Seat No.: _____ Enrolment No.

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–V (NEW) EXAMINATION – SUMMER 2019

Subject Code: 2150104 **Date: 03/06/2019**

Subject Name: Computational Fluid Dynamics II

Time: 02:30 PM TO 05:00 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)**	What are the various boundary conditions?	**03**
	(b)	Explain (1) Symmetry & (2) Periodic boundary conditions.	**04**
	(c)	Explain steps involved in solving finite volume method for one dimensional steady state diffusion problem.	**07**
Q.2	**(a)**	What is the full form of SIMPLE, SEIMPL-R & PISO?	**03**
	(b)	Explain Staggered Grid.	**04**
	(c)	Explain SIMPLE algorithm in detail.	**07**
		OR	
	(c)	Compare SIMPLE, SIMPLE-R and SIMPLE-C.	**07**
Q.3	**(a)**	Why pressure velocity coupling is required in the solution of Incompressible flow problems.	**03**
	(b)	What is TDMA? Explain in detail.	**04**
	(c)	Explain PISO algorithm in detail.	**07**
		OR	
Q.3	**(a)**	Why under-relaxation is required in SIMPLE?	**03**
	(b)	State the need of Upwind scheme over the central difference scheme.	**04**
	(c)	Write a note on Beam and Warming method.	**07**
Q.4	**(a)**	Draw 2D grid used for discretizationproblem and also write general discretized equation for interior nodes.	**03**
	(b)	Solve FVM for steady one dimensional convection and diffusion problem.	**04**
	(c)	What are the general properties of discretizationschemes?	**07**
		OR	
Q.4	**(a)**	How Finite Volume Method Works? Explain in brief.	**03**
	(b)	Explain Crank-Nicolson Scheme for the FVM for unsteady heat conduction problem	**04**
	(c)	Explain how central differencing schemes works?	**07**
Q.5	**(a)**	Explain supersonic viscid flow over the flat plate.	**03**
	(b)	Explain different boundary conditions for supersonic viscid flow over the flat plate.	**04**
	(c)	Explain flow chart for Mac-Cormark subroutine.	**07**
		OR	
Q.5	**(a)**	How multidimensionality does make the solution more difficult?	**03**
	(b)	Explain 2nd order upwind schemes.	**04**
	(c)	Write a note on High Resolution schemes.	**07**

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