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GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–V (NEW) EXAMINATION – WINTER 2018

Subject Code:2150104 **Date:20/11/2018**

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.**

			MARKS
Q.1	**(a)**	Why Pressure-Velocity coupling is required?	**03**
	(b)	What is Staggered Grid? Why it is used?	**04**
	(c)	Explain different types of inlet and outlet boundary conditions.	**07**
Q.2	**(a)**	Explain 1st order Upwind scheme.	**03**
	(b)	State the advantages of SIMPLE-R algorithm.	**04**
	(c)	Write a note on PISO algorithm.	**07**
		OR	
	(c)	Write a short note on Flux Vector Splitting.	**07**
Q.3	**(a)**	State the disadvantages of SIMPLE algorithm.	**03**
	(b)	What is TVD condition?	**04**
	(c)	Explain finite volume method (FVM) for two dimensional diffusion problems given by, $$\frac{\partial}{\partial x}\left(\Gamma\frac{\partial \phi}{\partial x}\right)+\frac{\partial}{\partial y}\left(\Gamma\frac{\partial \phi}{\partial y}\right)+S=0$$	**07**
		OR	
Q.3	**(a)**	Explain 2nd order Upwind scheme.	**03**
	(b)	State the advantages of PISO.	**04**
	(c)	Explain SIMPLE Algorithm.	**07**
Q.4	**(a)**	Number of calculations involved in SIMPLE-R is more than SIMPLE. True or False? Why?	**03**
	(b)	What is TDMA? Why it is used?	**04**
	(c)	Explain finite volume method (FVM) for steady one dimensional convection and diffusion problems given by, $$\frac{d}{dx}(\rho u\phi)=\frac{d}{dx}\left(\Gamma\frac{d\phi}{dx}\right)$$	**07**
		OR	
Q.4	**(a)**	What is the need of Upwind scheme?	**03**
	(b)	How does SIMPLE and SIMPLE-C differ?	**04**
	(c)	Write a note on SIMPLE-R algorithm.	**07**
Q.5	**(a)**	What is No-slip boundary condition? Explain with example.	**03**
	(b)	How step size is calculated for the flow over a flat plate?	**04**
	(c)	Write a note on Beam and Warming Method.	**07**
		OR	
Q.5	**(a)**	Explain Crank-Nicholson scheme.	**03**
	(b)	Explain Tri Diagonal Matrix Algorithm (TDMA).	**04**
	(c)	Explain FVM for One-Dimensional unsteady heat conduction problem	**07**

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