VIT

Vellore Institute of Technology

(Deemed to be University under section 3 of UGC Act, 1956)

Continuous Assessment Test-II– June/July 2023

gramme	:	**B.Tech (Mechanical Engineering)**	Semester	:	**Fall Inter 22-23**
urse Title	:	**Fluid Mechanics and Machines**	Code	:	**BMEE2041L**
			Class Nbr	:	**CH2022232500185**
ulty	:	**Dr. Sanjeev Jakhar**	Slot	:	**D2+TD2**
me	:	**1 ½ hours**	Max. Marks	:	**50**

OPEN BOOK EXAMINATION

Answer all FIVE Questions (5 x 10 = 50)

[Note: Assume appropriate data wherever necessary]

.No.	Sub. Sec.	Question Description	Marks
1.		A 30 cm × 15 cm venturimeter is provided in a vertical pipe line carrying oil of sp.gr. 0.9, the flow being upwards. The difference in elevation of the throat section and entrance section of the venturimeter is 30 cm. The differential U tube mercury manometer shows a gauge deflection of 25 cm. Calculate (1) the discharge of oil, (2) the pressure difference between the entrance section and the throat section. Take C_d=0.98.	10
2.		A pipe of 280 mm diameter conveying 0.27 m^3/s of water has a right angled bend in a horizontal plane. Find the resultant force exerted on the bend if the pressure at the inlet and outlet of the bend are 26.525 N/cm^2 and 24.544 N/cm^2.	10
3.		A main pipe splits into two parallel pipes, which then reunite to form a single pipe. The length and diameter for the first parallel pipe are 2100 m and 1.2 m respectively, while the length and diameter of 2nd parallel pipe are 2100 m and 0.9 m. Find the rate of flow each parallel pipe, if total flow in the main is 3.2 m^3/s. The co-efficient of friction for each parallel pipe is same and equal to 0.006.	10
4		Derive on the basis of dimensional analysis suitable parameters to present the thrust developed by propeller. Assume that the thrust P depends upon the angular velocity ω, speed of advance V, Diameter D, dynamic viscosity μ, mass density ρ, elasticity of fluid medium which can be denoted by the speed of sound in medium C.	10
5	(a)	A 170 mm diameter pipe reduces in diameter abruptly to 115 mm diameter. If the pipe carries water at 33 litres per second, calculate the pressure loss across the contraction. Take the co-efficient of contraction as 0.7.	6
	(b)	Consider the flow of air and water in pipes of the same diameter, at the same temperature, and at the same mean velocity. Comment whether the flow is turbulent, if so why.	4

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