

GUJARAT TECHNOLOGICAL UNIVERSITY**BE - SEMESTER– V (New) EXAMINATION – WINTER 2019****Subject Code: 2150104****Date: 21/11/2019****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) Describe about constant pressure boundary condition. **03**
 (b) Why periodic or cyclic boundary condition is needed? **04**
 (c) Distinguish between axisymmetric and symmetry boundary condition. **07**
- Q.2** (a) Describe about wall boundary condition. **03**
 (b) Explain PISO algorithm. **04**
 (c) Write down the steps involved in SIMPLE-R method. **07**
- OR**
- (c) Write the steps to be followed for SIMPLE-C method. **07**
- Q.3** (a) Compare the pros and cons of SIMPLE, SIMPLE-R and SIMPLE-C. **03**
 (b) Why Pressure velocity coupling is required to solve incompressible fluid flow problems? **04**
 (c) Explain first order upwind scheme in detail. State its disadvantages. **07**
- OR**
- Q.3** (a) What is TDMA? Why it is used? **03**
 (b) Explain Flux Vector Splitting. **04**
 (c) Explain second order Upwind scheme. **07**
- Q.4** (a) Differentiate Collocated grid and Staggered grid. **03**
 (b) Write a short note on High Resolution Schemes. **04**
 (c) Explain Godunov approach with the help of shock tube problem. **07**
- OR**
- Q.4** (a) Differentiate FDM, FVM and FEM. **03**
 (b) How Finite Volume Method works? Explain in brief. **04**
 (c) Write a note on FVM for two dimensional diffusion problems. **07**
- Q.5** (a) Write advantages of Finite Volume Method. **03**
 (b) Explain Crank Nicolson Scheme for unsteady heat conduction problem. **04**
 (c) Explain the concept of Supersonic flow over a sharp edged flat plate. **07**
- OR**
- Q.5** (a) How step size is calculated for the flow over a flat plate? **03**
 (b) Discuss the initial and boundary conditions for two dimensional unsteady, supersonic and viscous flows over the flat plate. **04**
 (c) Draw the flow chart of Main program for Navier-Stokes equation. **07**
