CBCS SCHEME

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17AE/AS72

Seventh Semester B.E. Degree Examination, July/August 2021
Computational Fluid Dynamics

Time: 3 hrs. Max. Marks: 100

Note: Answer any FIVE full questions.

1 a. Comment on CFD and Parallel Computing. **(10 Marks)**
b. Derive an expression for continuity equation. **(10 Marks)**

2 a. Explain various application of CFD in different engineering fields. **(10 Marks)**
b. Explain shock capturing and shock fitting with neat sketches. **(10 Marks)**

3 a. Explain parabolic, hyperbolic and elliptic forms of equations. **(10 Marks)**
b. Explain Cramer Rule and Eigen Value methods for classification of partial differential equations. **(10 Marks)**

4 a. Explain the impact of partial differential equation classification on steady inviscid supersonic flow. **(10 Marks)**
b. Describe the general behaviour of the different classes of partial differential equations. **(10 Marks)**

5 a. Explain need for grid generation and body fitted coordinate system. **(10 Marks)**
b. Explain essential features of structured grid and UN-structured grid. **(10 Marks)**

6 a. Describe adaptive grids and grid quality. **(10 Marks)**
b. Explain surface grid generation and multiblock grid generation technique. **(10 Marks)**

7 a. Explain the importance of discretisation and transformation in CFD. **(10 Marks)**
b. Differentiate between explicit and implicit approach of finite difference equations. **(10 Marks)**

8 a. Explain the time marching and space marching technique. **(10 Marks)**
b. Explain the transformation of governing partial differential equations from physical domain to computation domain. **(10 Marks)**

9 a. What is finite volume scheme? Explain. **(10 Marks)**
b. Explain cell centered and cell vertex techniques. **(10 Marks)**

10 a. Explain explicit and implicit time stepping. **(10 Marks)**
b. Explain flux vector splitting and upwind biasing. **(10 Marks)**

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Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
2. Any revealing of identification, appeal to evaluator and /or equations written eg, 42+8 = 50, will be treated as malpractice.