GUJARAT TECHNOLOGICAL UNIVERSITY BE - SEMESTER-V • EXAMINATION – WINTER 2013

Su Su Tii Inst	bject bject ne: 1 tructio 1. 2.	Code: 150104Date: 02-12-2013Name: Computational Fluid Dynamics - ITotal Marks: 700.30 am - 01.00 pmTotal Marks: 70ns:Attempt all questions.Make suitable assumptions wherever necessary.Eigenet to sight in direct foll words	
	3.	Figures to the right indicate full marks.	
Q.1	(a)	What is CFD? Justify CFD is an advanced research tool. Compare it with the wind tunnels.	07
	(b)	Explain in brief the steps involved to solve a problem using CFD software.	07
Q.2	(a)	Derive the momentum and continuity equation in non conservation form for 2 Dupstandy inviscid flow	07
	(b)	Obtain the conservation form of the equations derived in Q2 (a). OR	07
	(b)	Derive the energy equation for the 3-D, unsteady inviscid flow in conservation and non-conservation forms.	07
Q.3	(a)	Consider a small perturbated flow and get the roots of such equations by the Cramer's rule.	07
	(b)	Explain the Mac-cormark Technique in detail.	07
Q.3	(a)	Explain in general the parabolic and hyperbolic nature of the partial differential equations.	07
	(b)	Write a short note on shock fitting and shock capturing method.	07
Q.4	(a) (b)	Explain in brief the concept of adaptive grid and compressed grid. Explain in detail the Lax Wandroff Technique to handle the PDEs.	07 07
Q.4	(a) (b)	Explain in detail the implicit and explicit approaches applied to PDEs. Compare the different discretization techniques. Explain the different finite difference schemes.	07 07
Q.5	(a) (b)	Write a short note on Method of Relaxation. Explain the boundary conditions for subsonic inflow and supersonic outflow for convergent divergent nozzle.	07 07
05	(១)	OR With an example explain the finite volume method	07
Q.5	(a) (b)	Derive the momentum equation for 1-D subsonic-supersonic convergent divergent nozzle.	07
