

2012

Bachelor of Computer Application

Third Semester

BCA-16-304: Computer Oriented Numerical Methods

Time allowed: 3 Hours

Max. Marks: 65

NOTE: Attempt five questions in all, including Question No. 9 (Section -E) which is compulsory and selecting one question each from Section A-D.

x-x-x

Section – A

- 1) Write short notes for: (i) Floating point numbers storage. (ii) Measure of accuracy. (iii) Error propagation in addition and subtraction operation. (4+4+5=13)
- 2) (i) Differentiate between 1's and 2's complement. (ii) What is 2's complement of -40? (iii) How many significant digits in 0.7452 and 0.007452? (4+4+5=13)

Section – B

- 3) (i) Find the root of equation $x^3 - x - 4 = 0$, correct to three decimal places using Newton-Raphson method. (9+4=13)
- (ii) Discuss convergence of iterative methods.
- 4) (i) Solve the following system of equations using Gauss elimination method,
 $2x_1 + 3x_2 + 5x_3 = 23$; $3x_1 + 4x_2 + x_3 = 14$; $6x_1 + 7x_2 + 2x_3 = 26$ (9+4=13)
- (ii) What is concept of pivoting?

Section – C

- 5) (i) Given the following table,

x	0.25	0.50	0.75	1.00	1.25
$f(x)$	0.11	0.42	1.00	1.05	2.25

Find $f'(0.5)$ using Newton forward interpolation.

- (ii) What is numerical integration? (9+4=13)

- 6) Solve following using Trapezoidal and Simpson's 1/3rd methods:

x	1.0	1.2	1.4	1.6	1.8
$f(x)$	4.0152	4.3530	5.0436	6.3891	8.0250

(7+6=13)

Section – D

- 7) (i) Solve following using modified Euler's (predictor corrector) method:

Find $y(1)$ for $y' = -2xy^2$, $y(0) = 1$ with step length 0.2

- (ii) What is Chebyshev polynomials? (10+3=13)

- 8) (i) Given $y' + 2y = x^3 e^{-2x}$ with $y(0) = 1$. Find the solution using Runge-Kutta method at $x = 0.1$ using step size $h = 0.1$

- (ii) What is Taylor series representation? (10+3=13)

P.T.O.

(2)

Section - E

- 9) i) What are relative and percentage errors?
ii) What is convergence role in numerical methods?
iii) What is inverse interpolation?
iv) How Euler and modified Euler method different?

(3+3+3+4=13)

X-X-X