Marking scheme Paper code - U23g-114 (T1)

OCTOBER 2019 INSEM (T1)
S. Y. B.TECH. (CIVIL) (SEMESTER – III)
COURSE NAME: Introduction to Fluid Mechanics
COURSE CODE: CVUA21184
(PATTERN 2018)

Time: [1 Hour] [Max. Marks: 20]

Solution and marking scheme

			M	CO	BL
Q.1	a	n= 5, m=2, π variable = 3 $\pi_1 = Q/VL^2$ $\pi_2 = gL/V^2$ $\pi_3 = H/L$	1 3 3 1	2	3
		OR			
	b	$\tau = 12.5\,\pi \cos(5\pi y)$ at y = 0, $\tau = 39.27$ N/m² at y = 0.1 m $\tau = 0$ $P = 4\sigma/d = 97.33$ N/m² $P = 2\sigma/d = 48.67$ N/m²	2 1 1 2 2	1 1	3 3
Q.2	a	Depth of immersion = 0.68 m OB=0.34 m OG= 1.25 m BG=0.91 m BM= I/V= 0.36 m BM<BG buoy does not float with axis vertical	2 1 1 1 2 1	3	3
		OR			
	b	Hydrostatic force acting on gate = 9810*1.5*3*(9+0.75)=430.4 kN Frictional force F= μP= 86.08 kN Total downward force = W+ Friction = 104.082 kN Vertical force required = 104.082 kN	3 2 2 1	3	3
Q.3	a	$\frac{\partial u}{\partial x} + \frac{\partial v}{\partial y} = 0$ As the continuity equation is satisfied flow is possible $\Psi = \frac{x^4}{12} + \frac{y^4}{12} + 2xy - \frac{x^2y^2}{2}$	1 3	4	3
		OR			
	b	Φ= A(x²-y²) is valid potential function as it satisfies Laplace's equation $\frac{\partial^2\phi}{\partial x^2} + \frac{\partial^2\phi}{\partial y^2} = 0$ Φ =A cos x is not valid potential function as it does not satisfy Laplace's equation $\frac{\partial^2\phi}{\partial x^2} + \frac{\partial^2\phi}{\partial y^2} = 0$	2 2	4	3