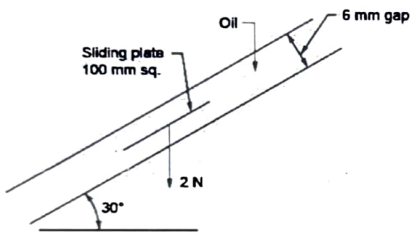
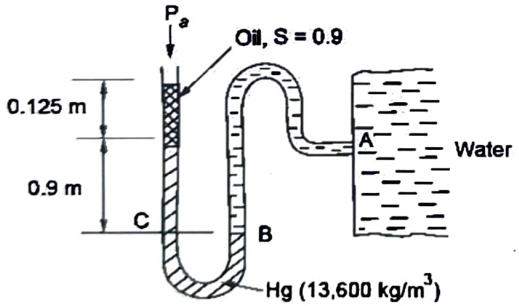
VIT
Vellore Institute of Technology
(Deemed to be University under section 3 of UGC Act, 1956)

SCHOOL OF MECHANICAL ENGINEERING
CONTINUOUS ASSESSMENT TEST – I
WINTER SEMESTER 2023-2024

Reg. No.
(To be filled by the student)
22BME0482

Programme Name & Branch : **BMA, BME, BMM**
Course Code : **BMEE204L**
Course Name : **Fluid Mechanics and Machines**
Faculty Name(s) : Dr. Thundil Karuppa Raj R; P ; Dr. Edison gundabattini; Dr. Aruna Kumar Behura; Dr. Abinash Mohanta; Dr. Deepakkumar R
Class Number(s) : **VL2023240504559, VL2023240504562, VL2023240504558**
Slot : **E1+TE1**
Date of the Exam : **15-02-2024**
Exam Duration : **90 minutes** **Maximum Marks: 50**

General instruction(s): Answer all the questions

Q. No	Question	Marks
1.	The space between two large inclined parallel planes is 6 mm and is filled with a fluid as shown in Fig.1. The planes are inclined at 30° to the horizontal. A small thin square plate of 100 mm side slides freely down parallel and midway between the inclined planes with a constant velocity of 3 m/s due to its weight of 2N. Determine the viscosity of the fluid.  Fig. 1	10
2.	A manometer is fitted as shown in Fig. 2. Determine the pressure at point A.  **Fig. 2.**	10
3.	A 100 kN pontoon of 4 m × 6 m × 0.8 m is to be used to transport a 200 kN cylindrical drum of 2 m in diameter through a river as shown in Fig.3. Check (1) whether the arrangement would be feasible (2) the stability.	10

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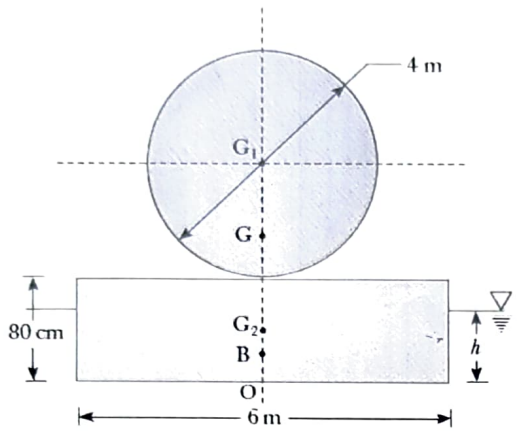

Fig. 3

4.	The wall of a reservoir is inclined at 30° to the vertical. A sluice 1m long along the slope and 0.8 m wide is closed by a plate. The top of the opening is 8 m below the water level. Determine the location of the centre of pressure and the total force on the plate.	10
5.	*Check whether the following velocity relations satisfy the requirements for steady irrotational flow* **(i)** $u = x + y, \quad v = x - y$ **(ii)** $u = xt^2 + 2y, \quad v = x^2 - yt^2$ **(iii)** $u = xt^2, \quad v = xyt + y^2$	10

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