 1	1	2
3.	What are the assumptions made in deriving Bernoulli's equation?	L 2	2	2
4.	Define rotational flow.	L 1	2	2
5.	Specify about dimensional analysis.	L 1	3	2
6.	State the Buckingham"s pi-theorem.	L 2	3	2
7.	What is the expression for head loss due to friction?	L 1	4	2
8.	Write short note on distorted model and undistorted model.	L 1	4	2
9.	Define boundary layer thickness.	L 2	5	2
10.	Generalize the drag force from a lift force?	L 2	5	2

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

Q.No		*Questions*	*BLT*	*CO*	*Marks*
11.	a	Calculate the capillary effect in millimeters a glass tube of 4 mm diameter when immersed in (i) Water (ii)mercury. The temperature of the liquid is 20^0 C and the values of the surface tension of water and mercury at 20^0C in contact with air are 0.073575 and 0.51N/m respectively. The angle of contact for water is zero that for mercury 130^0.Take Specific weight of water as 9790 N/m^3.	L 4	1	16
		Or			
	b i	Discuss the types of U –Tube Manometer.	L 4	1	8
	ii	Two pipes on the same elevation convey water and oil of specific gravity 0.88 respectively. They are connected by a U-tube manometer with the manometeric liquid having a specific gravity of 1.25. If the manometric liquid in the limb connecting the water pipe is 2 m higher than the other then find the pressure difference in two pipes.	L 4	1	8
12.	a	Explicate about velocity potential function and stream function and its relations in terms of equation.	L 3	2	16
		Or			
	b	Obtain the Euler's equation of motion and deduce that to Bernoulli's equation.	L 3	2	16

13.	a	Define Similitude and Discuss its type of similarities in detail.	L 3	3	16
		Or			
	b	Consider the problem of computing the drag force on a body moving through a fluid. Let D, ρ, μ, l, and V be drag force, specific mass of the fluid, dynamic viscosity of the fluid, body reference length, and body velocity, respectively.	L 3	3	16
14.	a	Discuss Moody diagram with neat sketch.	L4	4	16
		Or			
	b	The rate of flow of water through a horizontal pipe is 0.25 m^3/s. The diameter of the pipe which is 200 mm is suddenly enlarged to 400 mm. The pressure intensity in the smaller is 11.772 N/cm^2. Identify the (i) loss of head due to sudden enlargement, (ii) pressure intensity in the large pipe.	L4	4	16
15.	a	Analyze the following boundary layer parameters for the velocity distribution $u/U = (y/\delta)^{2/3}$: i) Displacement thickness, and Momentum thickness, ii) Energy thickness and Shape factor.	L4	5	16
		Or			
	b	A thin plate is moving in still atmospheric air at a velocity of 5 m/s. The length of the plate is 0.6 m and width is 0.5 m. Estimate: i) The thickness of the boundary layer at the end of the plate ii) Drag force on one side of the plate. Take density of air as 1.24 $kg/m^3$and kinematic viscosity of 0.15 stokes.	L4	5	16