GUJARAT TECHNOLOGICAL UNIVERSITY
BE - SEMESTER–III (NEW) • EXAMINATION – SUMMER 2015

Subject Code: 2130502   **Date:04/06/2015**

Subject Name: Fluid Flow Operation

Time:02.30pm-05.00pm   **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)**	Describe the behavior of Newtonian and Non Newtonian fluid with the help of figure and example.	**07**
	(b)	Derive the Bernoullis equation without friction.	**07**
Q.2	**(a)**	Explain the principle and working of gravity decanter along with a neat sketch. Write the major equations.	**07**
	(b)	Discuss the concept of hydrostatic equilibrium and derive mathematical condition of hydrostatic equilibrium.	**07**

OR

	(b)	Discuss Reynolds number with reference to Reynolds experiment and its significance.	**07**
Q.3	**(a)**	Derive Hagen-Poiseuille Equation	**07**
	(b)	Explain in detail : Drag and DragCoefficient	**07**

OR

Q.3	**(a)**	What is Fluidization? Give its application in chemical process industries.	**07**
	(b)	Explain fully developed flow. Also discuss concept of transition length for laminar and turbulent flow.	**07**
Q.4	**(a)**	What is meant by cavitation and priming? Explain the different characteristic curve of the centrifugal pump with neat sketches.	**07**
	(b)	Sulfuric acid of density 1300 kg/m3 is flowing through a pipe of 50mm ID. An orificemeter of 10mm diameter is fitted in the pipe. A mercury (sp. gr 13.6) manometer fitted to the system measures the differential pressure as 10cm. Calculate the mass flow rate of the acid in kg/hr. Assume orifice coefficient as 0.61.	**07**

OR

Q.4	**(a)**	Write a note on Gate valves and Globe Valves	**07**
	(b)	Calculate the power to pump a liquid at the rate of 1.5 kg/s from a ground level tank at atmospheric pressure through a 50mm ID steel pipe to a overhead tank 3m above at 2 kg/cm2 pressure. The distance between two tanks is 500m. Efficiency of the pump is 70%. The density and viscosity of the liquid is 1500 kg/m3 and 20 cp respectively. Friction factor f =16/NRe.	**07**
Q.5	**(a)**	With the help of a neat sketch explain the principle and working of a rotameter.	**07**
	(b)	Give differences between pipes and tubes? What steps are taken for prevention of leakage around moving parts?	**07**

OR

Q.5	**(a)**	Explain boundary layer separation and wake formation.	**07**
	(b)	Discuss the principle and working of a Reciprocating pump.	**07**

****