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

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–III (OLD) - EXAMINATION – SUMMER 2018

Subject Code:130502 **Date: 23/05/2018**

Subject Name: Fluid Flow Operation

Time:10:30 AM to 01:00 PM **Total Marks: 70**

Instructions:

1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**

Figures to the right indicate full marks.

Q.1	**(a)**	Describe the behavior of Newtonian and Non Newtonian fluid with the help of figure and example.	**07**
	(b)	Derive Hagen-Poiseuille equation.	**07**
Q.2	**(a)**	Show that the average velocity is one half of the maximum velocity for laminar flow of incompressible Newtonian fluid through circular pipe.	**07**
	(b)	Discuss the concept of hydrostatic equilibrium in centrifugal decanter and also derive an expression for variation in pressure as a function of radial position in decanter.	**07**
		OR	
	(b)	Show that momentum correction factor $\beta = 4/3$ for laminar flow of incompressible Newtonian fluid through a circular pipe.	**07**
Q.3	**(a)**	Brine of specific gravity 1.2 is flowing through a 10 cm I.D. pipeline at a maximum flow rate of 1200 liters/min. A sharp edged orifice connected to a simple U-tube mercury manometer is to be installed for the purpose of measurements. The maximum reading of the manometer is limited to 40 cm. Assuming the orifice coefficient to be 0.62, calculate the size of the orifice required.	**07**
	(b)	Write selection criteria for manometric fluid and also derive equation used for measurement of dynamic pressure drop using U-tube manometer.	**07**
		OR	
Q.3	**(a)**	Starting with Bernoulli's and continuity equation, derive an expression for venturimeter, stating all assumptions.	**07**
	(b)	Explain Reynold's experiments for determining types of flow of fluid.	**07**
Q.4	**(a)**	Explain construction & working of rotameter with sketch.	**07**
	(b)	Discuss construction & working of centrifugal pump.	**07**
		OR	
Q.4	**(a)**	What is fluidization and condition of fluidization?	**07**
	(b)	Explain cavitations and priming in pump. Explain the difference between fans, blowers and compressor	**07**
Q.5	**(a)**	Give differences between pipes and tubes? What steps are taken for prevention of leakage around moving parts?	**07**
	(b)	Discuss different types of valves used in chemical industries.	**07**
		OR	
Q.5	**(a)**	Explain any one method of dimensional analysis with suitable example.	**07**
	(b)	Derive an expression of head loss due to sudden expansion of flow area for steady flow of incompressible fluids.	**07**

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