Roll No.												

PRESIDENCY UNIVERSITY

BENGALURU

End - Term Examinations – December 2025	
Date: 09 – 12- 2025	**Time:** 09:30am – 12:30pm

School: SOE	**Program:** B.Tech in Civil	
Course Code : CIV2503	**Course Name:** Fluid Mechanics	
Semester: III	**Max Marks**: 100	**Weightage**: 50%

CO - Levels	CO1	CO2	CO3	CO4	CO5	CO6
Marks	13	2	2	27	32	24

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 the following a) Surface tension b) Viscosity	**2 Marks**	**L1**	**CO1**
2.	Show Bernoulli's equation for Real and ideal fluids	**2 Marks**	**L1**	**CO4**
3.	List the major and minor losses through pipe system	**2 Marks**	**L1**	**CO5**
4.	Show the relation between and velocity of fluid and shear stress as per Newton's law of Viscosity	**2 Marks**	**L1**	**CO1**
5.	Define hydrostatic pressure and write the equation to calculate hydrostatic pressure on horizontal plane.	**2 Marks**	**L1**	**CO3**
6.	List any two applications of fluid mechanics in the field of Mechanical engineering	**2 Marks**	**L1**	**CO1**
7.	Show the relation between atmospheric pressure, gauge pressure and absolute pressure	**2 Marks**	**L1**	**CO2**
8.	Define the following a) Compressible flow b) Incompressible flow	**2 Marks**	**L1**	**CO1**
9.	Define the following terms related to pumping system a) Suction head b) Delivery head	**2 Marks**	**L1**	**CO6**
10.	What is meant by a hydraulic turbine used in hydro power plant	**2 Marks**	**L1**	**CO6**

Part B

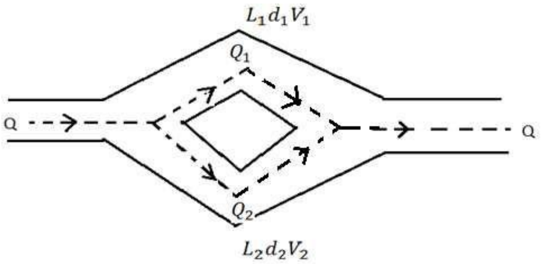
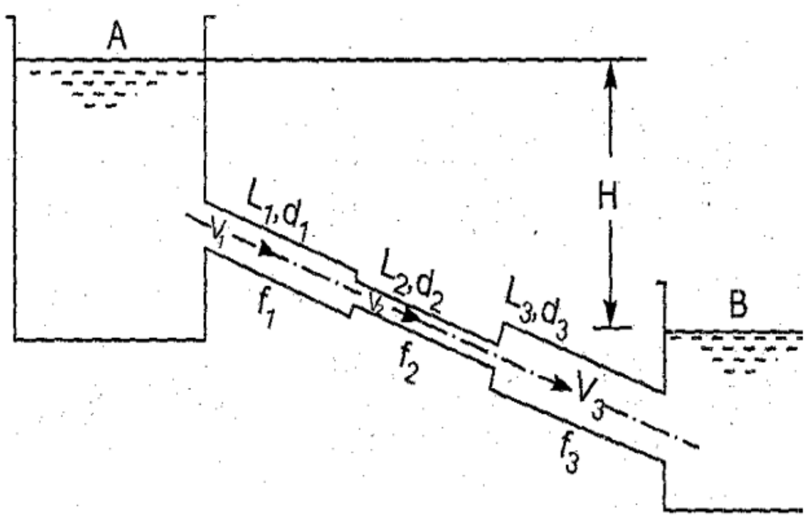
Answer the Questions. **Total Marks 80M**

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.	**10 Marks**	**L3**	**CO4**
		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**	**CO4**

13.	**a.**	With neat diagram explain the working principle of Orifice meter	**7 Marks**	**L2**	**CO4**
	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.	**8 Marks**	**L3**	**CO4**
		Or			
14.	**a.**	With neat diagram explain the working principle of Venturimeter meter	**7 Marks**	**L2**	**CO4**
	b.	An orifice meter with orifice diameter 15 cm is inserted in a pipe of 30 cm diameter. The pressure difference measured by a mercury oil differential monometer on the two sides of orifice meter gives a reading 50 cm of mercury. Find the rate of flow of oil of specific gravity 0.9 when the Co-efficient of discharge for the orifice meter is 0.64	**8 Marks**	**L3**	**CO4**

15.	**a.**	Compare steady flow and unsteady flow with the help of neat sketch	**5 Marks**	**L2**	**CO1**
	b.	Find the head loss due to friction in a pipe of diameter 300 mm and length 50 m, through which water is flow at a velocity of 3 m/s using a) Darcy formula, b) Chezy's formula for which C = 60. Take kinematic viscosity of water = 0.01 stoke	**10 Marks**	**L3**	**CO5**
		Or			
16.	**a.**	Compare uniform flow and non-uniform flow with the help of neat sketch	**5 Marks**	**L2**	**CO1**

	b.	A crude oil of kinematic viscosity 0.4 stoke is flowing through a pipe of diameter 300 mm at the rate of 300 liters/sec. Find the head loss due to friction for a length of pipe 50 m.	**10 Marks**	**L3**	**CO5**

17.	**a.**	A main pipe divides in to two parallel pipes which again forms one pipe as shown in figure 1. The length and diameter for the first parallel pipe are 2000 m and 1 m respectively, while the length and diameter of 2nd parallel pipe are 2000 m and 0.8 m . Find the rate of flow in each parallel pipe, if total flow in the main is 3.0 m^3/s. The co-efficient of friction for each parallel pipe is same and equal to 0.005.  **Figure-1**	**5 Marks**	**L3**	**CO5**
	b.	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 as shown in figure 2. compare the rate of flow of water, considering: a) Minor losses also b) Neglecting minor losses. Take co-efficient of friction are 0.005 , 0.0052 and 0.0048 respectively  **Figure-2**	**15 Marks**	**L3**	**CO5**
Or					

18.	**a.**	Find the loss of head when a pipe of diameter 200 mm is suddenly enlarged to a diameter of 400 mm. The rate of flow of water through pipe is 250 litres/sec	**5 Marks**	**L3**	**CO5**
	b.	A horizontal pipe of diameter 500 mm is suddenly contracted to a diameter of 250 mm. The pressure intensities in the large and smaller pipe is given as 13.73 N/cm^2 and 11.772 N/cm^2 respectively. Find the loss of head due to contraction if Cc = 0.62. Also determine the rate of flow of water.	**15 Marks**	**L3**	**CO5**

19.	**a.**	Describe in detail the construction and working principle of a reciprocating pump with a neat sketch.	**12 Marks**	**L2**	**CO6**
	b.	Explain in detail the construction and working principle of a Pelton wheel turbine with a neat sketch	**8 Marks**	**L2**	**CO6**
Or					
20.	**a.**	Explain the working of a centrifugal pump with a neat diagram and discuss its advantages and limitations.	**12 Marks**	**L2**	**CO6**
	b.	Explain in detail the construction and working principle of a Francis turbine with a neat sketch	**8 Marks**	**L2**	**CO6**