

PRAGATI ENGINEERING COLLEGE: SURAMPALEM
(AUTONOMOUS)

II B.Tech I Semester Supplementary Examinations, June - 2024

FLUID MECHANICS
(CE)

Time: 3 hours

Max. Marks: 70

Answer ONE Question from each Unit
All Questions Carry Equal Marks

Q. No.	Questions	BTL	CO	Marks
UNIT – I				
1.	a) What are differential manometers? Explain the types of differential manometers.	K1	CO1	7M
	b) Calculate specific weight, density and specific gravity of two liters of a liquid which weigh 7 N.	K3	CO1	7M
OR				
2.	a) Define the following fluid properties: Density, weight density, specific volume and specific gravity of a fluid.	K1	CO1	7M
	b) An oil film of thickness 1.5 mm is used for lubrication between a square plate of size 0.9 m × 0.9 m and an inclined plane having an angle of inclination 20°. The weight of the square plate is 392.4 N and it slides down the plane with a uniform velocity of 0.2 m/s. Find the dynamic viscosity of the oil	K3	CO1	7M
UNIT – II				
3.	a) Distinguish between: (i) Steady flow and un-steady flow (ii) Uniform and non-uniform flow (iii) Compressible and incompressible flow	K2	CO2	7M
	b) Distinguish between: (i) Rotational and irrotational flow (ii) Laminar and turbulent flow.	K2	CO2	7M
OR				
4.	a) Differentiate between one and two-dimensional flows of continuity equation.	K2	CO2	7M
	b) Explain the Free Vortex and Forced Vortex flow in detail	K2	CO2	7M
UNIT – III				
5.	a) State the momentum equation. How will you apply momentum equation for determining the force exerted by a flowing liquid on a pipe bend?	K2	CO3	7M
	b) A pipe of diameter 400mm carries water at a velocity of 25m/s. the pressures at the points A and B are given as 29.43N/cm ² and 22.563 N/cm ² respectively while the datum head at A and B are 28m and 30m. Find the loss of head between A and B.	K3	CO3	7M
OR				
6.	a) Derive Bernoulli's equation from fundamentals.	K3	CO3	7M

	b)	A pipe of 300mm diameter conveying $0.30 \text{ m}^3/\text{s}$ of water has a right angled bend in a horizontal plane. Find the resultant force exerted on the bend if the pressure at inlet and outlet of the bend are 24.525 N/cm^2 and 23.544 N/cm^2 .	K3	CO3	7M
UNIT – IV					
7.	a)	List out the minor losses in closed conduit flow and discuss their significance.	K2	CO4	7M
	b)	What is the significance of Reynolds's experiment? Explain how Reynolds's experiment is conducted.	K2	CO4	7M
OR					
8.	a)	Explain how the following flow problems are analyzed. i) Series pipe connection ii) parallel pipe connection	K2	CO4	7M
	b)	Differentiate between the total energy line and hydraulic gradient line.	K2	CO4	7M
UNIT – V					
9.	a)	Describe the different methods for the determination of various coefficients of an orifice.	K2	CO5	7M
	b)	A horizontal venturimeter with inlet and throat diameters 30cm and 15cm respectively is used to measure the flow of water. The reading of differential manometer connected to the inlet and the throat is 20cm of mercury. Determine the rate of flow. Take $C_d = 0.98$	K3	CO5	7M
OR					
10.	a)	Write in detail about the classification of orifices.	K2	CO5	7M
	b)	Water flows at the rate of $0.147 \text{ m}^3/\text{s}$ through a 150mm diameter orifice inserted in a 300mm diameter pipe. If the pressure gauges fitted upstream and downstream of the orifice plate have shown the readings of 176.58 kN/m^2 and 88.29 kN/m^2 respectively, find the coefficient of discharge C of the orifice meter?	K3	CO5	7M