PRN:		Course Code :	PAS202

First Year **M. Tech** End Semester Examination Winter 2024

Computational Fluid Dynamics 000467

Day and Date: Sat 30 Nov 2024 Max Marks: **100**

Time : 02:00PM To 05:00PM Duration: **03** hrs

Instructions:All questions are compulsory.

			Marks	Bloom's Level	CO
Q.1		**Attempt the following questions**			
	a)	Explain the basic equations of fluid dynamics.	08	3	1
	b)	Derive an equation for conservation of mass in fluid dynamics.	08	3	1
		OR			
	b)	Derive the Euler's equation for an in-viscid flow with no body forces acting on it.	08	3	1
Q.2		**Attempt the following question**			
	a)	Obtain the velocity potential and stream function for a two-dimensional source flow.	08	2	2
	b)	Explain the term vortex flow and find the velocity potential function and stream function.	08	2	2
		OR			
	b)	Define control volume? Write the integral and derivative forms for i. Conservation of mass ii. Conservation of energy.	08	2	2
Q.3		**Attempt any two from the following**			
	a)	Compare Explicit and Implicit approaches of CFD.	08	2	3
	b)	Comment on the methods of quality improvement of the Grid generation.	08	2	3
	c)	Differentiate between structured grid and unstructured grid using suitable example.	08	2	3
Q.4		**Attempt any two from the following**			
	a)	Write a short note on Skewness quality of a mesh	08	2	4
	b)	Explain explicit and implicit discretization techniques in detail.	08	2	4
	c)	Write a note on the finite difference method used in CFD analysis.	08	2	4
Q.5		**Attempt any two of the following**			
	a)	Explain the strong and weak formulation of a boundary value problem.	09	2	5
	b)	Write down the steps involved in the finite element method.	09	2	5
	c)	Explain the difference between FEM and FDM with suitable example.	09	2	5
Q.6		**Attempt any two of the following**			
	a)	Write a note on the finite volume method used in CFD analysis	09	3	5
	b)	Differentiate between finite volume method and finite element method with suitable example.	09	3	5
	c)	Describe Runge-Kutta Time Stepping.	09	3	5

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