

Total No. of Questions - [4]

Total No. of Printed Pages 2

G.R. No.

U359/111 (T1)
Solution / Marking scheme

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

			M	CO	BL	
Q1)	a)	$\frac{V_c}{V_0} = 1.319$ — 1M $\tau = 49.73 \text{ m}^2/\text{s}$ — 2M $F_L = 5.371 \text{ kN}$ — 1M	$Q = 8.29$ — 1M $\theta = 221.26^\circ$ — 2M.	[06]	1	3
	b)	$A_1 = 7.5 \text{ m}^2$ — 2M $A_2 = 22.5 \text{ m}^2$ — 2M $T = 394.55 \text{ sec}$ — 2M.		[06]	2	3
	c)	Derivation should include A, V, P, S, C . $C = \frac{8V}{dp}$, $C = \sqrt{\frac{dp}{d\epsilon}}$ — 4M.		[04]	2	2
Q2)	a)	$A = 2.4 \text{ m}^2$ — 1M $F_L = 208.3 \text{ N}$ — 1M $F_D = 41.6 \text{ N}$ — 1M	$F_R = 212.43 \text{ N}$ — 1M $\theta = 78^\circ 42'$ — 1M $P = 578.8 \text{ W}$ — 1M	[06]	1	3
	b)	$k_e = \frac{-V dp}{dv_1 + dv_2}$, $dp = \frac{E_t dR}{R^2}$ $k_e = \left[\frac{K}{1 + \frac{KD}{E_t}} \right]$, $C = \sqrt{\frac{k_e}{S}}$		[06]	2	2

	c)	$k_e = \frac{k}{1 + \frac{kD}{Et}} = 1369.19 \quad \text{--- } 2M.$ $C = \sqrt{\frac{k_e}{\rho_s}} = 1.31 \quad \text{--- } 2M$		[04]	2	3
Q3)	a)	$A = 5.74 m^2 \quad \text{--- } 1M$ $P = 7.048 m \quad \text{--- } 1M$ $R = 0.814 m \quad \text{--- } 1M$	$V = 0.766 m/s \quad \text{--- } 1M$ $Q = 4.40 m^3/s \quad \text{--- } 2M$	[06]	3	3
	b)	$A = 3.00 m^2 \quad \text{--- } 1M$ $P = 4.9 m \quad \text{--- } 1M$ $R = 0.612 m \quad \text{--- } 1M$	$\tau_0 = \tau R S_0 \quad \text{--- } 1M.$ $= 21.58 Pa.$	[04]	3	3
	c)	$V = C\sqrt{RS} \quad \text{--- } 1M$ $M = \frac{1}{n} R^{2/3} S^{1/2} \quad \text{--- } 1M$	$C = \frac{1}{n} R^{1/6} \quad \text{--- } 2M$	[04]	3	2
Q4)	a)	$A = 4.7374 m^2 \quad \text{--- } 1M$ $B = 0.908 m \quad \text{--- } 1M$ $R = 0.75 m \quad \text{--- } 1M$	$V = 2.1109 m/s \quad \text{--- } 1M$ $S_0 = 1.471 \times 10^{-3} \quad \text{--- } 2M$	[06]	3	3
	b)	$A = 43.5 m^2 \quad \text{--- } 1M$ $P = 20.817 m \quad \text{--- } 1M$ $R = 2.09 m \quad \text{--- } 1M$	$S_0 = 4.451 \times 10^{-4} \quad \text{--- } 1M.$	[04]	3	3
	c)	$\tau_0 = \tau R S \quad , \quad V = C\sqrt{RS} \quad \text{--- } 4M.$ $\tau_0 = 8V^2 \frac{P}{S} \quad ,$		[04]	3	2