Roll No.												

PRESIDENCY UNIVERSITY

BENGALURU

Make Up Examinations – December 2025

Date: 26 – 12- 2025 **Time:** 9:30am – 12:30pm

School: SOE	**Program:** B.Tech	
Course Code : MEC2010	**Course Name :** Fluid Mechanics	
Semester: MK	**Max Marks:** 100	**Weightage:** 50%

CO - Levels	**CO1**	**CO2**	**CO3**	**CO4**
Marks	**26**	**26**	**24**	**24**

Instructions:

(i) ***Read all questions carefully and answer accordingly.***

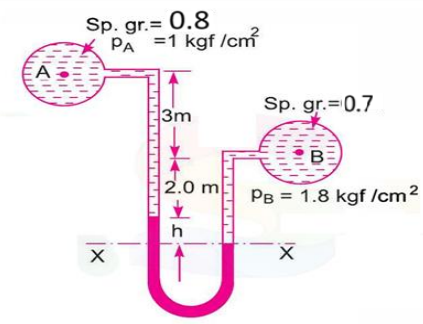
(ii) ***Do not write anything on the question paper other than roll number.***

Part A

Answer ALL the Questions. Each question carries 2marks.				**2Mx10Q=20M**
1	Define Kinematic and Dynamic viscosity.	**2 Marks**	**L1**	**CO1**
2	If a person studies about a fluid which is at rest, what will you call his domain of study?	**2 Marks**	**L1**	**CO1**
3	The value of density of water and air at atmospheric pressure is……..	**2 Marks**	**L1**	**CO1**
4	The value of the viscosity of an ideal fluid is ……..	**2 Marks**	**L1**	**CO2**
5	The value of the surface tension of an ideal fluid is ……..	**2 Marks**	**L1**	**CO2**
6	Pressure intensity or force due to pressure gradient for fluid at rest is considered as which kind of force?	**2 Marks**	**L1**	**CO2**
7	Which of the following is a type of fluid based on Reynolds number?	**2 Marks**	**L1**	**CO3**
8	Which of the following method is used exclusively in fluid mechanics?	**2 Marks**	**L1**	**CO3**
9	What is fluid mechanics?	**2 Marks**	**L1**	**CO4**
10	List and explain any 2 properties of fluids.	**2 Marks**	**L1**	**CO4**

Part B

Answer ALL Questions. Each question carries 20 marks.					4QX20M=80M
11	11a	Define Surface tension, Viscosity, Shear stress, Density and Capillarity.	10Marks	L2	CO1
	11b	List and brief at least five types of fluid flow.	10Marks	L2	CO1
		or			
12	12a	Sketch the Venurimeter and Orificemeter. Define its working Principle.	10Marks	L2	CO1
	12b	Deduce the relationship between compressibility and Bulk modulus.	10Marks	L2	CO1
13	13a	A cubical block of 40 cm side and of 40 kg weight is allowed to slide down along a plane inclined at 45° to the horizontal on which there is a film of oil having viscosity 2.16×10^{-3} N·s/m^2. What will be the terminal velocity of the block if the film thickness is 0.03 mm?	10Marks	L3	CO2
	13b	An oil of specific gravity 0.9 is flowing through a venturimeter having inlet diameter 40 cm and throat diameter 20 cm. The oil-mercury differential manometer shows a reading of 35cm. Calculate the discharge of oil through the horizontal venturimeter.	10Marks	L3	CO2
		or			
14	14a	The water is flowing through a pipe having diameter 30cm and 20cm respectively at section 1 and 2. The rate of flow through the pipe is 15 litre/s. The section 1 and 2 is 6m and 4m above the datum. If the pressure at section 1 is 59.24N/cm^2, find the pressure at section 2.	10Marks	L3	CO2
	14b	A hydraulic lift consists of 70 cm diameter ram and slides in a cylinder of diameter 70.02 cm, while the annular space is filled up with oil having kinematic viscosity of 0.56 cm^{2}s, and specific gravity of 0.85. If the rate of travel of ram 15m/min. Find the frictional resistance when 4m of ram is engaged in the cylinder.	10Marks	L3	CO2
15	15a	A U-tube differential manometer is used to measure the pressure difference between two points A and B in a pipeline. The manometer contains mercury and water. The left limb of the manometer, connected to point A, contains water up to a height of 0.8 m. The right limb, connected to point B, contains mercury with a height difference 0.4m between the two limbs. Calculate the pressure difference between the pipe A and B.	10Marks	L3	CO3

	15b	In the figure mentioned below find 'h', using manometric analysis.  	**10Marks**	**L3**	**CO3**
		or			
16	**16a**	A solid cylinder of 3 m diameter and 2 m height is made up of a material of specific gravity 0.8 and floats in water. Find its metacentric height.	**10Marks**	**L3**	**CO3**
	16b	A rectangular pontoon is 6 m long, 4 m wide, and 1.50 m high. The depth of immersion of the pontoon is 1.0 m in seawater. If the center of gravity is 0.8 m above the bottom of the pontoon, determine the metacentric height. The density of seawater = 1030 kg/m^3.	**10Marks**	**L3**	**CO3**
17	**17a**	Find the volume of the water displaced and the position of the center of buoyancy for a wooden block of width 2.5 m and of depth 1.5 m, when it floats horizontally in water. The density of the wooden block is 850 kg/m^3 and its length is 6.0 m.	**10Marks**	**L3**	**CO4**
	17b	Explain the different types of fluid flow.	**10Marks**	**L3**	**CO4**
		or			
18	**18a**	The velocity vector in a fluid flow is given V = 7x3i - 12x yj + 4tk. Find the velocity and acceleration of a fluid particle at (2, 1, 3) at time t = 3.	**10Marks**	**L3**	**CO4**
	18b	The velocity potential function Φ is given by the expression: $$\phi = -\frac{xy^3}{3} - x^2 + \frac{x^3 y}{3} + y^2$$ (i) Determine the velocity components in the X and Y directions. (ii) Demonstrate that this represents a valid case of fluid flow.	**10Marks**	**L3**	**CO4**

******* BEST WISHES *******