Roll No. | | | | | | | | | | | | | Total No. of Pages : 02

Total No. of Questions : 09

B.Tech.(Aerospace Engg.) (2012 Batch) (Sem.–6)

COMPUTATIONAL FLUID DYNAMICS

Subject Code : ASPE-309

Paper ID : [72454]

Time : 3 Hrs. Max. Marks : 60

INSTRUCTIONS TO CANDIDATES :

1. **SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.**
2. **SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.**
3. **SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.**

SECTION-A

Q1 Answer briefly :

a) What are the limitations and disadvantages of using CFD?

b) What type of boundary can be used for a computational boundary that represents an open physical boundary?

c) Write the expression for energy equation and mass conservation equation for compressible flow in Cartesian coordinates.

d) What is forward difference and central difference?

e) What are the three important rules while considering iterative convergence?

f) What are some of the benefits of a well-designed grid?

g) What is turbulence?

h) Name the stages of a CFD Analysis framework.

i) What is the difference between validation and verification?

j) What is the future of CFD?

SECTION-B

Q2 What is the convergence criterion control?

Q3 Explain Finite Volume Method in detail.

Q4 Explain structured mesh in detail.

Q5 Classify partial differential equations and explain methods to solve them.

Q6 What are shock fitting and shock capturing methods?

SECTION-C

Q7 Discuss the formulation of first, second and third order upwind schemes. (10)

Q8 Explain explicit and implicit methods. (10)

Q9 a) Explain errors and analysis of stability. (4)

b) What are round-off errors? (3)

c) Which method can be used to minimize them? (3)