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Code No: B0404

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
M.Tech II Semester Supplementary Examinations March 2010
COMPUTATIONAL FLUID DYNAMICS
(CAD / CAM)

Time: 3hours **Max.Marks:60**

Answer any five questions
All questions carry equal marks
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1.a) Differentiate among forward, backward and central finite difference schemes with suitable examples?
b) Explain the Thomas Algorithm for solving the Tridiognal matrix equations.

2.a) Solve the following algebraic equations.

$5x_1 + 2x_2 + 3x_3 = 10$
$2x_2 + 3x_2 + 9x_3 = 14$
$x_1 + 2x_2 + 6x_3 = 9$

b) What are the advantages and limitations of Implicit method over Explicit method.

3. Discuss different methods to solve the Convection – diffusion terms of differential equation given below.

$$\frac{\partial}{\partial x}(\rho u\phi) = \frac{\partial}{\partial x}\left(7\frac{\partial \phi}{\partial x}\right)$$ with their limitations.

4. Derive the equation for the solution of compressible flow through 1 – D Convergent – divergent nozzle and write the step by step algorithm.

5.a) Write SIMPLER algorithm for solving the pressure and velocity terms? Enumerate the steps.
b) What is staggred grid? Explain its importance.

6.a) Explain the Vorticity method for solving 2 – D Navier stokes equation of fluid flow problems? Discuss its limitations.
b) What are different boundary value problems? Explain.

7.a) Explain the K - $\in$ model for solving the turbulence equations.
b) What are different CFD packages? Explain.

8. Write short notes on:
   a) Burgers Equation.
   b) Finite difference, finite volume and finite element methods.
   c) Eulers Equation.

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