Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

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

Subject Code:3170109 Date:10-01-2023

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)**	Define CFD in technical words.	**03**
	(b)	Write an application of CFD and Define Compressible flow.	**04**
	(c)	Explain Finite Volume method with appropriate sketch.	**07**
Q.2	**(a)**	Difference between Structured and Unstructured grid.	**03**
	(b)	Define Multi block structured grid generation.	**04**
	(c)	Explain explicit and implicit methods.	**07**
		OR	
	(c)	Derive Hyperbolic partial differential equations.	**07**
Q.3	**(a)**	What is Adaptive grid?	**03**
	(b)	Explain the constant pressure boundary condition.	**04**
	(c)	Explain symmetry boundary condition, periodic or cyclic boundary condition.	**07**
		OR	
Q.3	**(a)**	What is turbulence flow?	**03**
	(b)	Define Inlet and Outlet Boundary Condition.	**04**
	(c)	Explain with appropriate sketch "Characteristics and important features of turbulent flow".	**07**
Q.4	**(a)**	Define Reynolds Number.	**03**
	(b)	Define Turbulent flow calculations.	**04**
	(c)	Discuss "effect of turbulent fluctuations on properties of mean flow".	**07**
		OR	
Q.4	**(a)**	What do you mean by Mixing length model?	**03**
	(b)	List out different types of Turbulence model.	**04**
	(c)	Derive Reynolds average Navier stokes (RANS) equation.	**07**
Q.5	**(a)**	Importance of Eddy viscosity model in CFD field.	**03**
	(b)	What is the Necessity of turbulence modeling?	**04**
	(c)	Write a note on "κ-ε model".	**07**
		OR	
Q.5	**(a)**	How does CFD code works?	**03**
	(b)	Explain Reynolds stress model.	**04**
	(c)	Explain Pressure based solver and Density based solver.	**07**

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