

Name:	
Enrolment No:	

UPES

Supplementary Examination, Dec 2023

Course: Finite Volume Methods of Conservation Laws

Semester: I

Program: M.Tech CFD

Time 03 hrs.

Course Code: ASEG7021

Max. Marks: 100

SECTION A

S. No.	Question	Marks	CO
Q 1	Define the governing equations of fluid flow and heat transfer.	4	CO1
Q 2	Compare the conservative form and non-conservative form of the governing equations of fluid flow.	4	CO1
Q 3	List various classifications of PDE in context of CFD and associated physical behavior.	4	CO2
Q 4	Discuss the significance of the finite volume method in solving diffusion problems.	4	CO2
Q 5	Emphasis on the significance of point iterative method.	4	CO3

SECTION B

Q 6	Examine the characteristics and applications of TVD schemes in the context of finite volume methods.	10	CO2
Q 7	Explain the hybrid differencing scheme and its use in solving convection–diffusion problems.	10	CO3
Q 8	Compare the advantages and disadvantages of the SIMPLE algorithms	10	CO4
Q 9	Explain the staggered grid and its importance in the solution algorithms for pressure-velocity coupling in steady flows. OR Compare the explicit and implicit schemes for solving unsteady flows, emphasizing their advantages and limitations.	10	CO4

SECTION-C

Q 10	Explain the solution algorithms for pressure-velocity coupling in steady flows, particularly focusing on the SIMPLER and PISO algorithms. Provide a comparative analysis. OR Illustrate the application of the Tridiagonal Matrix Algorithm (TDMA) to solve two-dimensional problems.	20	CO4
Q 11	Examine the solution procedures for unsteady flow calculations using the pseudo-transient approach. Illustrate with a practical example of transient convection–diffusion using QUICK differencing.	20	CO5