Total No. of Questions – [4]

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G.R. No.	

U359-111(T1)

OCTOBER 2019/ INSEM (T1)

T. Y. B. TECH. (CIVIL) (SEMESTER - I)

COURSE NAME: FLUID MECHANICS II

COURSE CODE: CVUA31171

(PATTERN 2017)

Time: [1 Hour] [Max. Marks: **30**]

(*) Instructions to candidates:

1) **Answer Q.1 OR Q.2 and Q.3 OR Q.4.**
2) **Figures to the right indicate full marks.**
3) **Use of scientific calculator is allowed**
4) **Use suitable data where ever required**

Q1)	a)	A cylinder 1.2 m in diameter and 9 m long rotates at 210 rpm with its axis normal to an air stream of velocity 10 m/s. Determine 1) circulation around the cylinder, 2) lift coefficient , 3)lift force, 4) location of stagnation point	[06]
	b)	A tank 10 m long and 3m wide is divided in two parts such that the area of one part is three times the area of the other. The partition contains an orifice of 10cm diameter with C_d=0.6.The water level in the larger portion is 3 m higher than that in the smaller one. Find the time taken to reduce the difference of level to 1m.	[06]
	c)	Derive expression for celerity of elastic wave through a fluid medium	[04]
		OR	
Q2)	a)	Experiments were conducted in a wind tunnel with a wind speed of 50 kmph on a flat plate of size 2 m long and1.2 m wide. The density of air is 1.20 kg/m^3. The plate is kept at an angle and the coefficients of drag and life are 0.75 and 0.15 respectively. Determine 1) lift force, 2) drag force, 3)resultant force, 4) direction of resultant force, 5) power extended in overcoming resistance of the plate	[06]
	b)	Derive expression for celerity of pressure wave in a fluid medium in an elastic pipe.	[06]
	c)	Determine the velocity of pressure wave in a circular pipe with rigid walls through which a liquid of relative density is 0.8.and bulk modulus of elasticity 1.5 x 10^9 N/m^2 is flowing.	[04]
Q3)	a)	A trapezoidal channel has a bed width of 2.0 m and side slope of 1.5 horizontal to 1 vertical. The channel has a longitudinal slope of 1/4000. If the Manning's coefficient of the channel boundary is 0.018, determine the mean velocity and discharge in the channel for a depth of 1.4 m.	[06]
	b)	A rectangular channel 2.5 m wide carries water at a depth of 1.2 m. The bed slope of the channel is 0.0036. Determine the average shear stress on the boundary.	[04]

	c)	Derive relationship between Manning's roughness coefficient and Chezy's coefficient	[04]
		OR	
Q4)	a)	The depth of flow in a trapezoidal section is to be restricted to 1.5m.If the side slopes are to be 1.5 horizontal 1 vertical and the section is to be efficient channel section, find the longitudinal slope required to carry a discharge of 10 m^3/s. The Manning's roughness coefficient = 0.015	[06]
	b)	A trapezoidal channel has bottom width 10m and side slope of 1.5 horizontal to 1 vertical. The Manning's n can be taken as 0.015.What bottom slope is necessary to pass 100 m^3/s of discharge in this channel at a depth of 3.0m?	[04]
	c)	Derive Chezy's Equation for velocity of uniform Flow.	[04]