

**BACHELOR OF COMPUTER APPLICATIONS
(PRE-REVISED)****Term-End Examination****June, 2013****CS-71 : COMPUTER ORIENTED NUMERICAL
TECHNIQUES***Time : 3 hours**Maximum Marks : 75*

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

1. (a) If 0.333 is the approximate value of $\frac{1}{3}$, find 5
absolute, relative and percentage errors.
- (b) Find a root of the equation $x^3 - 4x - 9 = 0$, 5
using the bisection method correct to
4 decimals.
- (c) Solve the equation 5
 $x^4 - 2x^3 + 4x^2 + 6x - 21 = 0$ given that the
sum of two of its roots is zero.
- (d) By using the Regula-falsi method, find an 5
approximate root of the equation
 $x^4 - x - 10 = 0$, that lies between 1.8 and 2,
correct to 3 decimals.
- (e) Find the real positive root of 5
 $3x - \cos x - 1 = 0$ by Newton - Raphson
method correct to 6 decimal places.

- (f) Solve the following system of linear simultaneous algebraic equations by Cramer's Rule. 5

$$4x_1 + 3x_2 + 6x_3 = 13$$

$$2x_1 - 4x_2 + x_3 = 8$$

$$3x_1 - 2x_2 + 6x_3 = 17$$

2. (a) Using Newton-Raphson method, compute the real root of the following equation correct to four decimal places : $2x = \tan x$

- (b) Find the real positive root of $e^x - 3x = 0$ by the method of iteration correct to 3 decimal places. 3x5=15

- (c) Solve the equations

$$2x_1 + x_2 + x_3 = 10$$

$$3x_1 + 2x_2 + 3x_3 = 18$$

$$x_1 + 4x_2 + 9x_3 = 16$$

using the Gauss' elimination method.

3. (a) Using Bisection method, compute one root of $e^x - 3x = 0$, correct to two decimal places, in the interval $[1.5, 1.6]$. 3x5=15

- (b) Use Jacobi's iteration method to solve the following system of equations :

$$20x + y - 2z = 17$$

$$3x + 20y - z = -18$$

$$2x - 3y + 20z = 25$$

- (c) Using Newton's forward interpolation formula, find $f(78)$ from the following table :

x	80	85	90	95	100
f	5026	5674	6362	7088	7854

4. (a) Using Regula - Falsi method, compute the real root of the equation $xe^x = 2$ in $(0.8, 0.9)$ correct to four decimal places. $3 \times 5 = 15$
- (b) Solve the following equations by Gauss-seidel method.

$$6x - 3y + z = 11$$

$$2x + y - 8z = -15$$

$$x - 7y + z = 10$$

- (c) Use Lagrange's interpolation formula to find $f(4)$ from the following data :

x	1	2	3	5
f	0	7	26	124

5. (a) Apply Newton - Raphson method to find an approximate root, correct to three decimal places of the equation $x^3 - 3x - 5 = 0$ which lies near $x = 2$. $3 \times 5 = 15$

(b) Evaluation $I = \int_0^1 \frac{1}{1+x^2} dx$ with $h = \frac{1}{6}$ by

Simpson's $\frac{1}{3}$ rule, Hence find out the value of π .

(c) Use Runge - kutta method to approximate y , when $x=0.1$ and $x=0.2$, given that $x=0$, when $y=1$ and $\frac{dy}{dx} = x + y$.
