

Seat No.: _____

Enrolment No. _____

GUJARAT TECHNOLOGICAL UNIVERSITY

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

Subject code: 1721005

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) State the various governing laws and equations on the basis of which CFD analysis is carried out 07
(b) Derive Integral form of energy conservation equation along z-direction 07
- Q.2 (a) Explain Different types of boundary conditions? 07
(b) Explain the various reasons for occurrence of various types of errors found between CFD results and experimental results 07
OR
(b) Discuss the k- ϵ model in turbulence flow modeling 07
- Q.3 (a) Discuss the difference between Finite element method and finite volume method 07
(b) Explain significance of stiffness matrix and isoperimetric elements while using the finite element philosophy 07
OR
- Q.3 (a) Explain the various reasons for occurrence of various types of errors found between CFD results and experimental results 07
(b) Discuss the advantages and limitations of computational fluid dynamics 07
- Q.4 (a) Explain the algorithm for formulation of problem for 1D steady state heat conduction in CFD analysis 07
(b) 07
OR
- Q.4 (a) Explain for viscous incompressible flow MAC algorithm 07
Q.4 (b) Explain Advection phenomenon in flow 07
- Q.5 (a) Derive two dimensional scalar transport equation 07
(b) Explain different discretization techniques used in CFD 07
OR
- Q.5 (a) Derive differential form of general equation of heat conduction in Cartesian co-ordinates 07
(b) State and explain advantages and limitations of finite volume method 07
