SUMMER-2024	
Exam Seat No.:	
Academic Year:2023-2024	Semester:III
Class:SY	Program:B.Tech Chemical Engineering
Branch Code:CHE	Pattern:2022
Name of Course:Fluid Mechanics	Course Code:CHE222003
Max. Marks:60	Duration:2.30 Hrs.

Instructions: Candidates should read carefully the instructions printed on the Question Paper
and on the cover page of the Answer Book, which is provided for their use.
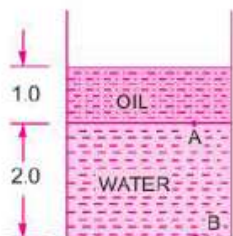
1. This question paper contains 2 pages.
2. Answer to each new question is to be started on a new page.
3. Assume suitable data wherever required, but justify it.
4. Draw the neat labelled diagrams, wherever necessary.
5. The last columns indicates the Course Outcome and level of Blooms Taxonomy of the Question/sub-question.

Question No. 1 Attempt following Question

1a) Mercury has a density of 13600 kg/m^3. Find its specific gravity, specific volume and weight density.   (6)   CO1

Question No. 2 Attempt following Question

2a) An open tank contains water upto a depth of 2 m and above it an oil of sp. gr. 0.9 for a depth of 1 m. (6)   CO2
Find the pressure intensity (1) at the interface of the two liquids, and (ii) at the bottom of the tank

Question No. 3 Attempt following Question

3a) Explain principle of venturimeter and derive expression of discharge for venturimeter.   (8)   CO3

OR

3b) Explain principle of orificemeter and derive expression of discharge for orificemeter.   (8)   CO3

3c) An orifice meter with orifice diameter of 15 cm is inserted in a pipe of 30 cm diameter. The   (8)   CO3
pressure difference measured by Mercury-oil differential manometer gives a reading of 50 cm of
mercury. Find flow rate of oil of specific gravity 0.9. Take $C_d = 0.64$.

<div align="center">**OR**</div>

3d)	A horizontal venturimeter with inlet and throat diameters as 20 and 10 cm respectively is used to measure flow rate of water. Discharge of of water through venturimeter is 60 lit/s. Coefficient of discharge of venturimeter is 0.98. Find reading of water-mercury differential manometer.	(8)	CO3

Question No. 4 Attempt following Question

4a)	Consider laminar incompressible flow of fluid through the tube. Derive the expressions of velocity and maximum velocity.	(8)	CO4

<div align="center">**OR**</div>

4b)	A laminar flow is taking place in a pipe of diameter 200 mm. The maximum velocity is 1.5 m/s. Find the mean velocity and the radius at which occurs. Also calculate velocity at 4 cm from the wall of the pipe.	(8)	CO4

4c)	Explain theorem and procedure of Buckingham's method of dimensional analysis.	(8)	CO4

<div align="center">**OR**</div>

4d)	Define and write expressions of a) Reynold number b) Froude number c) Weber number d) Euler number.	(8)	CO4

Question No. 5 Attempt following Question

5a)	Explain characteristics curve of centrifugal pump.	(8)	CO5

<div align="center">**OR**</div>

5b)	Define NPSH. Derive the equation for NPSH.	(8)	CO5

5c)	Describe efficiency of centrifugal pump.	(8)	CO5

<div align="center">**OR**</div>

5d)	Explain fluidization. Describe minimum fluidization velocity. State industrial applications of fluidization.	(8)	CO5

<div align="center">**XXXXXXXXXXXXXXXXXXXXXXXXXXXXXX**</div>