Seat No.: _____ **Enrolment No._____**

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–III (OLD) - EXAMINATION – SUMMER 2017

Subject Code: 130602 **Date: 02/06/2017**

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.**

Q.1	**(a)**	Define fluid. Enlist its properties and explain any two properties in detail.	**07**
	(b)	Explain the relationship between absolute pressure, atmospheric pressure and gauge pressure with neat sketch.	**07**
Q.2	**(a)**	Explain stability of submerged and floating body with neat sketch.	**07**
	(b)	State Bernoulli's theorem and obtain the equation from Euler's equation.	**07**
		OR	
	(b)	Derive Darcy- Weisbach equation for friction loss in pipes.	**07**
Q.3	**(a)**	State and prove Pascal's law.	**07**
	(b)	Calculate dynamic viscosity of an oil, which is used for lubrication between rectangular plate 1m x 0.3m and an inclined plane with angle of inclination 30^0. The weight of plate is 500 N and slides down the inclined plane with uniform velocity 0.4 m/s. Thickness of oil film is 1.5 mm.	**07**
		OR	
Q.3	**(a)**	Write the statement of continuity equation and derive the expression.	**07**
	(b)	The pipe A carrying water at pressure 150 KN/m^2 is connected by differential manometer to another pipe B. The distance between axis of two pipes A& B is 1.0m. The vertical height of water column in pipe A is 1.5 m. If difference in height of mercury in two limbs of manometer is equal to 60 mm. What is pressure in pipe B.	**07**
Q.4	**(a)**	Explain flow net in detail. Also discuss its characteristics and limitations.	**07**
	(b)	A circular plate 3.5 m in diameter is immersed vertically in water in such a way that it's greatest and least depth below the free surface are 4 m and 1 m respectively. Find the total pressure on one face of plate and position of center of pressure.	**07**
		OR	
Q.4	**(a)**	What is hydraulic coefficient? Give name and derive equation Cc= Cd/Cv.	**07**
	(b)	A stream function is given by $\psi = 5x-10y$. Determine the velocity component and also magnitude and direction of the resultant velocity at any point.	**07**
Q.5	**(a)**	What are the major losses and minor losses in pipe flow? Discuss in detail.	**07**
	(b)	A horizontal venture meter with inlet diameter 150 mm and throat diameter 70 mm is employed to measure the discharge of water. The differential manometer connected to the inlet gives reading of 150 mm of mercury. Determine the rate of flow if the co-efficient of discharge is 0.98	**07**
		OR	
Q.5	**(a)**	What do you understand by stagnation pressure? Obtain an expression for stagnation pressure of compressible fluid in terms of Mach number.	**07**
	(b)	Differentiate between (1) Orifice and Mouthpieces (2)Weir and Notches. Also enlist its types.	**07**

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