Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–VII (NEW) EXAMINATION – SUMMER 2022

Subject Code:3170109 Date:08/06/2022

Subject Name:Advance Computational Fluid Dynamics

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.**
4. **Simple and non-programmable scientific calculators are allowed.**

			MARKS
Q.1	**(a)**	Explain three different approaches of fluid dynamics?	**03**
	(b)	Differentiate Uniform grid and Non-Uniform grid.	**04**
	(c)	Explain the concept of Reynolds Averaging.	**07**
Q.2	**(a)**	What is Multi Block structured grid?	**03**
	(b)	Concept of Adaptive grid.	**04**
	(c)	Why an implicit method is accurate than Explicit method for complex flow?	**07**
		OR	
	(c)	Explain the method for transformation of 2D partial differential equation into algebraic equation.	**07**
Q.3	**(a)**	Explain Symmetry boundary condition.	**03**
	(b)	Enlist the factors affecting of grid transformation.	**04**
	(c)	Explain Delalunay triangulation method for unstructured grid generation.	**07**
		OR	
Q.3	**(a)**	Explain the Eigen value method for classification of partial differential equations.	**03**
	(b)	Explain Dirichalet boundary condition with suitable example.	**04**
	(c)	Advantages over Delalunay and Advancing front unstructured grid generation technique.	**07**
Q.4	**(a)**	Define: Transition and Turbulent flow.	**03**
	(b)	Advantages and Disadvantages of $k-\omega$ turbulent model.	**04**
	(c)	What is Boundary Condition? State its importance in solving fluid flow problem.	**07**
		OR	
Q.4	**(a)**	Difference between the Free-slip and Moving wall boundary condition.	**03**
	(b)	Explain the concept of Turbulent kinetic energy and dissipation effect.	**04**
	(c)	Explain Large Eddy Simulation technique.	**07**
Q.5	**(a)**	Advantages of Reynold stress equation Models over mixing length model.	**03**
	(b)	List out the necessity of turbulence modeling.	**04**
	(c)	Explain RANS model of turbulent flow.	**07**
		OR	
Q.5	**(a)**	Characteristics and Important features of Turbulent flow.	**03**
	(b)	General properties of turbulent quantities.	**04**
	(c)	What is the step wise procedure for solving pressure based CFD problem?	**07**

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