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Code No. : 14167 N/O

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS), HYDERABAD

Accredited by NAAC with A++ Grade

B.E. (Civil Engg.) IV-Semester Main &amp; Backlog Examinations, July-2023

Fluid Mechanics

Time: 3 hours

Max. Marks: 60

Note: Answer all questions from Part-A and any FIVE from Part-B

Part-A (10 × 2 = 20 Marks)

Q. No.	Stem of the question	M	L	CO	PO
1.	Differentiate between Newtonian and Non-Newtonian fluids?	2	1	1	1
2.	A circular plate of 2m diameter is immersed vertically below. The upper edge is one metre below the free surface. What is the magnitude of hydrostatic force on the plate?	2	2	1	2
3.	What do you understand by stream function and velocity potential function?	2	1	2	1
4.	A stream function is given by an expression $\psi = x^2 - y^2$ , Calculate the velocity at a point P(1,1)?	2	2	2	2
5.	Write various assumptions used in Bernoulli's equation?	2	1	3	1
6.	A pipe conveys water with velocity of 120m/min, and pressure gauge showing 3.5 bar. The pipe is located 10m above datum line. Find the total head of water in the pipe?	2	2	3	2
7.	In a laminar flow through a circular pipe of diameter 200mm, the maximum velocity is found to be 1m/s. What is the velocity at a radial distance of 50mm from the axis of the pipe?	2	2	4	2
8.	What is water hammering phenomenon?	2	1	4	1
9.	A cylindrical chimney 50m height and 0.9m diameter subjected to wind blowing of 30m/s. Density of air = 1.2Kg/m <sup>3</sup> and Drag coefficient = 0.8, Calculate the Drag force?	2	2	5	2
10.	What do you understand by boundary layer separation?	2	1	5	1
<b>Part-B (5 × 8 = 40 Marks)</b>					
11. a)	Two large plates are 6mm apart fixed and the space in between them is filled with a viscous liquid. A small plate of 1mm thickness and 100cm <sup>2</sup> surface area is pulled with a force of 32N parallel to the plates at midway between them with a velocity of 2m/s. The velocity profile is linear on either side of plate. Find the viscosity of the fluid?	4	4	1	2
b)	Describe with the help of neat sketches different types of manometers?	4	1	1	1
12. a)	An oil flows through a 100mm diameter pipe at a mean velocity of 180m/min. Take Mass density of oil $\rho = 879 \text{ Kg/m}^3$ . Find the volumetric flow rate and Mass flow rate of oil?	4	3	2	2

Contd... 2

THE UNIVERSITY OF CHICAGO

PHYSICS DEPARTMENT

PHYSICS 309

LECTURE 10

STATISTICAL MECHANICS

ENTROPY

THE BOLTZMANN EQUATION

THE SECOND LAW OF THERMODYNAMICS

THE GIBBS PARADOX