Register No : _____

THE KAVERY ENGINEERING COLLEGE

(An Autonomous Institution)

B.E/B.TECH DEGREE END SEMESTER THEORY EXAMINATIONS, APRIL-MAY 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*	*BLT*	*CO*	*Marks*
1.	Differentiate between real fluid and ideal fluid.	L2	1	2
2.	State the Newton's law of viscosity.	L1	1	2
3.	What is the difference between stream line and path line?	L2	2	2
4.	List any two applications of pipe bends.	L2	2	2
5.	What are the various dimensionless parameters?	L1	3	2
6.	Define fundamental dimensions.	L1	3	2
7.	Compare between laminar and turbulent flows in pipes.	L2	4	2
8.	Give a Darcy's Weishbach equation.	L1	4	2
9.	Define boundary layer.	L1	5	2
10.	What is meant by momentum integral equation?	L1	5	2

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

Q.No		*Questions*	*BLT*	*CO*	*Marks*
11.	a	A caisson (a large water tight chamber open at the bottom and water is kept out by air pressure and construction work is carried out under water) for closing the entrance to a dry dock is in a trapezoidal form which is 20 m wide at the top and 12m wide at the bottom and 5 m deep. Find the total pressure and centre of pressure on the caisson if the water on the outside is just level with the top and dock is empty.	L3	1	16
		Or			
	b i	A differential manometer is connected at the two pints A and B as shown in Figure.1 given below. Determine the pressure difference between the points A and B, by assuming that the specific gravity of gasoline as 0.9, mercury as 13.6 and oil as 0.8.	L3	1	8

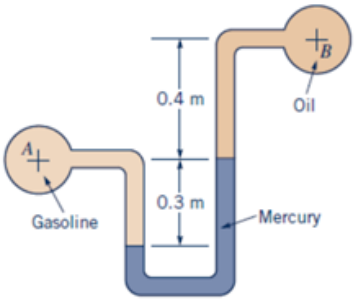

Figure.1

	ii	Find the density of a metallic body which floats at the interface of mercury of Specific gravity 13.6 and water such that 30% of its volume is submerged in mercury and 70% in water.	L3	1	8
12.	a	The stream function for a two-dimensional flow is given by $\Psi = 2xy$, calculate the velocity at the point P (2,3). Find the velocity potential function φ.	L3	2	16
		Or			
	b	The water is flowing through a pipe having diameters 20cm and 10cm at sections and 2 respectively. The rate of flow through pipe is 35 litres/sec. The section 1 is 6m above datum and section 2 is 4m above datum. If the pressure at section 1 is 39.24 N/cm^2, find the intensity of pressure at section 2.	L3	2	16
13.	a	The resisting force (F) of a supersonic plane during flight can be considered as dependent upon the length of the aircraft (L), Velocity (V), air viscosity (μ), air density (ρ) and bulk modulus (K). Express the functional relationship between these variables and the resisting force using dimensional analysis method.	L3	3	16
		Or			
	b i	Explain in detail about the various types of similarities of a model and prototype.	L2	3	8
	ii	Describe about the Weber number and Froude number.	L2	3	8
14.	a i	Explain about the Moody diagram with a neat sketch.	L2	4	8
	ii	Describe in detail about the total energy line and hydraulic gradient line.	L2	4	8
		Or			
	b	The rate of flow of water through a horizontal pipe is 0.20 m/s. The diameter of the pipe which is 250 mm is suddenly enlarged to 450 mm. The pressure intensity in the smaller pipe is 10.72 N/cm^2. Determine the Loss of head due to i) Sudden enlargement ii) Pressure intensity in the large pipe iii) Power lost due to enlargement	L3	4	16
15.	a	Find the displacement thickness, momentum thickness and energy thickness for the velocity distribution in the boundary layer given by $u/U = 3(y/\delta) - (y/\delta)^3$.	L3	5	16

Or

b	A thin plate is moving in still air at a velocity of 8 m/s. The length of the plate is 1.2 m and the width is 1.0 m. Calculate the thickness of the boundary layer at the end of the plate and drag force on one side of the plate. Take density of air as 2.54 kg/m3 and kinematic viscosity as 0.30 strokes.	L3	5	16