GUJARAT TECHNOLOGICAL UNIVERSITY
BE - SEMESTER–VII (NEW) EXAMINATION – WINTER 2021

Subject Code:3170109   **Date:15/12/2021**
Subject Name:Advance Computational Fluid Dynamics
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.**
4. **Simple and non-programmable scientific calculators are allowed.**

			MARKS
Q.1	**(a)**	State applications of CFD in Aerospace field.	**03**
	(b)	Explain in detail the different types of fluid flow.	**04**
	(c)	Explain the steps for CFD Preporcessing and Post Processing.	**07**
Q.2	**(a)**	What is grid transformation? Why it is required?	**03**
	(b)	Write a short note on error and stability. And define the stable equation.	**04**
	(c)	Explain the method for transformation of 2D partial differential equation into algebraic equation.	**07**
		OR	
	(c)	Discuss an implicit and Explicit approach.	**07**
Q.3	**(a)**	Explain the different boundary conditions applied to fluid flow domain.	**03**
	(b)	Explain the basic three category of boundary condition.	**04**
	(c)	Write a short note on structured and non structured grid.	**07**
		OR	
Q.3	**(a)**	Difference between the No-slip and Moving wall boundary condition.	**03**
	(b)	Enlist the factors affecting the grid.	**04**
	(c)	Explain Advancing front method for unstructured grid generation.	**07**
Q.4	**(a)**	Explain the need of mathematical behavior of governing equations in the field of Aerodynamics.	**03**
	(b)	Advantages and Disadvantages of Delalunay unstructured grid generation technique.	**04**
	(c)	What is Boundary Condition? State its importance in solving fluid flow problem.	**07**
		OR	
Q.4	**(a)**	Characteristics and Important features of Turbulent flow.	**03**
	(b)	General properties of turbulent quantities.	**04**
	(c)	Explain Advancing front method for unstructured grid generation.	**07**
Q.5	**(a)**	What is Turbulent flow?	**03**
	(b)	Advantages and Disadvantages of k-ε turbulent model.	**04**
	(c)	Explain RANS model of turbulent flow.	**07**
		OR	
Q.5	**(a)**	Explain Symmetry and Periodic Boundary condition.	**03**
	(b)	List out the necessity of turbulence modeling.	**04**
	(c)	Difference between k-ε and k-ω turbulent model.	**07**

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