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BAE/BAS702

Seventh Semester B.E./B.Tech. Degree Examination, Dec.2025/Jan.2026
Computational Fluid Dynamics

Time: 3 hrs. Max. Marks: 100

Note: 1. Answer any FIVE full questions, choosing ONE full question from each module.
2. M : Marks , L: Bloom's level , C: Course outcomes.

		Module – 1	M	L	C
Q.1	a.	Explain the applications of CFD with relevant examples.	10	L2	CO1
	b.	Derive the expression for divergence of velocity in fluid flows.	10	L3	CO1
		OR			
Q.2	a.	Differentiate between shock fitting and shock capturing techniques.	10	L2	CO1
	b.	Derive the continuity equation for a model of finite control volume fixed in space.	10	L3	CO1
		Module – 2			
Q.3	a.	Derive the classification technique for partial differential equations using Cramer's Method.	10	L3	CO1
	b.	Explain the unsteady thermal conduction equations with respect to the classification of PDE's of parabolic equations.	10	L2	CO2
		OR			
Q.4	a.	Derive the classification technique for partial difference equations using Eigen Value Method (compression with Cramer's method not required).	10	L3	CO1
	b.	Explain the classification of PDE for elliptic equations.	10	L2	CO2
		Module – 3			
Q.5	a.	Differentiate between Structured and Unstructured grids.	10	L2	CO2
	b.	Derive and explain the Lagrange interpolation method for structured grids.	10	L3	CO3
		OR			
Q.6	a.	Explain Grid Quality Parameters.	10	L2	CO2
	b.	Derive and explain the Delaunay-Voronoi diagram.	10	L3	CO3
		Module – 4			
Q.7	a.	Explain the Explicit and Implicit Methods.	10	L2	CO3
	b.	Derive an expression for reflection boundary condition.	10	L3	CO3

		OR			
Q.8	**a.**	Derive an expression for general transformation of the equations.	**10**	**L3**	**CO3**
	b.	Explain the concept of grid generation techniques.	**10**	**L2**	**CO3**
		Module – 5			
Q.9	**a.**	Explain the cell centered technique by highlighting its importance over other techniques.	**10**	**L2**	**CO4**
	b.	Explain explicit time stepping method and imply its significance.	**10**	**L2**	**CO4**
		OR			
Q.10	**a.**	Explain Cell Vertex Method and explain its key differences with all center techniques.	**10**	**L2**	**CO4**
	b.	Explain upwind scheme and highlight its importance with high resolution scheme.	**10**	**L2**	**CO4**

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