Seat No.: _____ Enrolment No.

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER– III(OLD) EXAMINATION – SUMMER 2019

Subject Code: 130101 **Date: 01/06/2019**

Subject Name: Fluid Mechanics

Time: 02:30 PM TO 05:00 PM **Total Marks: 70**

Instructions:

1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**

Q.1	**(a)**	Explain the following terms: (Any SEVEN) 1. Surface Tension 2. Cavitation 3. Non-Newtonian Fluid 4. Continuum 5. Buoyancy 6. Metacentre 7. Vorticity 8. Dynamic Similarity.	**07**
	(b)	Define and explain Viscosity and state Newtonian law of visicosity.	**07**
Q.2	**(a)**	Enlist different types of manometers and explain the working of a differential U-tube manometer.	**07**
	(b)	State and Prove Pascal's law.	**07**
		OR	
	(b)	Derive an equation of pressure variation with respect to vertical axis in a fluid under the gravity- Hydrostatic law.	**07**
Q.3	**(a)**	Define buoyant force, center of buoyancy, metacenter and metacentric height. Also describe conditions of equilibrium for floating and submerged bodies.	**07**
	(b)	Derive equations for total force and center of pressure for vertical plane surface immersed in a static liquid.	**07**
		OR	
Q.3	**(a)**	Obtain an expression for continuity equation for a three dimensional flow.	**07**
	(b)	Discuss different similarity conditions for the model similitude.	**07**
Q.4	**(a)**	Derive Euler's equation of motion along a stream line for an ideal fluid and integrate it to get the Bernoulli's equation.	**07**
	(b)	Explain the construction and working of a Venturimeter and also derive an expression for the discharge through it.	**07**
		OR	
Q.4	**(a)**	Derive and sketch the velocity distribution for viscous flow through a circular pipe. Using that prove that the ratio of maximum velocity to the average velocity is 2.	**07**
	(b)	Define: Reynolds number and explain "Reynolds' Experiment.	**07**
Q.5	**(a)**	Derive an expression for the velocity of sound wave in a compressible fluid in terms of change of pressure and change of density.	**07**
	(b)	Explain: Mach cone, Zone of silence, stagnation pressure, adiabatic process. Derive the energy equation for compressible flow in an adiabatic process.	**07**
		OR	
Q.5	**(a)**	Derive Darcy-Weisbach equation for the loss of head due to friction in pipes.	**07**
	(b)	Differentiate between following fluid flow: a) Steady and unsteady flow b) Uniform and Non Uniform flow c) Laminar and Turbulent flow	**07**

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