

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.

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|------------|--|-----------|
| 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 |
