CBCS SCHEME

USN

17AE72

Seventh Semester B.E. Degree Examination, Jan./Feb. 2023
Computational Fluid Dynamics

Time: 3 hrs. Max. Marks: 100

Note: ***Answer any FIVE full questions, choosing ONE full question from each module.***

Module-1

1 a. Explain shock fitting and shock capturing methods. **(10 Marks)**
b. What are physical Boundary conditions? Explain. **(10 Marks)**

OR

2 a. Define computational fluid dynamics and mention various CFD applications. **(10 Marks)**
b. Derive continuity equation used as an Governing equations in fluid dynamics. **(10 Marks)**

Module-2

3 a. Explain Hyperbolic and Parabolic forms of equations. **(10 Marks)**
b. Explain Cramer Rule and Eigen Value methods for classification of partial differential equation. **(10 Marks)**

OR

4 a. Explain the case study of steady inviscid supersonic flow in classification of partial differential equations. **(10 Marks)**
b. Explain the impact of partial differential equation classification an unsteady thermal conduction phenomenon. **(10 Marks)**

Module-3

5 a. Brief the importance of various co-ordinate system in grid generation. **(10 Marks)**
b. Explain the need for grid generation in computational fluid dynamics. **(10 Marks)**

OR

6 a. Explain structural grids adaptive method and un structured grids adaptive methods. **(10 Marks)**
b. Write short notes on algebraic grid generation technique. **(10 Marks)**

Module-4

7 a. Explain Time marching and Space marching. **(10 Marks)**
b. Explain Reflection boundary condition and relaxation techniques. **(10 Marks)**

OR

8 a. Explain Explicit and implicit approaches of finite difference equations. **(10 Marks)**
b. Explain upwind scheme and numerical viscosity. **(10 Marks)**

Module-5

9 a. Explain Cell Centered and Cell Vertex techniques in spatial discretisation. **(10 Marks)**
b. Explain explicit time stepping and implicit time stepping in temporal descretisation. **(10 Marks)**

OR

10 a. Explain high rerolutin scheme and flux vector splitting. **(10 Marks)**
b. Explain artificial dissipation and flux limiters. **(10 Marks)**

* * * * *