Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–VI • EXAMINATION – SUMMER 2013

Subject Code: 160105 **Date: 30-05-2013**

Subject Name: Computational Fluid Dynamics 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 High Resolution Scheme in general.	**07**
	(b)	Discuss in detail flux difference splitting .	**07**
Q.2	**(a)**	Explain Beam Warming Approach.	**07**
	(b)	Discuss upwind scheme in detail. Briefly state numerical forms of Euler equation.	**07**
		OR	
	(b)	Utilizing the generic form for the subsonic supersonic flow through nozzle derive the flux terms and source terms as a function of u_1, u_2, u_3.	**07**
Q.3	**(a)**	Explain the concept of additional considerations for implicit method.	**07**
	(b)	Discuss multidimensional problem and approximate factorization.	**07**
		OR	
Q.3	**(a)**	Discuss in detail the advantages of upwind scheme comparing with previous schemes developed.	**07**
	(b)	Describe in detail second order upwind scheme and state total variation diminishing concept.	**07**
Q.4	**(a)**	Obtain the roots of I-D unsteady flow using the method of Jacobians.	**07**
	(b)	Derive the non dimensional form of conservative form of Governing equations for subsonic-supersonic flow through C-D nozzle.	**07**
		OR	
Q.4	**(a)**	Using a neat sketch explain how to set up a problem for flow through nozzle with shock into the divergent section.	**07**
	(b)	Draw the flow chart for TAUXY function subprograme for viscid flow over the flat plate.	**07**
Q.5	**(a)**	Write a short note on shock tube and apply the Godunov approach for the same.	**07**
	(b)	Derive the transformed form of governing equations for Prandtl Mayer expansion waves.	**07**
		OR	
Q.5	**(a)**	Draw and explain the flow chart for main program for supersonic, inviscid flow over a flat plate.	**07**
	(b)	Derive the expression for Prandtl-Mayer functions for a supersonic flow expanded from a corner.	**07**

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