Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

B. E. Sem. - V - Examination – June- 2011

Subject code: 152003

Subject Name: Fluid Mechanics & Machines

Date:24/06/2011 **Time: 10:30 am – 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)**	Explain with neat sketch of pelton turbine type hydraulic machinery.	**07**
	(b)	Explain difference between centrifugal pump and reciprocating pump.	**07**
Q.2	**(a)**	Define Viscosity and its units. Also differentiate solid , liquids and gases fluid.	**07**
	(b)	Define centre of pressure and determine the total pressure on a circular plate of diameter 2 meter which is placed vertically in water in such a way that the centre of plate is 3.5 meter below the free surface of water . Fund the position of centre of pressure also.	**07**
		OR	
	(b)	Find the volume of water displaced and position of centre of buoyancy for a wooden block of width 2 meter and of the depth 1 meter , when its floats horizontally in water . The density of wooden block is 675 kg/m^3 and its length 5 meter. Also define meta centre.	**07**
Q.3	**(a)**	Distinguish between : (1)Stead flow and un –steady flow (2) Stream function and velocity potential function.	**07**
	(b)	Name the different forces present in a fluid flow for the Euler's equation of motions and also state Bernoulli's theorem & its assumptions for steady flow of an incompressible fluid .	**07**
		OR	
Q.3	**(a)**	A stream function is given by $\psi = 5x - 6y$. Calculate the velocity component and also magnitude with direction of the resultant velocity at any point.	**07**
	(b)	A nozzle type pipe through which water is flowing , is having diameter 25 cm and 15 cm at the cross-section 1 and 2 respectively . The velocity of water at section 1 is given by 5 m/sec. Find the velocity head at sections 1 and 2 and also rate of discharge.	**07**
Q.4	**(a)**	What do you mean by viscous flow and turbulent flow ?	**07**
	(b)	Explain boundary layer flow theory with its displacement thickness.	**07**
		OR	
Q.4	**(a)**	Determine the difference in the elevations between the water surfaces in the two tank which connected by a horizontal pipe of diameter 275 mm and length 380 m. The rate of water flow through the pipe is 290 litres/ sec. Consider all losses and assume the value of friction loss co-efficient f is 0.0077.	**07**
	(b)	Explain concept of lift and drag and also state its equations.	**07**
Q.5	**(a)**	What is the function of draft tube? , And also classify the draft tube.	**07**
	(b)	What is specific speed of turbine and pump?, State its equations.	**07**
		OR	
Q.5	**(a)**	What is priming? Why it is necessary in case of centrifugal pump?	**07**
	(b)	Write short note on steam turbine and gas turbine.	**07**

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