

Seat No.: _____

Enrolment No. _____

GUJARAT TECHNOLOGICAL UNIVERSITY

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

Subject Code:130101

Date:02/01/2017

Subject Name:Fluid Mechanics

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) Define following **07**
Kinematic viscosity, Capillary, Surface tension, Vapor pressure, Cavitation, Cohesion, Adhesion.
- (b) Derive an expression for work done in adiabatic expansion processes. **07**
- Q.2** (a) State and prove Pascal's Law. **07**
- (b) Explain Absolute, Gauge, Atmospheric and Vacuum Pressure and their relations. **07**
- OR**
- (b) Prove that the pressure at a same level will be equal even though there is no direct horizontal path between two points, provided that in the same continuous body of fluid. **07**
- Q.3** (a) Derive an expression to calculate pressure difference in U-Tube Differential Manometer and Inverted Manometer. **07**
- (b) Derive an equation for the motion for forced vortex flow. **07**
- OR**
- Q.3** (a) Define metacenter and metacentric height. Explain method for determination of metacentric height. **07**
- (b) Explain the construction and working of a Venturimeter and also derive an expression for the discharge through it. **07**
- Q.4** (a) Derive Darcy-Weisbach equation for the loss of head due to friction in pipes. **07**
- (b) State Bernoulli's theorem for compressible fluid flow and derive an expression for the same when the process is adiabatic **07**
- OR**
- Q.4** (a) Derive an expression for the discharge of water over the V notch with usual notation. **07**
- (b) Explain Dash pot mechanism and its utility. **07**
- Q.5** (a) Derive an expression for the Hagen Poiseuille's formula. **07**
- (b) Define stagnation pressure. Derive an expression for that. **07**
- OR**
- Q.5** (a) Explain Reynolds' experiment with neat sketch. **07**
- (b) Derive and sketch the velocity distribution for viscous flow through a circular pipe. Using that prove that the ratio of maximum velocity to the average velocity is 2. **07**
