



VIT

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

SLOT: D2+TD2

REG. NO.:

SCHOOL OF MECHANICAL ENGINEERING
CONTINUOUS ASSESSMENT TEST - I
FALL SEMESTER 2025-2026

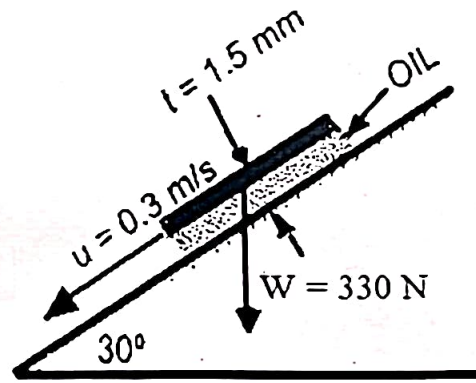
Programme Name & Branch	:	B.Tech (BME, BMV, BMM)	
Course Code	:	BMEE204L	
Course Name	:	Fluid Mechanics and Machines	
Faculty Name(s)	:	Dr. C.G.Mohan, Dr. R. Prakash, Dr. P. Rajesh Kanna, Dr. R. Deepakkumar, Dr. Gaurav Gupta, Dr. K. Ashok	
Class Number(s)	:	VL2025260102043, 2044, 2045, 2046, 2047, 2686	
Date of Examination	:	20.08.2025	
Exam Duration	:	90 minutes	Maximum Marks: 50

General instruction(s):

- Answer All Questions
- M - Max mark; CO - Course Outcome; BL - Blooms Taxonomy Level (1 - Remember, 2 - Understand, 3 - Apply, 4 - Analyse, 5 - Evaluate, 6 - Create)
- Course Outcome Statements:

CO 1: Demonstrate the significance of fluid properties and laws of fluid statics to engineering systems.

CO 2: Describe the flow fields using Lagrangian and Eulerian approaches

Q. No	Question	M	CO	BL
1.	<p>Calculate the dynamic viscosity of oil which is used for lubrication between a square plate of size 0.8 m x 0.8 m and an inclined plane with angle of inclination 30°. The weight (W) of the square plate is 330 N and it slide down the inclined plane with uniform velocity (u) of 0.3 m/s. The thickness (t) of the oil film is 1.5 mm.</p> 	10	CO1	BL3



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2.	<p>A multiple U-tube manometer is fitted to a pipe with centre at A as shown in Figure. Determine the pressure at A. Consider all the manometric heights are in m. Take specific gravity of water = 1, and oil = 0.9.</p>	10	CO1	BL3
3.	<p>A 3-m-wide, 8-m-high rectangular gate is located at the end of a rectangular passage that is connected to a large open tank filled with water as shown in Figure. The gate is hinged at its bottom and held closed by a horizontal force, located at the center of the gate. The maximum value for F_H is 3500 kN. Determine the <u>maximum water depth, h</u>, above the center of the gate that can exist without the gate opening.</p>		CO1	BL3
4.	<p>A fluid flow is given by, $V = xy^2i - 2yz^2j - \left[zy^2 - \frac{2z^3}{3}\right] k$. Calculate the velocity and acceleration at the point [1,2,3]. Consider i, j and k are unit vectors in x, y and z directions respectively.</p>	10	CO2	BL3
5.	<p>Determine the equation of the streamline that passes through the point (2, -1) when $t = 2$ s if the velocity field is given by: $V = 2y^2i + xytj$ m/s. Consider i, j are unit vectors in x and y directions respectively.</p>	10	CO2	BL3