Seat No.: _____ *Enrolment No._____*

GUJARAT TECHNOLOGICAL UNIVERSITY

BE SEM-III Examination-Dec.-2011

Subject code: 130602 **Date: 17/12/2011**

Subject Name: Fluid Mechanics

Time: 2.30 pm -5.00 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)**	Classify different types of orifices according to its shapes, size, discharge condition and shape of upstream edge. Explain all in brief.	**07**
	(b)	A closed vessel contains water up to a height of 2.5 m and over the water surface there is air having pressure 9.0 N/cm2 above atmospheric pressure. At the bottom of the vessel there is an orifice of dia. 15 cm. Find the rate of flow of water from orifice. Take Cd = 0.6	**07**
Q.2	**(a)**	Name the major and minor losses of head of pipe flow with various relations. Also state the difference between D-W formula and Chezy's formula of pipe flow.	**07**
	(b)	A horizontal pipe 60 m long and 200 mm in dia. is connected to a water reservoir. Water flows through the pipe at the rate of 90 l/s under a head of 5 m. The pipe discharge into atmosphere. If f = 0.036 (Darcy's friction factor), draw T.E.L. and H.G.L. for the pipeline.	**07**
		OR	
	(b)	Differentiate between notch and weir. Classify the weirs on basis of shapes of crest and describe all in brief.	**07**
Q.3	**(a)**	What do you mean by venturihead? Obtained the discharge equation for venturimeter.	**07**
	(b)	What are the various forces consider to derive Euler's equation. Write application of Bernoulli's equation and of Momentum equation.	**07**
		OR	
Q.3	**(a)**	What is flownet? Write uses of flownet and explain various methods in brief to obtain flownet.	**07**
	(b)	Define Stream function, Circulation, Vorticity, Source, Sink, Doublet and convective acceleration.	**07**
Q.4	**(a)**	What is metacentre? Explain how metacentric height is determined analytically.	**07**
	(b)	A block of wood has a horizontal cross section 600mm X 600mm and height h. It floats vertically in water. If the sp. gr. of wood is 0.6, find the maximum height of the block so that it can remain in stable equilibrium.	**07**
		OR	
Q.4	**(a)**	Obtain an expression for the depth of centre of pressure when the lamina is immersed in a liquid at an angle with horizontal.	**07**
	(b)	Define atmospheric pressure. Explain how atmospheric pressure is measured by various devices.	**07**

Q.5	**(a)**	Differentiate between fluid mechanics and mechanics of solids? Describe different types of fluids	**07**
	(b)	Explain control volume concept of fluid and describe the branches of fluid mechanics	**07**

OR

Q.5	**(a)**	What is Mach number? What is the importance of Mach number in the flow of compressible fluids?	**07**
	(b)	Obtain the general energy equation for compressible flow.	**07**

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