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Register Number:
Name of the Candidate:

B.Sc. DEGREE EXAMINATION, May 2015

(COMPUTER SCIENCE)

(FIRST YEAR)

(PART-III)

130/140: SCIENTIFIC COMPUTING

(Common with B.Sc I.T and B.C.A)

Time: Three hours Maximum: 100 marks

Answer any FIVE questions **(5×20=100)**

1. a) Solve for a positive root of x-cos x =0 by regular falsi method. (10)

   b) Using Gauss –Seidal method, solve the following system. Start with x=1, y=2, z=3 (10)

$$x+3y+52z=173.61$$
$$x-27y+2z=71.31$$
$$41x-2y+3z=65.46$$

2. a) Apply Gauss-Jordan method, to solve the system. (10)

$$8x-3y+2z=20$$
$$4x+11y-z=33$$
$$6x+3y+12z=35$$

   b) Find the least positive root of the equation tan x = x to an accuracy of 0.0001 by Newton-Raphson method. (10)

3. a) Compute f''(0) and f ''(4) from the data. (10)

x	0	1	2	3	4
y	1	2.718	7.381	20.086	54.598

   b) Find the value of y at x=21 from the following data. (10)

x	20	23	26	29
y	0.3420	0.3907	0.4384	0.4848

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4. a) Find the First, Second and Third derivatives of f(x) at x=1.5 if, (10)

x	1.5	2.0	2.5	3.0	3.5	4.0
F(x)	3.375	7.000	13.625	24.000	38.875	59.000

b) Evaluate (10)

$$\int_0^5 \frac{dx}{4x+5}$$

by Simpson's one-third rule and hence find the value of $\log_e 5$(n=10)

5. a) Using Taylor's series method find y at x=1 .1 and 1.2 by solving, (10)

$$\frac{dy}{dx} = x^2 + y^2 \text{ given } y(1)=2.3$$

b) Find an approximate solution of the initial value problem, (10)

$y'=1+y^2$, $y(0)=0$

by Picard's method

6. a) Using Euler's method. (10)

Solve $\frac{dy}{dx} = 1+xy$ with y(0)=2

Find y(0.1), y(0.2) and y(0.3)

b) Compute y(0.1) and y(0.2) by Runge –Kutta 4th order for the differential equation. (10)

$$\frac{dy}{dx} = xy + y^2, y(0) = 1$$

7. a) Classify the equations. (10)

i) $U_{xx}+2u_{xy}+u_{yy}=0$

ii) $x^2 f_{xx}+(1-y^2)f_{yy}=0$

b) Solve, (10)

$$\frac{\partial^2 u}{\partial x^2} - 2\frac{\partial u}{\partial t} = 0$$

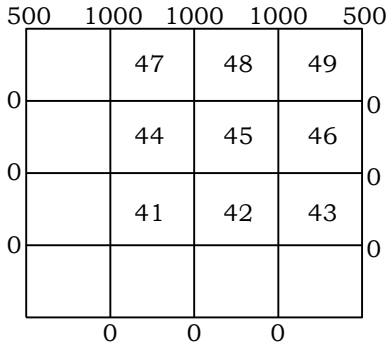
Given u(0,t)=0, u(4,t)=0

U(x,0)=x(4-x)

Assume h=1

Find the values of u up to t=5

8. a) Solve the Laplace equation at the interior points of the square region given below: (10)



b) Compare Trapezoidal rule and Simpson's 1/3 rule for evaluating numerical integration. (5)

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