

GUJARAT TECHNOLOGICAL UNIVERSITY**PDDC- SEMESTER-III - EXAMINATION – SUMMER 2017****Subject Code: X30604****Date: 02/06/2017****Subject Name: Advanced Fluid Mechanics****Time: 02:30 PM to 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.

- Q.1** (a) Enlist types of fluid flow and define each of them. **07**
 (b) Derive continuity equation in three dimensions in Cartesian Coordinates. **07**
- Q.2** (a) Enlist methods of determination of coefficient of viscosity and explain any one of them in detail. **07**
 (b) Explain Hardy-Cross method. **07**
- OR**
- (b) Write Euler's equation of motion and derive Bernoulli's equation from Euler's Equation. **07**
- Q.3** (a) Explain Reynold's Experiment. **07**
 (b) Derive the expression for displacement thickness. **07**
- OR**
- Q.3** (a) Explain what is meant by separation of boundary layer. Describe the methods to control separation. **07**
 (b) What do you understand by the hydro-dynamically smooth and rough boundaries? **07**
- Q.4** (a) Explain the Buckingham's π theorem method for dimensional analysis **07**
 (b) What is dimensional homogeneity? Check dimensional homogeneity for **07**
- $$v = \sqrt{2gh} \quad \text{and} \quad T = 2\pi \sqrt{\frac{l}{g}}$$
- OR**
- Q.4** (a) Write short note on dimensionless numbers. **07**
 (b) Explain standing wave flume and parshall flume. **07**
- Q.5** (a) Define the term stream function. How it differs by potential function. **07**
 (b) Write a short note on hydraulic jump. **07**
- OR**
- Q.5** (a) Write detailed notes on specific energy and specific energy curve. **07**
 (b) Explain Prandtl's mixing length theory. **07**
