Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

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

Subject Code:3161915 Date:20-12-2022

Subject Name: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)**	Define CFD.	**03**
	(b)	Explain Finite volume method shortly.	**04**
	(c)	Write a note on Experimental, Theoretical and Numerical approach in CFD.	**07**
Q.2	**(a)**	Write an application of CFD in different engineering field.	**03**
	(b)	Write a short note on Reynolds transport theorem.	**04**
	(c)	Derive Navier-Stokes equation.	**07**
		OR	
	(c)	Difference between FVM, FDM and FEM.	**07**
Q.3	**(a)**	What is Tridiagonal matrix algorithm method?	**03**
	(b)	What is Alternative Direction Implicit method?	**04**
	(c)	What is the procedure to find out “1-D steady state diffusion problem” using Finite Volume method?	**07**
		OR	
Q.3	**(a)**	List out different types of Turbulence model.	**03**
	(b)	Make a list of different types of grid. Explain any one in short.	**04**
	(c)	What is the procedure to find out “2-D steady state diffusion problem” using Finite Volume method?	**07**
Q.4	**(a)**	What is the purpose of domain or control volume in CFD problem?	**03**
	(b)	Write a note on “False diffusion”.	**04**
	(c)	List out difference types of error. Explain any one	**07**
		OR	
Q.4	**(a)**	Why Boundary condition is required to solve the problem in CFD?	**03**
	(b)	What is advection scheme? Explain	**04**
	(c)	What are the difference between First order Upwind scheme and Second order Upwind scheme? Explain in brief.	**07**
Q.5	**(a)**	Difference between One and Two equation models in turbulence modeling.	**03**
	(b)	What is PISO Algorithm?	**04**
	(c)	Write a note on SIMPLE Algorithm.	**07**
		OR	
Q.5	**(a)**	Explain Domain and boundaries for the solution of elliptic equations in two dimensions.	**03**
	(b)	Explain factors affecting the grid in numerical grid generation.	**04**
	(c)	Briefly explain Lax-Wendroff Method	**07**

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