Seat No.: _____ **Enrolment No._____**

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–V (NEW) - EXAMINATION – SUMMER 2017

Subject Code: 2150104 **Date: 03/05/2017**

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.**

			MARKS
Q.1		**Short Questions**	**14**
	1	Write full form of SIMPLE.	
	2	Why guessing velocity field rather than pressure field is preferable in SIMPLE-R?	
	3	Why under-relaxation is required in case of SIMPLE?	
	4	State the disadvantage of Central difference scheme and advantage of Upwind scheme.	
	5	How would you define Characteristic Line?	
	6	How pressure and velocities are corrected in SIMPLE-R?	
	7	Larger computational efforts are required in SIMPLE-R than SIMPLE. True or False?	
	8	FVM is not more accurate than FDM. True or False?	
	9	What do you mean by Convection?	
	10	How would you define Time Marching Scheme?	
	11	Which descritization method is less time consuming?	
	12	What do you mean by Stable Solution?	
	13	What is Convergence?	
	14	FDM is very complex to set up. True or False?	
Q.2	**(a)**	Discuss problems caused due to Non-linearity and Multidimensionality while solving governing flow equations.	**03**
	(b)	What makes SIMPLE-R more efficient than SIMPLE?	**04**
	(c)	Which steps would you follow while solving a problem using SIMPLE-C method?	**07**
		OR	
	(c)	What do you mean by Boundary Condition? Explain in details.	**07**
Q.3	**(a)**	Why Upwind Schemes were developed?	**03**
	(b)	Can you compare Staggered grid with the Uniform grid? Explain.	**04**
	(c)	Solve Finite Volume Method for two dimensional diffusion problem.	**07**
		OR	
Q.3	**(a)**	Write advantages of Finite Volume Method.	**03**
	(b)	Write the difference between FDM and FVM.	**04**
	(c)	List out steps involved in SIMPLE-R algorithm.	**07**
Q.4	**(a)**	Explain Flow over a flat plate – The Physical Problem.	**03**
	(b)	Explain 1st order Upwind Scheme in detail.	**04**
	(c)	How would you differentiate SIMPLE & SIMPLE-R?	**07**

OR

Q.4	**(a)**	Calculate the step size for the case of flow over a flat plate.	**03**
	(b)	Explain the concept of 1st order Upwind Scheme in detail.	**04**
	(c)	Derive governing flow equations for flow over a flat plate.	**07**
Q.5	**(a)**	How Finite Volume Method Works? Explain in brief.	**03**
	(b)	Explain High resolution schemes.	**04**
	(c)	Why linearization is required? Explain the Beam & Warming method.	**07**

OR

Q.5	**(a)**	Explain Crank Nicolson Scheme for the FVM for unsteady heat conduction problem.	**03**
	(b)	Solve FVM for steady one dimensional convection and diffusion problem.	**04**
	(c)	What is Multidimensional Problem? How would you resolve it?	**07**

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