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CS-71

01692

BACHELOR IN COMPUTER APPLICATIONS

Term-End Examination

June, 2011

CS-71 : COMPUTER ORIENTED NUMERICAL TECHNIQUES

Time : 3 hours *Maximum Marks : 75*

Note : *Question number* **1** *is* ***compulsory****. Attempt* ***only three*** *questions from the rest. In total, you have to answer* ***four*** *questions. Use of Calculator is permitted.*

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1. (a) Explain the loss of significant digits in subtraction of two nearly equal numbers. **5**

(b) Prove that $\mu^2 = 1 + \frac{1}{4}\delta^2$ **5**

(c) Evaluate $\int_0^1 \frac{1}{1+x^2} dx$ **5**

using Simpson's $\frac{1}{3^{rd}}$ rule taking h = $\frac{1}{4}$.

(d) Find a root of the equation **5**

$x^3 - x - 11 = 0$

correct to 4 decimals using bisection method.

(e) Find a root of the equation 5

$x^3 - 3x^2 + 7x - 8 = 0$

correct to three decimals using Newton Rapson's method.

(f) Solve the equation 5

$3x^3 - 4x^2 + x + 88 = 0,$

one root being $2 + \sqrt{7}\, i$

2. (a) Using Newton's forward interpolation formula, find y at $x = 8$ from the following table. 5

x :	0	5	10	15	20	25
y :	7	11	14	18	24	32

(b) Find a root of the equation 5

$x^3 - 4x - 9 = 0,$

correct to three decimals using Regula Falsi method.

(c) Solve the equation 5

$x^3 - 7x^2 + 36 = 0,$

given that one root is double of another.

3. (a) Find the cube root of 41, using Newton - Raphson's method. 5

(b) Apply Runge - Kutta fourth order method, to find an approximate value of y when $x = 0.2$, given that 5

$$\frac{dy}{dx} = x + y$$

and $y = 1$, when $x = 0$.

(c) Use Lagrange's interpolation formula to find y when $x = 5$ from the following data : 5

x :	0	1	3	8
y :	1	3	13	123

4. (a) Given the values 5

x :	5	7	11	13	17
$f(x)$:	150	392	1452	2366	5202

evaluate f(9) using Newton's divided difference formula.

(b) Find a root of the equation 5

$x^3 - 5x - 11 = 0$,

correct to three decimals using iteration method.

(c) Solve the following system of linear equations 5

$2x + y + z = 4$

$x + 2y + z = 4$

$x + y + 2z = 4$

by Jacobi's iteration method.

5. (a) Solve the following equations by Gauss - Seidel method. 5

$2x + y + 6z = 9$

$8x + 3y + 2z = 13$

$x + 5y + z = 7.$

(b) Solve the system of equations 5

$3x + y - z = 3$

$2x - 8y + z = -5$

$x - 2y + 9z = 8$

using Gauss - elimination method.

(c) The velocity v (km/min) of a moped which starts from rest is given at fixed intervals of time t (min) as follows : 5

t :	2	4	6	8	10	12	14	16	18	20
v :	10	18	25	29	32	20	11	5	2	0

Estimate approximately the distance covered in 20 minutes.