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2008 SRM UNIVERSITY

B.TECH II SEMESTER DEGREE EXAMINATIONS

NUMERICAL METHODS

DECEMBER 2008

TIME:3 HOUR
MARK:100

ANSWER ALL QUESTIONS

PART-A(10*2=20 MARKS)

1.State principle of least squares.

2.Write down Newton Raphson formula.

3.Define the operators :(i)d (ii)μ.

4.Give the Newton's divided difference interpolation formula..

5.Write th e numerical integration formula using trapezoidal method.
4
6.Evaluate ? e^x dx,using simpson's 1/3rd rule.
0
e^0 = 1,e^1 = 2.72,e^2 =7.39,e^3 = 20.09,e^4 =54.6.

7.State Taylor's algorithm for the first order differential equation.

8.How many prior values are required to predict the next value in milne's method?

9.Classify the PDE xUxx + yYyy =0, x > 0,y > 0.

10.Write the crank-nicholson difference scheme to solve Uxx = aUt with u(0,t) = t0, u(l,t)=t1, , u(x,0)= f(x).

PART-B(5*16 = 80MARKS)

11.a.Fit a parabola to the following data:
x 1 2 3 4 5
y 2 3 5 8 10
(OR)
b.Solve by Gauss jacobi method
12x +4y-z =32
x +3y+10z = 24
2x +17y+4z =35

12.a. Apply Newton's backward difference formula to the data below toobtain a polynomial of degree 4.

x 1 2 3 4 5
y 1 -1 1 -1 1
(OR)
b. Use Lagrange's formula to find x when y = 85 from the following:
x 2 5 8 14
y 94.8 87.9 81.3 68.7

13.a.Find $f'(x)$ and $f''(x)$ at x = 1.1.Given
x 1 1.1 1.2 1.3 1.4 1.5 1.6
y 7.9 8.4 8.7 9.1 9.4 9.7 10.1
(OR)

b.Evaluate ? $dx/1+x^2$ using (i) simpson's 1/3 rule (ii) simpson's 3/8 ruleand compare the resultwith the exact integration.

14.a.Solve the equation dy/dx = 1- y with x =0,y = 0 using modified Euler method.Find y(0.1), y(0.2).

(OR)

b.Using Milne's predictor and corrector formula,find y(4.4) given
$5xy' + y^2 = 2$,y(4) =1, y(4.1) =1.0049, y(4.2) =1.0097 and y(4.3) =1.0143.

15.a. Solve Uxx +Uyy = 0 over the squre mesh of side 4 units, satisfying the following boundary conditions.
(i) u(0,y) = 0 for 0 = y = 4
(ii) u(4,y) = 12+y for 0 = y = 4
(iii) u(x,0) = 3x for 0 = x = 4
(iv) $u(x,4) = x^2$ for 0 =x = 4

(OR)

b.Solve the equation Ut = Uxx subject to the conditions u(x,0) = sin px, 0 =x = 1, u(0,t) = u(1,t) =0 using crank Nicholson method