Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

M.E –IIst SEMESTER–EXAMINATION – JULY- 2012

Subject code: 1723906 Date: 12/07/2012

Subject Name: Computational Fluid Dynamics

Time: 10:30 am – 13:00 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)**	Derive an expression for energy equation for small, moving fluid element.	**07**
	(b)	Write short note on Finite volume method	**07**
Q.2	**(a)**	What are the pressure correction techniques? Solve the following system of equations using Gauss Siedel Method; $3X_1+7X_2+13X_3=76$ $X_1+5X_2+3X_3=28$ $12X_1+3X_2-5X_3=1$ Use (1,0,0) as the initial guess value. Compare your answer with true solution $X_1=1$, $X_2=3$, $X_3=4$	**07**
	(b)	Discuss different types of boundary condition necessary for solving the problem of CFD.	**07**
		OR	
	(b)	Explain steps for solving the examples using FEM	**07**
Q.3	**(a)**	Explain Delaunay Triangulation.	**07**
	(b)	Explain C-Grid topology with suitable example	**07**
		OR	
Q.3	**(a)**	Explain Transfinite Interpolation for volume grid generation	**07**
	(b)	Explain O-grid topology and H-grid topology	**07**
Q.4	**(a)**	Write short note on Reynolds-Averaged Navier-Stokes Equations	**07**
	(b)	Write and explain governing equation for combusting flow.	**07**
		OR	
Q.4	**(a)**	Write and explain governing equation for turbulant flow.	**07**
Q.4	**(b)**	Write short note on general standard used for data exchange	**07**
Q.5	**(a)**	Explain simple internal flow through driven cavity	**07**
	(b)	Explain Car-Reacting flow in a gas burner.	**07**
		OR	
Q.5	**(a)**	Explain multi-phase flow in an air lift reactor.	**07**
	(b)	Explain simple internal flow through T-Junction	**07**

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