Vivekananda College of Engineering & Technology, Puttur [A Unit of Vivekananda Vidyavardhaka Sangha Puttur ®] Affiliated to VTU, Belagavi & Approved by AICTE New Delhi			
CRM08	Rev 1.10	<ME>	<24-08-2022>

CONTINUOUS INTERNAL EVALUATION - 3

Dept: ME	Sem / Div: 4th	Sub: Fluid Mechanics	S Code: 18ME43
Date: 02/09/2022	Time: 9:30-11:00 am	Max Marks: 50	Elective: N

Note: Answer any 2 full questions, choosing one full question from each part.

QN		Questions	Marks	RBT	CO's
		PART A			
1	a	What is a veturimeter? Derive an expression for the discharge through a veturimeter.	10	L3	CO3
	b	The water: is, flowing through pipe of length 100m having diameters 600mm at upper end and 300mm at the longer end at the rate of 50 litres/sec. The pipe has a slope of 1 in 30. Find the pressure at the lower end if the pressure at the higher level is 19.62 N/cm^2.	9	L3	CO3
	c	Define the followings, Mach number, Sub-sonic flow Sonic flow and Super sonic flow	6	L2	CO5
		OR			
2	a	Derive Euler's equation of motion along a stream line and deduce Bernoulli's equation. State the assumptions made.	10	L3	CO3
	b	sub-marine moves horizontally in sea, A pitot static tube placed in front of sub-marine and along its axis is connected to the two limbs of U-tube manometer containing mercury. The difference of mercury level is found to be 200mm. Find the speed of the sub-marine in km/hr. Take specific of gravity of mercury as 13.6 and sea water as 1.026, $C_v = 0.98$.	7	L3	CO3
	c	Write short essay on the engineering application of CFD.	9	L2	CO5

		PART B			
3	a	Derive an expression for velocity of sound in a fluid.	10	L3	CO5
	b	Explain the necessity of CFD.	5	L2	CO5
	c	An orifice meter with orifice diameter 15 cm is inserted in a pipe of 30 cm diameter. The pressure difference measured by a mercury oil differential manometer on the two sides of the orifice meter gives a reading of 50 cm of mercury. Find the flow rate of flow of oil of sp. gr. 0.9 when the co-efficient of discharge of the orifice meter=0.64.	10	L3	CO3
		OR			
4	a	Calculate the stagnation pressure, temperature and density at the stagnation point on the nose of a plane, which is flying at **800 km/hour** through still air having a pressure **8.0 N/cm^2 (abs.)** and temperature **-10°C.** Take **R = 287 J/kg K and k = 1.4.**	8	L3	CO5
	b	Find the velocity, of bullet fired in standard air. If the mach angle is 30°. Take R = 287.14 J/kg K and k = 1.4 for air. Assume temperature is 15°C.	7	L3	CO5
	c	Derive an expression for discharge through a triangular notch.	10	L3	CO3

Prepared by: Satheesha Kumar K

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