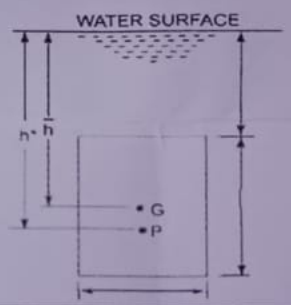
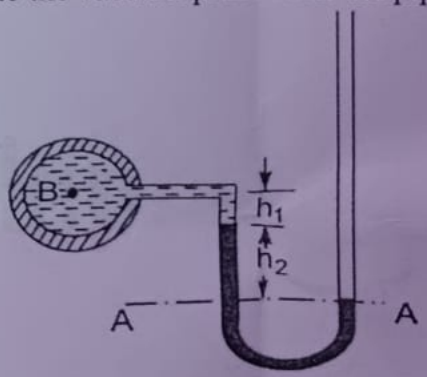
HVSC26

VIT
Vellore Institute of Technology
(Deemed to be University under section 3 of UGC Act, 1956)

Continuous Assessment Test-I, Sept. 2023

Programme	:	B.Tech (Mech)	Semester	:	Fall Semester 23-24
Course	:	Fluid Mechanics and Machines	Code	:	BMEE204L
Faculty	:	Dr. Harish R Dr. Bhisham Dhurandher Dr. Joseph Daniel	Class Nbr		CH2023240100127 CH2023240100128 CH2023240100165
			Slot	:	D1+TD1
Time	:	1.5 Hrs	Max. Marks	:	50

Attempt any 5 Questions

Q. No.	Question Description	Marks
1.	A rectangular plane surface is 1.5 m wide and 2.5 m high. It lies in vertical plane in water. Determine the total pressure and position of centre of pressure on the plane surface when it upper edge is horizontal and 1.5 m below the free water surface. 	10
2.	Negative pressure in water pipe was measured using U-tube manometer containing mercury. The left limb was connected to the water pipe and right limb was exposed to the atmosphere. Height of water upto centre of pipe in the left limb is h_1= 30 mm. Difference between the mercury levels in the two limbs is h_2= 50 mm. Calculate the vacuum pressure in the pipe. 	10
3.	a) Discuss the Newton's law of viscosity with the help of graph, and classify the fluids by relating shear stress and shear strain. b) Discuss the condition of equilibrium for floating body.	5 5
4.	a) If for a two-dimensional potential flow, the velocity potential is given by $\emptyset = 5(x^2 - y^2)$	7

	Determine the velocity at the point P (4, 5). Also Determine the value of stream function at the point P. b) Name the two approaches to describe fluid motion and describe its essential features.	3
5.	a) Define the following terms: i) Uniform and non-uniform flow. ii) Steady and unsteady flow. iii) Streamline iv) Rotational and irrotational flow. b) The hydraulic lift consists of two pistons, with diameters measuring 60 cm and 5 cm, respectively. What is the magnitude of the force exerted by the larger piston in response to a 50 N load applied to the smaller piston?	5 5
6.	The velocity vector in a fluid is given as $V = 6x^3i - 8x^2yj + 3tk$. Find the velocity and acceleration of a fluid particles at (2,1,3) at time t=1.	10