PVP 23

Code: 23CE3303

II B.Tech - I Semester – Supplementary Examinations - MAY 2025

FLUID MECHANICS
(CIVIL ENGINEERING)

Duration: 3 hours Max. Marks: 70

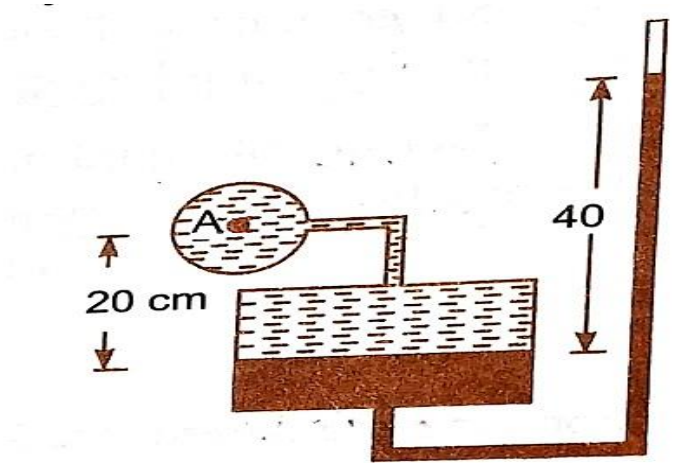
Note: 1. This question paper contains two Parts A and B.
2. Part-A contains 10 short answer questions. Each Question carries 2 Marks.
3. Part-B contains 5 essay questions with an internal choice from each unit. Each Question carries 10 marks.
4. All parts of Question paper must be answered in one place.

PART – A

1.a)	Name the main branches of fluid mechanics.
1.b)	Write the relationships for density, specific weight.
1.c)	What is fluid pressure at a point?
1.d)	Define Pascal's Law.
1.e)	Define Fluid Kinematics.
1.f)	Compare laminar and turbulent flows.
1.g)	Distinguish between an orifice meter and orifice.
1.h)	Define continuity and Bernoulli's equation.
1.i)	Define Darcy's equation.
1.j)	What are minor losses in pipes and give examples?

PART – B

					Max. Marks
UNIT-I					
2	a)	Define density, specific weight, and specific gravity, and explain their interrelationships.			5 M

	b)	Explain the thermodynamic properties of fluid.	5 M
OR			
3	a)	Find density, specific weight of 1 liter weight of petrol of specific gravity 0.7.	5 M
	b)	Differentiate between kinematic and dynamic viscosity and explain their significance in fluid mechanics.	5 M
UNIT-II			
4	a)	Explain an expression for total pressure and centre of pressure for a vertically immersed surface.	5 M
	b)	Find the pressure in pipe if the area of reservoir is 100 times the area of the tube for manometer reading shown in Figure. The specific gravity of mercury is 13.6 for a single column manometer is connected to a pipe containing a liquid of specific gravity. 0.9 as shown in fig. 	5 M
OR			
5	a)	Demonstrate the pressure intensity in the liquids is directly proportional to the height of a point from free surface liquid.	5 M

	b)	Find the pressure of air in the tank in pascles for a closed tank is filled with water upto 50 cm then by an oil of height 100 cm whose specific gravity is 0.8 and above that air is filled. This tank is connected to the mercury manometer and difference in its heights is recorded as 15 cm. The lower level of mercury is 10 cm below the tank level.	5 M
UNIT-III			
6	a)	Explain steady & unsteady flow, uniform & Non-uniform flow with neat sketches.	5 M
	b)	Explain the stream function and velocity potential function with examples.	5 M
OR			
7	a)	Define one, two & three dimensional flows.	5 M
	b)	Explain the equation of continuity and obtain an expression for continuity equation for a 3 dimensional flow in Cartesian coordinates.	5 M
UNIT-IV			
8	a)	What is Euler's equation? Explain how to obtain the Bernoulli's equation from it.	5 M
	b)	A pipe of diameter 400mm carries water at a velocity of 25m/s. The pressures at a point are given as 29.43 N/cm^2 and 22.563 N/cm^2 while the datum head at A and B are 28m and 30m. Find the loss of head between A and B.	5 M
OR			
9	a)	Explain the principle of venturimeter with a neat sketch. Derive the expression for rate of flow of fluid through it.	5 M

	b)	An orifice meter with orifice diameter 10cm is inserted in a pipe of 20cm diameter. The pressure gauges fitted upstream and downstream of the orifice gives readings of 19.62 N/cm^2 and 9.81 N/cm^2. Coefficient of discharge for orifice meter is 0.6. Find the discharge of water through pipe.	5 M
		UNIT-V	
10	a)	Develop the equation for head loss in pipes due to friction Darcy-Weisbach equation.	5 M
	b)	Explain the variation of friction factor with Reynolds's number.	5 M
		OR	
11	a)	Explain the concept of pipes in parallel and series.	5 M
	b)	Explain hydraulic grade line and total energy line. Discuss its practical significance in analysis of fluid flow problems.	5 M