(i) Printed Pages : 4]

(ii) Questions : 9]

Roll No. .....

Sub. Code : 0 9 3 1

Exam. Code : 0 0 2 9

Bachelor of Computer Application
3rd Semester Examination

1127

COMPUTER ORIENTED NUMERICAL METHODS

Paper : BCA–16–304

Time : 3 Hours] [Max. Marks : 65

Note :– Attempt *five* questions in all, including Question No. **9** in Section E which is compulsory and taking *one* question each from Section–A to Section–D.

Section–A

1. (a) How to store floating point numbers in memory ? Give example. 6

(b) What do you understand by significant Digits ? How to compute error ? What is the relationship between relative error and significant digits ? 7

2. (a) What are different types of errors ? How error is propagated in addition and subtraction operations ? 6

(b) Discuss consequences of normalization. 7

Section–B

3. (a) Solve the following non-linear equation using Birge-Vieta method :

$$x^3 - x^2 - x + 1 = 0$$ 6

(b) Derive equation for False Position method and discuss its convergence. 7

4. (a) How to solve a set of simultaneous linear equations using Gauss Elimination Method with Pivoting ? Explain with the help of example. 6

(b) Solve the following set of equations using Gauss Jordan method :

$$2x_1 + 3x_2 + 4x_3 = 20$$

$$4x_1 + 2x_2 + 3x_3 = 17$$

$$x_1 + 4x_2 + 2x_3 = 17$$ 7

Section–C

5. (a) What are finite differences ? How to find forward, backward, divided differences and the difference tables ? 6

(b) Derive Newton's Backward Difference Interpolation Formula. 7

6. (a) Derive formula for Simpson's 1/3th rule. 6

(b) Find integral of $f(x)$ for the following points using Trapezoidal rule and Simpson's 3/8th rule :

	y
0.1	1.01
0.2	1.04
0.3	1.09
0.4	1.16
0.5	1.25
0.6	1.36
0.7	1.49
0.8	1.64
0.9	1.81

7

Section–D

7. (a) How to approximate a function using Taylor series representation ? Give example. 6

   (b) What is an ordinary differential equation ? How is it different from partial differential equation ? What do you understand by order and degree of a differential equation ? Explain the concepts with the help of suitable examples. 7

8. Discuss Runge-Kutta 2nd and 4th order methods. Solve the following differential equation using both the methods and analyze the results :

$$dy/dx = 3x + y \text{ for } 0.1 <= x <= 0.5$$

Given that $y = 0$ when $x = 0$ and $h = 0.1$. 13

Section–E

Compulsory Question

9. (a) What is Round-off Error ? Give example. 2

   (b) When to terminate an iterative procedure ? 2

   (c) What do you understand by exact and approximate numbers ? Give example. 2

   (d) What do you understand by convergence of a method ? 2

   (e) What are predictor corrector methods ? Give example. 2

   (f) What is Interpolation and Inverse Interpolation ? Give example. 3