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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**

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