

Seat No.: \_\_\_\_\_

Enrolment No. \_\_\_\_\_

# GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER-VI (NEW) - EXAMINATION – SUMMER 2016

Subject Code:2160101

Date:06/05/2016

Subject Name: Aerodynamics II

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) What is bound vortex and Horse shoe vortex? Explain with details. **07**  
(b) Explain Prandtl's Classical Lifting line theory. **07**
- Q.2** (a) What is Airfoil? Explain Airfoil Nomenclature with a neat sketch. **07**  
(b) Define: Aerodynamic Twist, Geometric Twist, Lift, Profile Drag, Induced Drag, Downwash and Angle of Attack **07**
- OR**
- (b) Explain the aerodynamics for a Delta Wing. **07**
- Q.3** (a) Explain and prove linearized velocity potential equation. **07**  
(b) What is Transformation? Explain transformation of a circle into a straight line with a neat sketch. **07**
- OR**
- Q.3** (a) State and Explain Kutta condition with the help of diagram. **07**  
(b) Explain Classical Thin Airfoil Theory. **07**
- Q.4** (a) Explain transformation of a circle into a symmetric airfoil with a neat sketch. **07**  
(b) Explain the flow over a finite wing and explain the concept of a vortex filament. **07**
- OR**
- Q.4** (a) Define Critical Mach number and Drag Divergence Mach Number? Explain both the terms in detail with a proper diagram. **07**  
(b) Derive linearized supersonic pressure coefficient formula. **07**
- Q.5** (a) Derive Prandtl-Glauert rule for compressibility correction. **07**  
(b) Explain Kelvin's circulation theorem. **07**
- OR**
- Q.5** (a) Explain transformation of a circle into an ellipse with a neat sketch. **07**  
(b) Explain the flow over a supercritical airfoil. State the advantages of supercritical airfoil. **07**

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