Seat No.: _____ Enrolment No._____

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 Joukowsky 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**

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