

GUJARAT TECHNOLOGICAL UNIVERSITY
BE VI – SEMESTER – EXAMINATION – SUMMER 2015

Subject Code: 160101**Date: 01/05/2015****Subject Name: AERODYNAMICS II****Time: 10.30AM-01.00PM****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 laminar flow, transition, turbulent flow and flow separation over an airfoil **07**
(b) Explain aerodynamics behavior of slender bodies in compressible flow and incompressible flow **07**
- Q.2** (a) Derive velocity potential equation for subsonic compressible flow over airfoil **07**
(b) Write short notes on low speed airfoils **07**
- OR**
- (b) Derive general solution equation for symmetric airfoil using two dimensional airfoil theory **07**
- Q.3** (a) Using Kutta Joukowski transformation, explain transformation of circle into cambered airfoil **07**
(b) Explain Prandtl's classical lifting line theory by deriving suitable mathematical equation **07**
- OR**
- Q.3** (a) Explain numerical solution procedure for exact Joukowski transformation **07**
(b) Explain load distribution on elliptical wing using lifting line theory **07**
- Q.4** (a) What is downwash? Explain its ground effect **07**
(b) Derive equation for pressure coefficient using linearized supersonic flow theory **07**
- OR**
- Q.4** (a) Explain vortex lattice method **07**
(b) Explain supersonic airfoil drag estimation using linearized supersonic theory **07**
- Q.5** (a) Explain airfoil nomenclature with diagram. Also explain NACA – 4 digit, NACA - 5 digit and NACA - 6 digit airfoil nomenclature. **07**
(b) Explain laws of vortex for incompressible flow over finite wing. **07**
- OR**
- Q.5** (a) What is conformal transformation? Explain in detail **07**
(b) Write short note on profile theory **07**
