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CS-71

06249

BACHELOR OF COMPUTER APPLICATIONS (PRE-REVISED)

Term-End Examination

June, 2014

CS-71 : COMPUTER ORIENTED NUMERICAL TECHNIQUES

Time : 3 hours *Maximum Marks : 75*

Note : *Question number **1** is **compulsory**. Attempt **any three** from question number 2 to 5. Calculator is **allowed**.*

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1. (a) Show that $a(b-c) \neq ab-ac$ where $a = 0.5555 \times 10^1$, $b = 0.4545 \times 10^1$, $c = 0.4535 \times 10^1$ using four decimal digit arithmetic with rounding. **6x5=30**

(b) Give floating point representation of following in two decimal digits and four decimal digits with rounding 0.4861416×10^2, 2.3748, 0.0436

(c) Solve using Cramer's Rule

$$x + y + z = 7$$

$$2x + 3y + 2z = 17$$

$$4x + 9y + z = 37$$

(d) Perform three iteration to find cube root of 41 using Newton-Raphson Method.

(e) Find Lagrange Interpolating polynomial for the following :

x	2.5	3.5
$f(x)$	6	8

Also find $f(3)$?

(f) Solve the following initial value problem using Heun's method of $O(h^2)$ where $y' = -ty^2$, $y(2) = 1$ find $y(2.1)$; $h = 0.1$.

2. (a) Find real root of the equation $f(x) = x^3 - 4x - 9 = 0$ using Bisection Method in four iterations. **3x5=15**

(b) Solve the following system of equation by Gauss Elimination Method

$$54x + y + z = 110$$
$$2x + 15y + 6z = 72$$
$$-x + 6y + 27z = 85$$

(c) Find root of the equation $f(x) = x \log_{10} x - 1.2$ by Regular Falsi Method upto 4 decimal places.

3. (a) Perform three iteration using Jacobi Method for following system of equation **3x5=15**

$$\begin{bmatrix} -8 & 1 & 1 \\ 1 & -5 & -1 \\ 1 & 1 & -4 \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \\ x_3 \end{bmatrix} = \begin{bmatrix} 1 \\ 16 \\ 7 \end{bmatrix}$$

(b) Evaluate $\int_0^1 \frac{dx}{1+x^2}$ by subdividing the interval (0,1) into 6 equal parts using $\frac{1}{3}$rd Simpson's Rule.

(c) Apply Secant method to find a root of the equation $2x^3+3x^2+3x+1=0$ with initial approximations as $x_0=-0.2$, $x_1=-0.4$.

4. (a) Use Taylor Series Method to solve the equation **3x5=15**

$$y'=x^2+y^2$$

for $x=0.25$ and $x=0.5$
given that $y(0)=1$.

(b) Find Newton's Backward Difference form of interpolating polynomial for the data

x	4	6	8	10
$f(x)$	19	40	79	142

Hence interpolate $f(9)$.

(c) Evaluate $\int_0^1 \frac{dx}{1+x^2}$ by subdividing the interval (0,1) into 6 equal parts using Trapezoidal Rule.

5. (a) Find y where $x=0.1$, given that $y(0)=1$ and $y'=x^2+y$ with step length $h=0.05$ using Euler Method. **3x5=15**

(b) Given $\frac{dy}{dx}=\frac{y-x}{y+x}$, $y(0)=1$, $h=0.2$ find $y(0.2)$ upto 4 decimal places using Runge-Kutta Method of fourth order.

(c) Find value of x where $y=3$ from the following

x	4	7	10	12
y	-1	1	2	4

Using Lagranges inverse interpolation ?
