Roll No.												

PRESIDENCY UNIVERSITY

BENGALURU

End - Term Examinations – December 2025

Date: 11-12-2025 **Time:** 09:30AM – 12:30PM

School: SOE	**Program:** B. Tech. MECHANICAL ENGINEERING	
Course Code: MEC2502	**Course Name:** Fluid Mechanics and Machinery	
Semester: III	**Max Marks**: 100	**Weightage**: 50%

CO - Levels	**CO1**	**CO2**	**CO3**	**CO4**	**CO5**	**CO6**
Marks	**12**	**12**	**24**	**24**	**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. 10Q x 2M=20M

1.	Define density and state its SI unit.	**2 Marks**	**L1**	**CO1**
2.	State Pascal's law.	**2 Marks**	**L1**	**CO2**
3.	Define continuity equation.	**2 Marks**	**L1**	**CO3**
4.	What is Reynolds number? Mention its importance.	**2 Marks**	**L1**	**CO3**
5.	State Bernoulli's equation.	**2 Marks**	**L1**	**CO4**
6.	Differentiate uniform and non-uniform flow.	**2 Marks**	**L1**	**CO4**
7.	Define major and minor losses.	**2 Marks**	**L1**	**CO5**
8.	Define kinematic viscosity.	**2 Marks**	**L1**	**CO5**
9.	Define buoyancy.	**2 Marks**	**L1**	**CO6**
10.	What is metacentric height?	**2 Marks**	**L1**	**CO6**

Part B

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

11.	**a.**	Explain density, viscosity, capillarity, surface tension.	**10 Marks**	**L2**	**CO1**
	b.	Explain Pascals law with derivation.	**10 Marks**	**L2**	**CO2**
Or					
12.	**a.**	Explain surface tension & capillarity with diagrams.	**10 Marks**	**L2**	**CO1**
	b.	Explain pressure measuring devices (piezometer, U-tube).	**10 Marks**	**L2**	**CO2**

13.	A hose of diameter 20 mm fills a 0.07385 m^3 bucket in 50 s. It connects two nozzles of diameters 10 mm and 6 mm. Determine discharge, velocities at the nozzles, ratio of dynamic pressures, and effect of area reduction on velocity and pressure.	**20 Marks**	**L3**	**CO3**
Or				
14.	A block of volume 0.04 m^3 floats in a liquid of density 900 kg/m^3. Weight of block is 250 N. Determine buoyant force, submerged volume, submerged height, stability condition, and justification using metacentric concepts.	**20 Marks**	**L3**	**CO6**

15.	A pipe reduces linearly from 30 mm to 10 mm over 1.5 m. Velocity at the larger end is 1.2 m/s. Determine the diameter function, velocity function, discharge, acceleration at exit, and flow classification.	**20 Marks**	**L4**	**CO3**
Or				
16.	A pontoon of dimensions 2 m × 1 m × 0.5 m weighs 1500 N. Determine displaced volume, centre of buoyancy, moment of inertia of water-plane area, metacentric height, and stability condition.	**20 Marks**	**L4**	**CO6**

17.	Water flows at 2.5 m/s through a sudden expansion (K=1.0), sudden contraction (K=0.4) and elbow (K=0.75). Determine individual minor losses, total loss, equivalent water column loss, comparison with major loss of 1.5 m, and evaluate importance of minor losses.	**20 Marks**	**L5**	**CO5**
Or				
18.	In a differential manometer, mercury shows 25 cm level difference. Pipe fluid is oil with SG=0.8. Determine pressure difference, equivalent water column, pressure in kPa, sensitivity and reason for use of differential manometer.	**20 Marks**	**L5**	**CO5**