GUJARAT TECHNOLOGICAL UNIVERSITY
BE - SEMESTER–VI (NEW) EXAMINATION – SUMMER 2022

Subject Code:3161915   **Date:16/06/2022**
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.**

			MARKS
Q.1	(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)	Derive an energy equation in non conservation form.	07
Q.2	(a)	Explain Reynolds transport theorem.	03
	(b)	Explain Domain and boundaries for the solution of parabolic equations in two dimensions.	04
	(c)	Explain finite volume central differencing scheme.	07
		OR	
	(c)	Discuss in detail Navier-Stokes equation.	07
Q.3	(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
		OR	
Q.3	(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
Q.4	(a)	Write a short note on Explicit approach.	03
	(b)	Discuss ADI scheme.	04
	(c)	Solve FVM problem for 1-D heat diffusion.	07
		OR	
Q.4	(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
Q.5	(a)	Explain RANS modeling in brief.	03
	(b)	Differentiate between explicit and implicit approach.	04
	(c)	Explain SIMPLE algorithm.	07
		OR	
Q.5	(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

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