Seat No.: _____ Enrolment No._____

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**

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