

GUJARAT TECHNOLOGICAL UNIVERSITY**BE - SEMESTER-VI • EXAMINATION – SUMMER • 2014****Subject Code: 160101****Date: 19-05-2014****Subject Name: Aerodynamics - II****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 low speed flow over an airfoil. **07**
(b) Explain steps for exact Joukowski transformation process and its numerical Solution. **07**
- Q.2** (a) Write a short note on bound vortex, Horse shoe vortex system. **07**
(b) Derive Prandtl-Glauert rule for compressibility correction. **07**
- OR**
- (b) Explain in details with procedure about transformation of circle into symmetric airfoil. **07**
- Q.3** (a) Explain streamline, stream function, angular velocity, vorticity. **07**
(b) Explain about the vortex lattice system on a finite wing. **07**
- OR**
- Q.3** (a) Prove that Show that for thin symmetric airfoils the centre of pressure is the quarter chord position. **07**
(b) The normal force is acting at the midpoint of the chord. Find the moment on the airfoil at the leading edge of the airfoil. **07**
- Q.4** (a) Give statements of Kutta condition & Explain it. Also relate it with lift generation in inviscid flow. **07**
(b) Explain Biot-Savart Law for vortex and Derive equation for infinite wing. **07**
- OR**
- Q.4** (a) Write a short note on supersonic area rule with suitable example. **07**
(b) What is an expansion Hodograph? What is its use in supersonic aerodynamics? **07**
- Q.5** (a) Derive velocity potential equation for inviscid, compressible subsonic flow over a body immersed in a uniform flow. **07**
(b) Discuss Influence of downwash on tail plane and ground effect. **07**
- OR**
- Q.5** (a) Write notes on aerodynamics of airfoil, infinite wing and finite wing. **07**
(b) Write note on aerodynamics of fuselage system. **07**
