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SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR
(AUTONOMOUS)

B.Tech II Year I Semester Supplementary Examinations June-2024
INTRODUCTION TO FLUID MECHANICS
(Civil Engineering)

Time: 3 Hours **Max. Marks: 60**

PART-A
(Answer all the Questions **5 x 2 = 10** Marks)

1	a	Name different types of Monometers.	CO1	L1	2M
	b	Define stream, streak and path lines.	CO2	L1	2M
	c	Define hydraulic gradient.	CO3	L1	2M
	d	Name different losses in pipes.	CO4	L1	2M
	e	Define Reynold's number.	CO5	L1	2M

PART-B
(Answer all Five Units 5 x 10 = 50 Marks)

UNIT-I

2	a	State Pascal's law. What do you understand the terms Absolute, Gauge, atmospheric & vacuum pressure?	CO1	L1	5M
	b	What is the gauge pressure at a point 3m below the free surface of a liquid having a density 1.53 x 10^3 kg/m^3.If the atmospheric pressure is equivalent to 750mm of mercury? The Specific gravity ofmercury is 13.6 and density of water = 1000 kg/m^3	CO1	L3	5M

OR

3		Define centre of pressure and derive an expression for centre of pressure for a vertically submerged surface.	CO1	L2	10M

UNIT-II

4		Obtain an expression for continuity equation for a three - dimensional flow.	CO2	L2	10M

OR

5		The velocity vector in a fluid flow is given by V=4x+10xy+2k find the velocity and acceleration at fluid particle (2,1,3) & t=1.	CO2	L3	10M

UNIT-III

6		A horizontal venture meter with 30cm diameter inlet and 10cm throat is used for measuring the flow of water through a pipeline. If pressure in pipe is 1.5kpa and the vacuum pressure at the throat is 40cm of mercury, calculate the rate of flow. It may be presumed that 5% of differential head is lost between the pipe main and the throat section. Also make calculations for the discharge co-efficient take specific weight of water = 10kN/m^3	CO3	L3	10M

OR

7	a	State Bernoulli's theorem for steady flow of an incompressible fluid. Derive the expression for Bernoulli's theorem from first principle and state the assumption made for such a derivation.	CO3	L2	5M
	b	A 30 cm diameter pipe, conveying water, branches into two pipes of diameters 20 cm and 15 cmrespectively. If the average velocity in the 30 cm diameter pipe is 2.5 m/s. Find the discharge in the pipe. Also determine the velocity in 15 cm pipe if the average velocity in 20 cm diameter pipe is 2 m/s.	CO3	L3	5M

UNIT-IV

8	Derive the expression for head loss in pipes due to sudden enlargement and sudden contraction formula.	CO4	L2	10M

OR

9	A Siphon of diameter 200 mm connects two reservoirs having a difference in elevation of 20 m. The length of the siphon is 500 m and the summit is 3.0 m above the water level in the upper reservoir. The length of the pipe from upper reservoir to the summit is 100 m.Determine the discharge through the siphon and also pressure at the summit. Neglect minor losses. The co efficient of friction is 0.005.	CO4	L3	10M

UNIT-V

10	Derive the expression for maximum velocity for a laminar flow through circular pipes.	CO5	L2	10M

OR

11	For a turbulent flow in a pipe diameter 300mm, find the discharge when centreline velocity is 2m/s and velocity at a point 100mm from center is 1.6m/s.	CO5	L3	10M

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