



VIT

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

REG.NO.:

SCHOOL OF CHEMICAL ENGINEERING
CONTINUOUS ASSESSMENT TEST -I
FALL SEMESTER 2024-2025

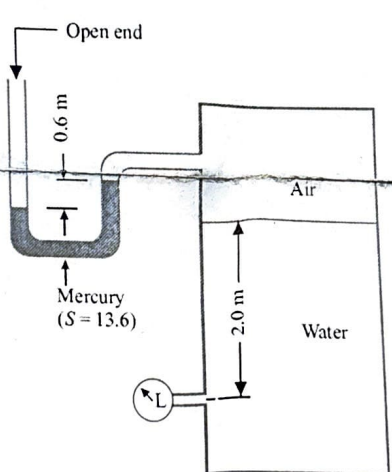
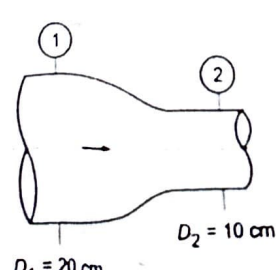
SLOT: D1+TD1

Programme Name & Branch : B.Tech (Chemical Engineering)
Course Code : BCHE205L
Course Name : Momentum Transfer
Faculty Name : D Chitra
Class Number : VL2024250102660
Date of Examination : 28-08-2024
Exam Duration : 90 minutes

Maximum Marks: 50

General instruction:

- Answer ALL Questions
- Assume necessary and appropriate data if required

Q. No	Question	Marks
1.	In Fig.1, if the local atmospheric pressure is 700 mm of mercury, find (i) Absolute pressure of air in the tank. (5 marks) (ii) Pressure gauge reading at L. (5 marks)  Fig.1	10
2.	An oil of density 917 kg/m^3 is being pumped in a pipe of diameter 15 cm. The discharge is measured as 850 liters/min. the drop in pressure in a stretch of 800 m of pipeline, both ends at the same elevation, is measured as 95 kPa. Estimate the absolute viscosity of the oil. Refer Fig.2.  Fig.2	10



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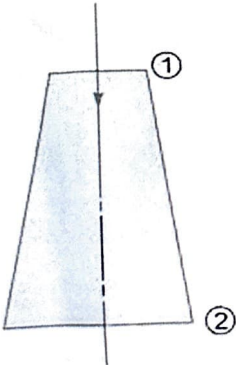
3.	In the two-dimensional incompressible flow field, the velocity components are given as, $u = 3x - x^2y + \frac{y^3}{3}, \quad v = xy^2 - y - \frac{x^3}{3}$ (i) Obtain an expression for the stream function. (5 marks) (ii) Obtain velocity potential function. (5 marks)	10
4.	Define the following (i) Vorticity (2marks) (ii) Streakline (2marks) (iii) Pathline (2marks) (iv) Timeline (2marks) (v) Streamline(2marks)	10
5.	A conical tube of length 2 m is fixed vertically with its smaller end upwards as shown in Fig.3. The velocity at the smaller end is 5 m/sec while at the lower end, it is 2 m/sec. the pressure head at the smaller end is 2.5 m of liquid. The head loss at the tube is $0.35 (v_1 - v_2)^2 / 2g$, where v_1 is the velocity at the smaller end and v_2 at the lower end respectively. Determine the pressure head at the lower end. Flow takes place in the downward direction. 	10

Fig.3
