BONAM VENKATA CHALAMAYYA INSTITUTE OF TECHNOLOGY & SCIENCE
(AUTONOMOUS)
II - B.Tech I-Semester Regular Examinations (BR23), November - 2024
FLUID MECHANICS (CIVIL)

Time: 3 hours   Max. Marks: 70

Question Paper consists of Part-A and Part-B
*Answer **ALL** the question in **Part-A and Part-B***

PART–A (10X2 = 20M)

		Marks	CO	BL
1. a)	Define the following fluid properties (i) Density (ii) weight density (iii) specific volume and (iv) specific gravity of fluid	(2M)	CO1	BL2
b)	Define the surface tension give their dimensions?	(2M)	CO1	BL2
c)	Determine atmospheric, gauge and vacuum pressure.	(2M)	CO2	BL4
d)	Define manometer and piezo meter?	(2M)	CO2	BL4
e)	Define Rate of flow?	(2M)	CO3	BL3
f)	Define streamline and streak line?	(2M)	CO3	BL3
g)	What is mean by orifice? Classify the types of orifices?	(2M)	CO4	BL2
h)	Define Reynolds number and Froude's number?	(2M)	CO4	BL2
i)	Define Darcy's weisbach equation?	(2M)	CO5	BL4
j)	Define hydraulic grade line and total energy line	(2M)	CO5	BL4

PART–B (5X10 = 50M)

		Marks	CO	BL
2a.	Derive the expression for capillary rise and fall with neat sketch.	5(M)	CO1	BL2
b.	Calculate the capillary effect in mm in a glass tube 2 mm in diameter when immersed in (i) Water, (ii) Mercury. Both the liquids being at 20 ^{0}C and the values of the surface tension for water and mercury at 20 ^{0}C in contact with air are respectively 0.0736 N/m and 0.51 N/m. Contact angle for water = 0^{0} and for mercury 130^{0}	5(M)	CO1	BL2
(OR)				
3a.	Derive the expression for Viscosity?	5(M)	CO1	BL2
b.	A certain liquid has dynamic viscosity of 0.073 poise and specific gravity of 0.87. Compute the kinematic viscosity of the liquid in stokes and also in m2/s.	5(M)	CO1	BL2

		Marks	CO	BL
4a.	Classify the U-tube manometer with neat sketches is used to measure small pressure differences?	5(M)	CO2	BL4
b.	A simple U-tube manometer containing mercury is connected to a pipe in which a fluid of specific gravity 0.8 and having vacuum pressure is flowing. The other end of the manometer is open to atmosphere. Find the vacuum pressure in pipe, if the difference of mercury level in the two limbs is 40 cm and the height of fluid in the left from the centre of pipe is 15cm below.	5(M)	CO2	BL4

	(OR)			
5a.	Determine the expressions for total pressure and center of pressure for a vertically immersed surface?	5(M)	CO2	BL4
b.	A tank has a base 4m square from which four side slope outward at 450 to the horizontal for a vertical height of 3m they then turn vertically upward for another 3m. The tank is filled with water of full depth of 6m. Find the total pressure and centre pressure on one of the sloping sides of the tank	5(M)	CO2	BL4

6a.	Classify the types of fluid flows? Define each type of fluid flow?	10(M)	CO3	BL3
	(OR)			
7a.	Define the equation of continuity. Obtain the expression for continuity equation in three dimensions?	10(M)	CO3	BL3

8a.	Derive Bernoulli's equation and state assumptions	5(M)	CO4	BL2
b.	250 lit/s of water is flowing in a pipe having a diameter of 300mm. If the pipe is bent by 1350 (that is change from initial to final direction is 1350), find the magnitude and direction of the resultant force on the bend. The pressure of water flowing is 39.24N/cm2.	5(M)	CO4	BL2
	(OR)			
9a.	Explain the working of Pitot tube. Derive an expression for measurement of velocity by Pitot tube.	5(M)	CO4	BL2
b.	A horizontal venturimeter with inlet and throat diameters 40cms and 20cms respectively is used to measure the flow of water. The reading of differential Manometer connected to the inlet and throat is 18 cm of mercury. Determine the rate of flow. Take Cd=0.97	5(M)	CO4	BL2

10a	What are hydraulic grade line and total energy line? Draw the neat sketch?	5(M)	CO5	BL4
b.	Explain how the following flow problems are analyzed. i) Series pipe connection (ii) parallel pipe connection	5(M)	CO5	BL4
	(OR)			
11a	The difference in water surface levels in two tanks, which are connected by three pipes in series of lengths 300m, 170m, and 210m and of diameters 300mm, 200mm and 400mm respectively is 12m. Determine the rate of flow of water if co-efficient of friction are 0.005, 0.0052 and 0.0048 respectively. Considering: (i) minor losses (ii) neglecting minor losses.	10(M)	CO5	BL4

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