Seat No.: _____   Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY
BE - SEMESTER–III(OLD) • EXAMINATION – WINTER 2016

Subject Code:130502   **Date:04/01/2017**

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.**
3. **Figures to the right indicate full marks.**

Q.1	**(a)**	What is fluid? Classify fluids based on rheological properties.	07
	(b)	Derive Bernoulli's equation without friction and without pump work.	07
Q.2	**(a)**	Derive Barometric equation.	07
	(b)	Discuss Reynolds number with reference to Reynolds experiment and give its significance	07

OR

	(b)	A horizontal cylindrical continuous decanter is to separate 10 m³/h of a liquid petroleum fraction from an equal volume of wash acid. Oil is continuous phase and at the operating temperature has density of 860 kg/m³ and viscosity of 1 cP. Density of acid is 1160 kg/m³. Compute the volume of the vessel, if 95% vessel is filled with given liquid mixture.	07
Q.3	**(a)**	Derive Hagen Poiseuille equation.	07
	(b)	Explain boundary layer separation and wake formation.	07

OR

Q.3	**(a)**	Brine having specific gravity 1.15, is draining from the bottom of a large open tank through a 50-mm pipe. The drainpipe ends at a point 5 m below the surface of the brine in the tank. Considering a streamline starting at the surface of the brine in the tank and passing through the center of the drain line to the point of discharge and assuming that friction along the streamline is negligible, calculate the velocity of flow along the streamline at the point of discharge from the pipe.	07
	(b)	Derive for shear stress distribution for fluid in steady flow in a cylindrical tube. Also give the relation between skin friction and wall shear.	07
Q.4	**(a)**	What is fluidization? Writer its application in chemical industries.	07
	(b)	Write a short note on types of fluidization.	07

OR

Q.4	**(a)**	Explain Cavitation and NPSH.	07
	(b)	Differentiate between pipe and tube.	07
Q.5	**(a)**	What is valve? With neat sketch discuss gate valve and globe valve.	07
	(b)	What is dimensional analysis? Discuss any one method of dimensional analysis with suitable example.	07

OR

Q.5	**(a)**	Explain the characteristic curve of centrifugal pump with neat sketches.	07
	(b)	With a neat sketch explain the construction and working of a venturimeter.	07

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