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PRESIDENCY UNIVERSITY

BENGALURU

Make Up Examinations – December 2025

Date: 26 – 12- 2025

Time: 9:30am – 12:30pm

School: SOE	Program: B.Tech		
Course Code: CIV2009	Course Name: Fluid Mechanics		
Semester: MK	Max Marks: 100	Weightage: 50%	

CO - Levels	C01	C02	C03	C04	C05
Marks	8	46	46	-	-

Instructions:

- (i) Read all questions carefully and answer accordingly.
- (ii) Do not write anything on the question paper other than roll number.

Part A

Answer ALL the Questions. Each question carries 2marks.

10Q x 2M=20M

1.	Define viscosity and mention its significance in fluid motion	2 Marks	L2	C01
2.	Define density and explain its significance in fluid mechanics.	2 Marks	L2	C01
3.	List the major and minor losses through pipe system	2 Marks	L2	C03
4.	State Newton's law of Viscosity	2 Marks	L2	C01
5.	List any two applications of Bernoulli's equation	2 Marks	L2	C02
6.	Write Darcy's Welsbach equation to calculate major losses through pipe system	2 Marks	L2	C03
7.	Show the flow pattern for laminar, transition and turbulent flow based on Reynold's experiment	2 Marks	L2	C03
8.	Differentiate between compressible and incompressible fluids.	2 Marks	L2	C02
9.	List the assumptions made in derivation of Bernoulli's equation	2 Marks	L2	C02
10.	What is meant by capillarity in fluids	2 Marks	L2	C01

Part B

Answer the Questions.

Total Marks 80M

11.	a.	Water is flowing through a pipe of 5 cm diameter under a pressure of 29.43 N/cm ² and with mean velocity of 2.0 m/s. Find the total head or total energy per unit weight of the water at a cross section, which is 5 m above the datum line.	8 Marks	L3	C02
	b.	An oil of specific gravity 0.8 is flowing through a orificemeter having inlet diameter 20 cm and orificemeter diameter 10 cm. The oil-mercury differential monometer shows a reading of 25 cm of mercury. Calculate the discharge of oil through the Orificemeter. Take $C_d = 0.61$.	12 Marks	L3	C02
Or					
12.	a.	The water is flowing through a pipe having diameter 20 cm and 10 cm at sections 1 and 2 respectively. The rate of flow through pipe is 35 litres/sec. the section 1 is 6 m above datum and section 2 is 4 m above datum. If the pressure at section 1 is 39.24 N/cm ² . Find the intensity of pressure at section 2.	10 Marks	L3	C02
	b.	A horizontal Venturimeter with inlet and throat diameters 30 cm and 15 cm respectively is used to measure flow of water . The reading of differential monometer connected to the inlet and the throat is 20 cm of mercury. Determine the rate of flow take $C_d = 0.98$.	10 Marks	L3	C02
13.	a.	With neat diagram explain the working principle of Orifice meter	10 Marks	L2	C02
	b.	A 0.3 m pipe carries water at a velocity of 24.4 m/s. At points A and B measurements of pressure and elevation were respectively 361 kN/m ² and 288 kN/m ² and 30.5 m and 33.5 m. For steady flow, find the loss of head between A and B	10 Marks	L3	C02
Or					
14.	a.	With neat diagram explain the working principle of Venturimeter	10 Marks	L2	C02
	b.	A 0.25 m diameter pipe carries oil of specific gravity 0.8 at the rate of 120 liters per second and the pressure at a point A is 19.62 kN/m ² (gage). If the point A is 3.5 m above the datum line, calculate the total energy at point A in meters of oil.	10 Marks	L3	C02

15.	a.	Find the head loss due to friction in a pipe of diameter 250 mm and length 80 m, through which water is flow at a velocity of 2.8 m/s using a) Darcy formula, b) Chezy's formula for which $C = 60$. Take kinematic viscosity of water = 0.01 stoke.	14 Marks	L3	C03
	b.	Find the Reynolds number if a fluid of viscosity 0.35 Ns/m^2 and relative density of 1300 Kg/m^3 through a 20 mm pipe with a Velocity of 2.5 m/s?	6 Marks	L2	C03

Or

16.	a.	Find the diameter of a pipe of length 3000m when the rate of flow of water through the pipe is 300 litres/sec and head loss due to friction is 4 m. Take the value of $C = 50$ in Chezy's formulae	14 Marks	L3	C03
	b.	Calculate the Reynolds number if a fluid flows through a diameter of 80 mm with velocity 5 m/s having density of 800 Kg/m^3 and having viscosity of 0.45 Ns/m^2	6 Marks	L2	C03

17.	a.	The difference in water surface levels in two tanks, which are connected by three pipes in series of lengths 300 m, 170 m and 210 m and of diameters 300 mm, 200 mm and 400 mm respectively, is 12 m. Determine the rate of flow of water if co-efficient of friction are 0.005 , 0.0052 and 0.0048 respectively, Neglecting minor losses.	15 Marks	L3	C03
	b.	Three pipes of length 900 m, 600 m and 500 m and of diameters 600 mm, 500 mm and 400 mm respectively are connected in series. These pipes are to be replaced by a single pipe of length 1700 m. Find the diameter of single pipe.	5 Marks	L2	C03

Or

18.	a.	Three pipes of 400 mm, 200 mm and 300 mm diameters have lengths of 400 m, 200 m and 300 m respectively. They are connected in series to make a compound pipe. The ends of this compound pipe are connected with two tanks whose difference in levels is 16 m. If co-efficient of friction for these pipes is same and equal to 0.005, determine the discharge through the compound pipe neglecting the minor losses	15 Marks	L3	C03
	b.	A pipe line of 60 cm diameter bifurcates at a y- junction into two branches 30 cm and 20 cm in diameter. If the rate of flow in the main pipe is $1.4 \text{ m}^3/\text{s}$ and mean velocity of flow in 30 cm diameter pipe is 6.5 m/s, determine the rate of flow in the 20 cm diameter pipe	5 Marks	L2	C03