Seat No.: _____ Enrolment No. _____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–VI (OLD) • EXAMINATION – WINTER 2017

Subject Code: 160105 **Date: 08-11-2017**

Subject Name: Computational Fluid Dynamics-II

Time: 02:30 pm to 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)**	What is CFD? State its application in various fields.	**07**
	(b)	State the disadvantage of Central difference scheme and explain 1st order upwind scheme.	**07**
Q.2	**(a)**	What is Grid transformation? Explain with an example of airfoil.	**07**
	(b)	Write a note on Multidimensional Problem.	**07**
		OR	
	(b)	What is the need of Linearization? Explain the Beam and Warming Method.	**07**
Q.3	**(a)**	Derive the flux terms of governing equations for Numerical Solution of Prandtl-Mayer expansion flow field.	**07**
	(b)	Discuss the calculation of step size in space and time for flow over flat plate.	**07**
		OR	
Q.3	**(a)**	Explain purely subsonic flow through the CD nozzle. Also explain the boundary conditions for the same.	**07**
	(b)	Explain TVD and flux limiters in brief	**07**
Q.4	**(a)**	Explain the MacCormack subroutine for a flat plate	**07**
	(b)	Write a short note on High Resolution Schemes.	**07**
		OR	
Q.4	**(a)**	Write a note on Shock tube problem.	**07**
	(b)	Write a short note on Stretched Grids with example.	**07**
Q.5	**(a)**	Write a short note on Boundary Fitted Coordinate systems with example.	**07**
	(b)	Transform the governing equations of Prandtl-Mayer expansion flow field from (x,y) coordinate system to (ξ,η) coordinate system	**07**
		OR	
Q.5	**(a)**	Discuss the initial and boundary conditions for two dimensional unsteady, supersonic, viscous flow over the flat plate.	**07**
	(b)	Write a short note on The Godunov Approach with the help of the shock tube problem.	**07**

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