

# CBGS SCHEME

USN

--	--	--	--	--	--	--	--	--	--

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)

\*\*\*\*\*

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.