

**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 -II
FALL SEMESTER 2024-2025**

SLOT: D2+TD2

	AB and BC joined in series. Pipe AB is 10 cm in diameter, 20 m long and has a value of $f = 0.02$. Pipe BC is of 16 cm diameter, 25 m long and has an $f = 0.018$. The junctions with the reservoirs and between the pipes are abrupt. (a) Calculate the discharge (b) What difference in reservoir elevations is necessary to have a discharge of 15 L/s? [include all minor losses]		CO5	BL3
5.	A small sphere of density ρ_s and diameter D settles at a terminal velocity V in a liquid of density ρ_f and dynamic viscosity μ . Gravity g is known to be a parameter. Express the functional relationship between these variables in a dimensionless form.	10	CO5	BL3

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Programme Name & Branch : B.Tech Chemical Engineering
Course Code : BCHE205L
Course Name : Momentum Transfer
Faculty Name(s) : Dr. Dharmendra Kumar Bal

Class Number(s) : VL2024250102661
Date of Examination : 16-10-2024
Exam Duration : 90 minutes

Maximum Marks: 50

General instruction(s): Answer all questionsNote: (1) Open book/Open note book exam(2) Moody's chart is allowed

Q. No	Question	Marks	Course Outcome (CO)	Bloom's Taxonomy (BL)
1.	A pipe carrying water has a 30 cm × 15 cm venturimeter which is positioned inclined at 30° to the horizontal. The flow is upwards. The converging cone is 45 cm in length and the C_d of the meter is 0.98. A differential U-tube manometer with mercury as indicating fluid is connected to the inlet and to the throat and shows a differential column height of 30 cm. (i) Calculate the discharge in the pipe. (ii) If the pressure in the inlet section is 50 kPa, determine the pressure at the throat. (iii) Find the head loss in the converging section of the venturimeter.	10	CO3	BL3
2.	Oil of relative density 0.8 and dynamic viscosity 1 Pa.s flow between two fixed parallel plates kept 1.5 cm apart. If the mean velocity is 1.5 m/s, calculate (a) The maximum velocity (b) The boundary shear stress (c) Velocity and shear stress at a distance of 0.2 cm from the plates and (d) The head loss in a distance of 25 m.	10	CO4	BL3
3.	Glycerine of dynamic viscosity 1.5 Pa.s and density 1260 kg/m ³ flows at a velocity of 5 m/s in a 10 cm diameter pipe. Estimate (a) the boundary shear stress in the pipe due to flow (b) Head loss in a length of 12 m of pipe (c) power expended by the flow in a distance of 12 m.	10	CO4	BL3
4.	Two reservoirs with a difference in water surface elevation of 10 m are connected by a pipeline ABC that consists of two pipes of	10		