Seat No.: _____   Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY
Diploma Engineering - SEMESTER–III • EXAMINATION – WINTER 2013

Subject Code: 330501   **Date: 28-11-2013**
Subject Name: Fluid Flow Operation
Time: 02:30 pm - 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.**
4. **English version is considered to be Authentic.**

Q.1	(a)	Define pressure and justify that the pressure turns out to be independent of orientation of any direction on which the pressure is assumed to act.	07
	(b)	Derive the Bernoulli equation from general energy equation.	07
Q.2	(a)	Define Viscosity .write down the Newton's law of viscosity and difference between Newtonian and Non-newtonian fluid.	07
	(b)	Write down short note on Prandlt theory for boundary layer.	07
		OR	
	(b)	Explain with net sketches (i) U tube manometer (ii) Globe valve.	07
Q.3	(a)	Derive the Hagen-Poiseuilles equation and write down the significance of that.	07
	(b)	Define: (i)Velocity head (ii) Friction factor (iii) Skin friction (iv) Form friction (v) Reynolds stress (vi)Kinematic viscosity (vii) Eddy viscosity	07
		OR	
Q.3	(a)	Difference between Pipe and tube.	07
	(b)	Short note on Fluidization.	07
Q.4	(a)	Derive the equation for Orifice meter for discharge.	07
	(b)	Classify the fluid moving machineries.	07
		OR	
Q. 4	(a)	Discuss the characteristic curves of Centrifugal pump.	07
	(b)	Brief note on Conveying.	07
Q.5	(a)	Benzene is pumped at 40 ° C for reservoir at atmospheric pressure. Pump suction is 100 cm. above benzene level I feed tank. Head loss due to fluid in suction line is 40 gmf cm/cm. Specific gravity of benzene is 0.8 .Vapor pressure of benzene at 40 ° C is 300 gmf/cm^2. Calculate available NPSH.	07
	(b)	Explain the working principle and construction of Rotameter with neat sketches.	07
		OR	
Q.5	(a)	Find out the types of flow for water passing at 200 ml/sec. through a pipe of 1.35 cm I.D. at 20 ° C	07
	(b)	A venturimeter is installed in a 25 mm ID pipe. The pressure drop across upstream and downstream side and throat of venturimeter is 2 m of water. Calculate the volumetric flow rate in m^3/s. (Data: throat Diameter = 15 mm, Density of water = 1000 kg /m^3 , C_v = 0.98)	07

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