

Code: 9A21703

B.Tech IV Year I Semester (R09) Supplementary Examinations June 2017

COMPUTATIONAL AERODYNAMICS

(Aeronautical Engineering)

Time: 3 hours

Max. Marks: 70

Answer any FIVE questions
All questions carry equal marks

- 1 (a) How CFD is helpful as a research tool, a design tool, and an educational tool in analyzing fluid dynamical problems with neat sketches?
(b) Explain the physical meaning of divergence of velocity that frequently appears in the equations of fluid dynamics.
- 2 Explain conservation and non-conservation forms of governing flow equations with illustrations from continuity equation. Comment on integral versus differential form of the governing flow equations.
- 3 (a) Explain and differentiate shock fitting and shock capturing methods with neat sketches.
(b) Write short notes on the following:
(i) Strong and weak conservation forms of governing equations.
- 4 Discuss the mathematical and physical behavior of flows governed by parabolic equations with an example of unsteady thermal conduction in two and three dimensions.
- 5 (a) Write short notes on the following properties of numerical solutions of fluid flows:
(i) Stability.
(ii) Consistency.
(iii) Accuracy.
(iv) Convergence.
(b) Explain the implicit formulation with an example.
- 6 (a) What is the difference between computational plane and physical plane?
(b) Write a short notes on transformations used in computational aerodynamics.
- 7 What are doubly connected and multiply connected domains?
- 8 Explain grid point clustering with neat sketches.
