

GUJARAT TECHNOLOGICAL UNIVERSITY**BE - SEMESTER-VI • EXAMINATION – WINTER • 2014****Subject Code: 160101****Date: 26-11-2014****Subject Name: Aerodynamics - II****Time: 02:30 pm - 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) Define with neat sketch Aspect ratio, Dihedral angle, and Angular velocity. **07**
(b) Explain real case of flow over the airfoil. **07**
- Q.2** (a) Explain with details Critical Mach number and Mach number. **07**
(b) Explain Prandtl's Classical Lifting line theory. **07**
- OR**
- (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.3** (a) Explain about the vortex lattice system on a finite wing. **07**
(b) Using mathematical derivation provide the solution of generalized equation for symmetric airfoil using thin airfoil theory. **07**
- OR**
- Q.3** (a) Write notes on bound vortex, Horse shoe vortex system. **07**
(b) Explain in details with procedure about transformation of circle into Symmetric airfoil. **07**
- Q.4** (a) Explain Biot-Savart Law for vortex. **07**
(b) Derive lift and wave-drag coefficient for linearized supersonic flow. **07**
- OR**
- Q.4** (a) Explain application of linearized to supersonic airfoil. **07**
(b) Explain Kelvin's circulation theorem. **07**
- Q.5** (a) Explain the vortex sheet and the vortex panel numerical method. **07**
(b) Explain with neat sketch Supersonic Airfoil drag. **07**
- OR**
- Q.5** (a) Write a short note on Delta wings with neat sketch. **07**
(b) Explain profile theory for two dimensional flap wing. **07**
