Enrolment No./Seat No_____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–VI (NEW) EXAMINATION – SUMMER 2024

Subject Code:3161915 Date:30-05-2024

Subject Name: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.**

Q.1	**(a)**	Explain Reynolds transport theorem.	**03**
	(b)	Explain Domain and boundaries for the solution of parabolic equations in two dimensions.	**04**
	(c)	Discuss in detail Navier - Stokes equation.	**07**
Q.2	**(a)**	Define CFD? Why it is widely used as a research tool now days?	**03**
	(b)	Explain Eigen value method for determining the classification of PDEs.	**04**
	(c)	Explain finite volume central differencing scheme.	**07**
		OR	
	(c)	Derive an energy equation in non conservation form.	**07**
Q.3	**(a)**	Explain Domain and boundaries for the solution of elliptic equations in two dimensions.	**03**
	(b)	What is Grid? List out factor affecting of grid generation.	**04**
	(c)	Explain PISO algorithm.	**07**
		OR	
Q.3	**(a)**	Write a short note on Explicit approach.	**03**
	(b)	Discuss ADI scheme.	**04**
	(c)	Solve FVM problem for 1-D heat diffusion.	**07**
Q.4	**(a)**	What is Grid Transformation? Why it is required?	**03**
	(b)	Write a short note on Lax - Wendroff technique.	**04**
	(c)	Explain finite volume method for one dimensional steady state diffusion problem.	**07**
		OR	
Q.4	**(a)**	Explain RANS modeling in brief.	**03**
	(b)	Differentiate between explicit and implicit approach.	**04**
	(c)	Explain SIMPLE algorithm.	**07**
Q.5	**(a)**	Explain inlet and outlet boundary condition.	**03**
	(b)	Write a short note on structured grid.	**04**
	(c)	Discuss in detail Tridiagonal Matrix Algorithm.	**07**

OR

Q.5	**(a)**	State applications of CFD in various fields.	**03**
	(b)	Differentiate FDM, FEM and FVM.	**04**
	(c)	What is Discretization? Why it is required? List the basic discretization techniques.	**07**

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