VIT

Vellore Institute of Technology

Continuous Assessment Test – II

Programme Name & Branch: B.Tech. (BME, BCL)

Course Name & Code: Fluid Mechanics (MEE 1004)

Class Number: Common To A2 Slot **Slot:** A2 **Exam Duration:** 90 mins **Max. Marks:** 50

General instruction(s): *Missing data, if any, may be suitably assumed.*

Section – A (5 x 10 = 50 Marks)

S.No.	Question	Course Outcome (CO)
1.	A 300 mm x 150 mm venturimeter is provided in a vertical pipeline carrying oil of Sp. Gravity 0.9, the flow being upwards. The difference in elevations of the throat section and entrance section of the venturimeter is 300 mm. The differential U tube mercury manometer shows a gauge deflection of 250 mm. If the meter coefficient is 0.98 calculate a) discharge of the oil b) pressure difference b/w the entrance and throat section What would be the pressure difference for the same discharge if the venturimeter is made horizontal?	3
2.	The fluid flowing in a reversing elbow makes a 180° U-turn before it is discharged, as shown in Figure 1. The elevation difference between the inlet and the exit sections is 0.3 m. Determine the anchoring force needed to hold the elbow in place.	3
3.	Two reservoirs have 6 m difference in water levels, and are connected by a pipe 60 cm diameter and 3000 m long. Then, the pipe branches into two pipes each 30 cm diameter and 1500 m long. The friction coefficient is 0.01. Neglecting minor losses, determine the flow rates in the pipe system?	4
4.	Consider a laminar flow of water (1.512×10^{-4} m^3s^{-1}) through a pipe of diameter 200 mm. If the maximum flow velocity is 1.5 m/s, calculate the following a) mean velocity and the radius at which it occurs b) velocity at 4 cm from the wall of the pipe c) pressure head for a length of 500 mm	4
5.	A horizontal pipe line is connected to a water tank at one end and discharges freely into the atmosphere at the other end. The specifications of the system are shown in Figure 2. Take f = 0.01 for both the sections of the pipe and draw the total energy line and the hydraulic gradient.	4

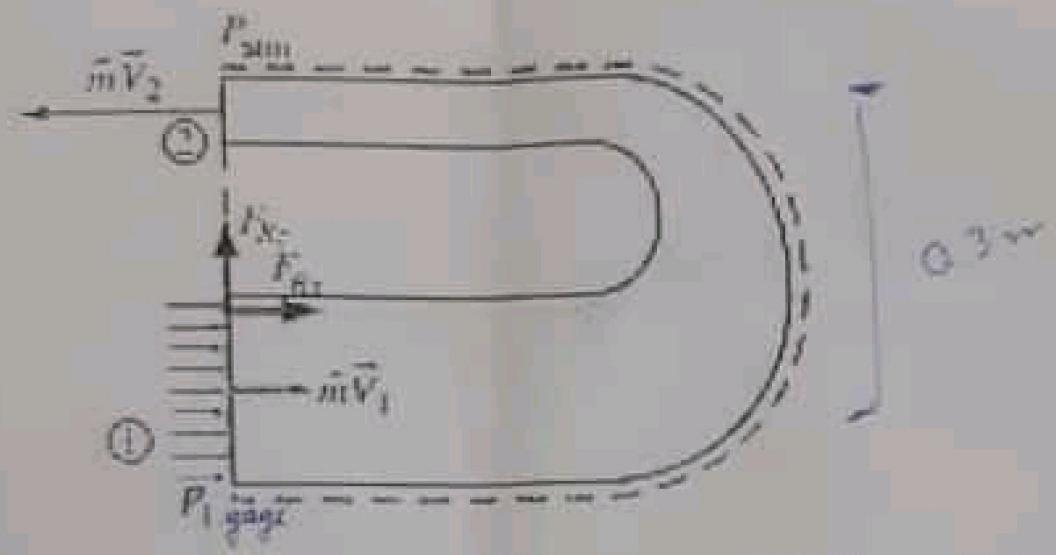

Figure 1

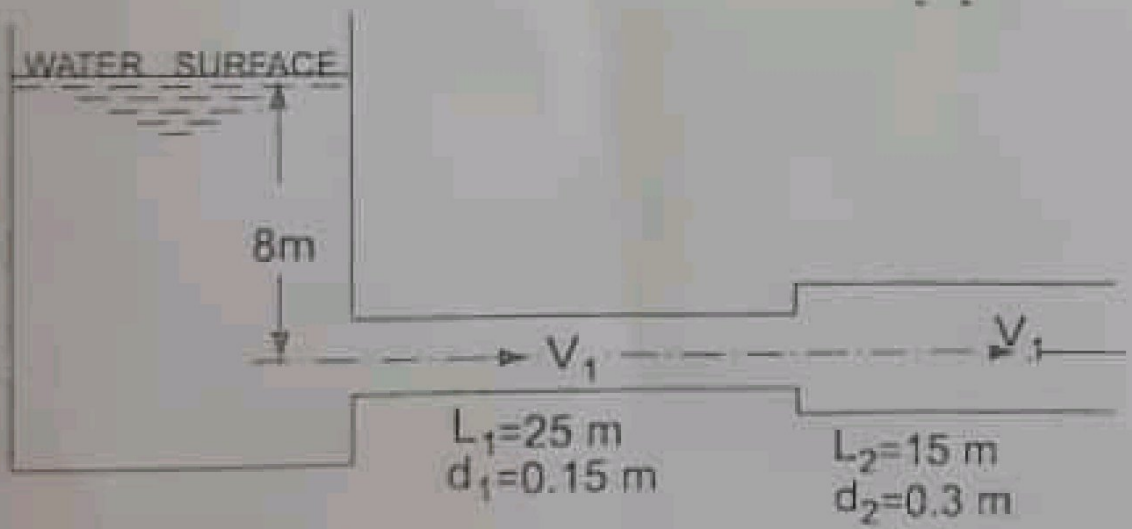

Figure 2

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