



Continuous Assessment Test – I

Programme Name & Branch: B-Tech (BME/BCL)

Course Code & Name : MEE1004, Fluid Mechanics

Faculty-In-Charge : Prof: Sreeja Sadasivan

Slot: D2

Exam Duration: 90 Minutes

Maximum Marks: 50

Answer all the questions

1. A 1.5 cm wide gap between two vertical plane surfaces is filled with an oil of specific gravity 0.9 and dynamic viscosity 2 Ns/m^2 . A metal plate $1\text{m} \times 1\text{m} \times 0.1 \text{ cm}$ thick and weighing 20 N is placed midway in the gap as shown in Fig. 1. Find the force required if the plate is to be lifted up with a constant velocity of 0.1 m/s.

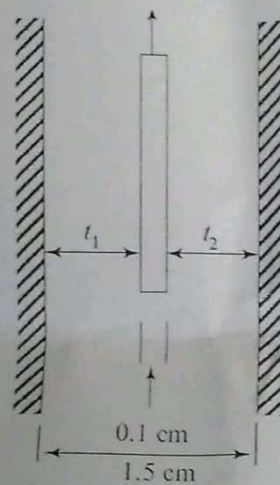


Fig. 1

2. A 50 cm square gate ($a = 0.5$) has its top edge 10 m below the water surface. It is on an 45° angle and its bottom edge is hinged as shown in Fig. 2. What force P is needed to just open the gate?

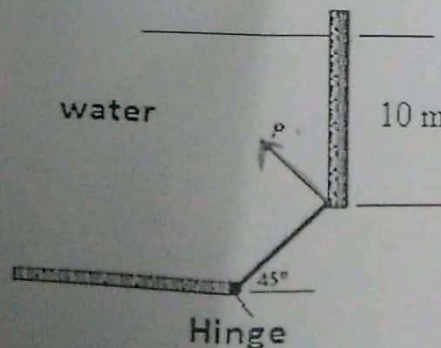


Fig. 2

JOIN
VIT QUESTION PAPERS
ON TELEGRAM



SEARCH VIT QUESTION PAPERS
ON TELEGRAM TO JOIN

3. The system in Fig. 3 is open to 1 atm on the right side.
- (a) If $L = 120$ cm, what is the air pressure in container A?
- (b) Conversely, if $P = 135$ kPa, what is the length L ?

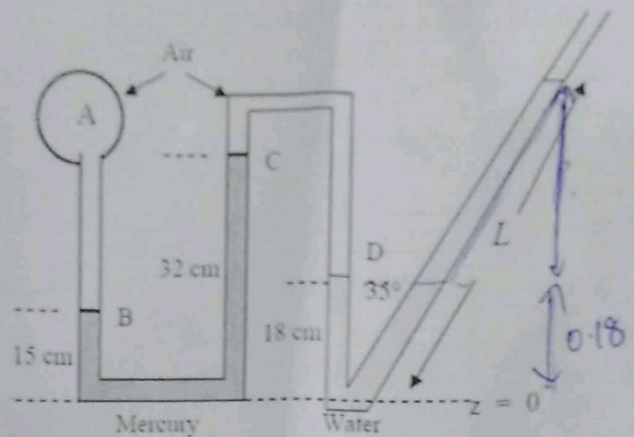


Fig. 3

4. As shown in Fig. 4, surface tension forces can be strong enough to allow a double edge steel razor blade to float on water, but a single edge blade will sink. (a) The mass of the double-edge blade is 0.64×10^{-3} kg, and the total length of its sides is 206 mm. Determine the value of θ required to maintain equilibrium between the blade weight and the resultant surface tension force (b) The mass of the single-edge blade is 2.61×10^{-3} kg, and the total length of its sides is 154 mm. Explain why this blade sinks. Support your answer with necessary calculation.

The coefficient of surface tension is 0.0734 N/m.

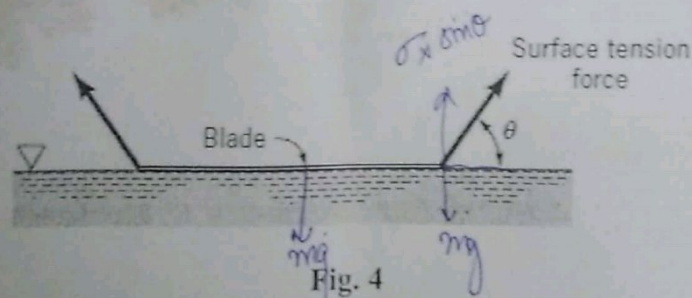


Fig. 4

5. Explain briefly the following:

- Surface Tension
- Capillarity
- Compressibility
- Vapour Pressure