GUJARAT TECHNOLOGICAL UNIVERSITY
BE - SEMESTER– IV(NEW) EXAMINATION – SUMMER 2023

Subject Code:3140110   **Date:07-07-2023**
Subject Name:Fluid Mechanics
Time:10:30 AM TO 01:00 PM   **Total Marks:70**
Instructions:
1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**
4. **Simple and non-programmable scientific calculators are allowed.**

			MARKS
Q.1	**(a)**	Define: Total Pressure, Centre of Pressure and buoyancy.	**03**
	(b)	Differentiate Ideal and Real Fluids.	**04**
	(c)	Explain working of U-tube Differential manometer.	**07**
Q.2	**(a)**	Define: Weight density, Metacentre, Metacentric height	**03**
	(b)	State and prove Pascal's Law	**04**
	(c)	Derive continuity equation for 2-D & 3-D flow in Cartesian coordinates.	**07**
		OR	
	(c)	Derive an expression for rate of flow through venturimeter.	**07**
Q.3	**(a)**	Derive the expression of velocity potential function and stream function for a linear flow.	**03**
	(b)	Explain Surface Tension Phenomena in detail.	**04**
	(c)	Define notch and weir. Derive an expression for discharge over triangular notch section.	**07**
		OR	
Q.3	**(a)**	What is Reynold's Number? Explain its physical significance.	**03**
	(b)	Derive an expression for power absorbed in Journal earing.	**04**
	(c)	Derive an expression for discharge over trapezoidal notch section.	**07**
Q.4	**(a)**	Define circulation and velocity potential function.	**03**
	(b)	Explain working of Pitot Tube.	**04**
	(c)	Derive an expression for total pressure and centre of pressure on a plane surface immersed in a liquid.	**07**
		OR	
Q.4	**(a)**	Compare Eulerian and Lagrangian frame of reference.	**03**
	(b)	Explain in brief the losses in flow through pipes.	**04**
	(c)	Explain step by step procedure of Buckingham's π-theorem.	**07**
Q.5	**(a)**	Explain the need of inclined column manometers.	**03**
	(b)	Explain Laminar and Turbulent boundary layer.	**04**
	(c)	Derive an expressions shear stress and velocity for HAGENPOISEVILLE L	**07**
		OR	

Q.5 **(a)** Define Laminar Sub layer. **03**

(b) Write a note on Stability of floating bodies. **04**

(c) Derive Darchy Weishbach's equation **07**

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