Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

M. E. - SEMESTER – II • EXAMINATION – SUMMER • 2013

Subject code: 1723906 **Date: 05-06-2013**

Subject Name: Computational Fluid Dynamics

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)**	Derive Energy equation for moving infinitesimally small fluid element	**07**
	(b)	What are the pressure correction techniques? Describe the numerical procedure for pressure correction.	**07**
Q.2	**(a)**	Drive Momentum equation for moving infinitesimally small fluid element	**07**
	(b)	Discuss different types of boundary condition necessary for solving the problem of CFD	**07**
		OR	
	(b)	Clearly distinguish between the finite difference, FEM and FVM methods used for solving CFD problem. Why FVM as preferred method in CFD?	**07**
Q.3	**(a)**	Write short note on head loss in flow through T- junction.	**07**
	(b)	Write short note on simulation of reacting flows.	**07**
		OR	
Q.3	**(a)**	Discuss the effects of external turbulent flow over Ahmed body.	**07**
	(b)	Discuss different aspects of steady incompressible 2-D driven cavity flow.	**07**
Q.4	**(a)**	Explain Euler/Euler approach and Euler/Lagrange approach for multiphase flow.	**07**
	(b)	Write short note on general standard used for data exchange	**07**
		OR	
Q.4	**(a)**	Write short note on Reynolds-Averaged Navier-Stokes Equations	**07**
	(b)	Differentiate between zero equation, one equation and two equation turbulence model.	**07**
Q.5	**(a)**	Differentiate clearly between O-Grid topology and J-Grid topology with suitable example.	**07**
	(b)	Discuss the benefits of un-structured mesh with example.	**07**
		OR	
Q.5	**(a)**	Write a short note on grid generation techniques for structured and un-structured grids.	**07**
	(b)	Explain Delaunay Triangulation.	**07**

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