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

GUJARAT TECHNOLOGICAL UNIVERSITY

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

Subject Code:2150104 Date:02/05/2018

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	**(a)**	Define: Convergence, Advection and Diffusion.	**03**
	(b)	What is Finite Volume Method? Explain it with suitable diagram.	**04**
	(c)	What is Computational Fluid Dynamics? Write a note on CFD applications.	**07**
Q.2	**(a)**	Compare explicit and implicit scheme.	**03**
	(b)	Write a note on Central Differencing Scheme.	**04**
	(c)	What are the advantages and disadvantages of upwind scheme? Explain second order upwind scheme.	**07**
		OR	
	(c)	What is Boundary Condition? What are the Basic types of Boundary Conditions? Explain with a suitable diagram.	**07**
Q.3	**(a)**	For the case of supersonic flow over a flat plate, how calculation of step size is done in space and time?	**03**
	(b)	State the disadvantages of SIMPLE and Explain SIMPLER in details.	**04**
	(c)	Explain Flux vector splitting.	**07**
		OR	
Q.3	**(a)**	Explain Shock layer with a proper diagram.	**03**
	(b)	Write a note on Beam & Warming Method.	**04**
	(c)	Explain SIMPLEC in detail.	**07**
Q.4	**(a)**	Define: Control Volume, No-slip Condition and Fluid.	**03**
	(b)	Write a note on Staggered Grid.	**04**
	(c)	Explain Finite Volume Method for One dimensional Unsteady heat conduction.	**07**
		OR	
Q.4	**(a)**	Write advantages of Finite Volume Method.	**03**
	(b)	Write down the steps of SIMPLE.	**04**
	(c)	Explain PISO algorithm.	**07**
Q.5	**(a)**	Explain Crank Nicolson scheme for the FVM for unsteady heat conduction problem.	**03**
	(b)	Compare the pros and Cons of SIMPLE, SIMPLE-R and SIMPLE-C.	**04**
	(c)	Write down the governing flow equations for the problem of supersonic viscid flow over a flat plate.	**07**
		OR	
Q.5	**(a)**	Why upwind scheme is needed? Explain.	**03**
	(b)	Explain the supersonic flow over a flat plate physical problem with a neat sketch.	**04**
	(c)	Explain Finite Volume Method for Steady One dimensional convection and diffusion problem.	**07**

****