R09

Code No: C0405

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
M.Tech I - Semester Examinations March/April-2011
NUMERICAL METHODS FOR PARTIAL DIFFERENTIAL EQUATION (CAD/CAM)

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

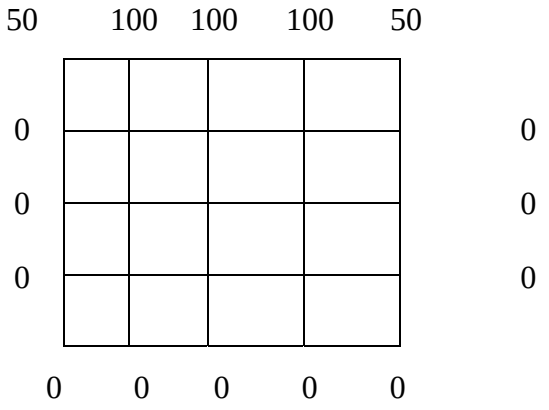
Answer any five questions
All questions carry equal marks
- - -

1. Solve the Partial Differential equation by Crank Nicolson method
$\frac{\partial u}{\partial t} - \frac{\partial^2 u}{\partial x^2} = 0, \quad 0 < x < 1, 0 < t$
Subject to the conditions
$u(0,t) = 0$, $u(x, 0) = x$, $u(1, t) = 0$. [12]

2. Solve the Partial Differential equation $u_{xx} + u_{yy} = 0$ given that
$u(x, 0.1) = 50x$, $u(0,y) = 0$, $u(x, 0) = 0$, $u(0.5, y) = 50y$. [12]

3. Solve the Partial Differential equation $u_{xx} + u_{yy} = 0$ given that
$u(x, 0) = x^2$, $0 \le x \le 1$
$u(0,y) = (y-1)^2$, $u(x, 0) = (x-1)^2$, $u(1, y) = y^2$, $0 \le y \le 2$. [12]

4. Solve $u_{xx} + u_{yy} = 0$ for



[12]

5. Solve the Partial Differential equation $16 \frac{\partial^2 u}{\partial x^2} = 0, \quad 0 < x < 1, 0 < t$
Subject to the conditions
$u(0,t) = 0$, $u(x, 0) = x(2 - x)$
$u(4, t) = 0$, taking $h = 1$. [12]

Contd……2

6. Derive five point formula by ADI method. [12]

7. Solve the boundary value problem
$y'' + y + 2x(1 - x) = 0, 0 < x < 1, y(0) = y(1) = 0$ by Galerkin method. [12]

8. Solve the boundary value problem
$y'' + 2 = 0, 0 < x < 1, y(0) = y(1) = 0$ by Galerkin method. [12]

----o0o----