

GUJARAT TECHNOLOGICAL UNIVERSITY
BE - SEMESTER-VI (OLD) - EXAMINATION – SUMMER 2017

Subject Code: 160105

Date: 01/05/2017

Subject Name: Computational Fluid Dynamics -II

Time: 10:30 AM to 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) State the disadvantages of Central difference scheme over Upwind Scheme. **07**
 Explain 1st order Upwind Scheme in detail.
- (b) Describe Oshero approximate Riemann solver. **07**
- Q.2** (a) Explain 2nd order Upwind Scheme in detail. **07**
 (b) Explain the organization of Navier Stokes equation code for the supersonic viscous flow over the flat plate. **07**
- OR**
- (b) Explain Grid Transformation with example. **07**
- Q.3** (a) Differentiate between Structured and Unstructured grid. **07**
 (b) Write a short note on High Resolution Schemes. **07**
- OR**
- Q.3** (a) Transform the governing equations of Prandtl-Mayer expansion flow field from (x,y) coordinate system to (ξ,η) coordinate system. **07**
 (b) Write a step wise procedure to apply the finite difference equation for the flat plate. **07**
- Q.4** (a) Write a short note on Stretched Grids with example. **07**
 (b) Write a short note on The Godunov Approach with the help of the shock tube problem. **07**
- OR**
- Q.4** (a) Discuss the physical problem of Prandtl Meyer expansion wave by explaining the analytical solution of flow. **07**
 (b) Differentiate between the expansion and compression shockwaves. Discuss how expansion waves are generated. **07**
- Q.5** (a) Discuss the initial and boundary conditions for two dimensional unsteady, supersonic, viscous flow over the flat plate. **07**
 (b) Explain physical problem of isentropic flow over nozzle. **07**
- OR**
- Q.5** (a) Write a note on Beam and Warming Method. **07**
 (b) Write a note on Multi-dimensional problem. **07**
