

THE KAVERY ENGINEERING COLLEGE*(An Autonomous Institution)*

UG/PG DEGREE END SEMESTER THEORY EXAMINATIONS, APRIL/MAY 2026

*Third Semester**Chemical Engineering*

UCHT24304 / CH3352 – Fluid Mechanics for Chemical Engineers

*Regulations – 2024 & 2021**Duration : 3 Hrs**Maximum : 100 Marks***PART – A (ANSWER ALL QUESTIONS) (Marks 10*2=20)**

<i>Q.No</i>	<i>Questions</i>	<i>BTL</i>	<i>CO</i>	<i>Marks</i>
1.	Explain briefly the concept of continuum.	L2	1	2
2.	Distinguish between ideal and real fluids.	L2	1	2
3.	Summarize the limitations of Bernoulli's equation.	L2	2	2
4.	Distinguish between laminar flow and turbulent flow through circular pipes.	L2	2	2
5.	Can you describe the term dimensional homogeneity?	L1	3	2
6.	What is meant by similitude?	L1	3	2
7.	List out four minor losses when a fluid is flowing through a pipe.	L1	4	2
8.	Define Reynolds number for packed bed.	L1	4	2
9.	Define the term cavitation.	L1	5	2
10.	Compare fan and blower.	L2	5	2

PART – B (ANSWER ALL QUESTIONS) (Marks 5*16 = 80)

<i>Q.No</i>	<i>Questions</i>	<i>BLT</i>	<i>CO</i>	<i>Marks</i>
11.	a Elaborate the different types of Non-Newtonian fluids in detail.	L2	1	16
	Or			
	b Discuss various types of fluid motions along with their basic properties.	L2	1	16
12.	a Derive Bernoulli's energy equation for steady irrotational fluids and state the assumptions used.	L3	2	16
	Or			
	b Derive the continuity equation for a three-dimensional flow.	L3	2	16
13.	a Describe the method of dimensional analysis using Buckingham's Pi theorem.	L2	3	16
	Or			
	b i Discuss the usefulness of dimensionless analysis in scale up.	L2	3	8
	ii Bring out the relationship between dimensional analysis similitude.	L2	3	8

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| 14. | a | A horizontal pipe line 60 m long is connected to a water tank at one end and discharges freely into the atmosphere at the other end. For the first 30 m of its length from the tank, the pipe is 20 cm diameter and its diameter is suddenly enlarged to 40 cm. The height of water level in the tank is 10 m above the centre of the pipe. Considering all the losses, determine the rate of flow. Take $f = 0.01$ for both sections of pipe. | L3 | 4 | 16 |
| | | Or | | | |
| | b | Water is flowing over a plate along 1 m length. The velocity of water is 0.15 m/s. The viscosity and density of water may be taken as 0.01 poise and 1000 kg/m ³ . If the flow is laminar and boundary layer thickness at the end of the plate can be estimated by $\delta = 5.48 x / \sqrt{Re_x}$. Calculate the boundary layer thickness at 0.5 m and in along the length of the pipe. | L3 | 4 | 16 |
| 15. | a | Explain the working principle of Venturimeter with a neat sketch and discuss relative merits and demerits of Venturimeter with respect to orifice meter. | L2 | 5 | 16 |
| | | Or | | | |
| | b | Draw a neat sketch for centrifugal pump and explain its working principle and give its applications. | L2 | 5 | 16 |