Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE VI SEMESTER– • EXAMINATION – SUMMER 2015

Subject Code:160105 **Date:12/05/2015**

Subject Name: Computational Fluid Dynamics 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)**	Discuss the physical problem of Prandtl Meyer expansion wave by explaining the analytical solution of flow.	**07**
	(b)	Explain the concept of lagging coefficient method in the Beam Warming Method	**07**
Q.2	**(a)**	Explain physical problem of isentropic flow over nozzle.	**07**
	(b)	Explain the organization of Navior Stokes equation code for the supersonic viscid flow over the flate plate.	**07**
		OR	
	(b)	Discuss the calculation of step size in space and time for flow over flate plate.	**07**
Q.3	**(a)**	Explain the MacCormack subroutine for a flat plate.	**07**
	(b)	Explain purely subsonic flow through the CD nozzle. Also explain the boundary conditions for the same.	**07**
		OR	
Q.3	**(a)**	Briefly explain the nozzle shape and initial conditions for a CD nozzle.	**07**
	(b)	Explain Approximate factorization in multidimensional problem.	**07**
Q.4	**(a)**	Explain Godunov approach.	**07**
	(b)	Explain flux vector splitting and state the conditions which improve performance of the numerical scheme.	**07**
		OR	
Q.4	**(a)**	Discuss the causes of development of the upwind method specify the advantages and disadvantages of the schemes.	**07**
	(b)	Explain TVD and flux limiters in brief.	**07**
Q.5	**(a)**	Explain the concept of additional considerations for implicit method.	**07**
	(b)	Discuss upwind scheme in detail. Briefly state numerical forms of Euler equation.	**07**
		OR	
Q.5	**(a)**	Discuss Adaptive grids under grid transformation	**07**
	(b)	Explain error and stability analysis for 1D heat conduction equation.	**07**

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