(i) Printed Pages : 3 Roll No. .....

(ii) Questions : 9 Sub. Code : 0 9 3 1

Exam. Code : 0 0 2 9

Bachelor of Computer Applications 3rd Semester

1128

COMPUTER ORIENTED NUMERICAL METHODS

Paper : BCA-16-304

Time Allowed : Three Hours] **[Maximum Marks : 65**

Note :– (1) Attempt **five** questions in all, including Q-9 in Unit-V, which is compulsory and taking **one** question each from Unit-I to Unit-IV.

(2) Use of only Non-programmable and Non-storage type of calculator is allowed. Log tables are allowed.

UNIT—I

1. (a) Discuss various representations used to store integers in memory. 6

(b) What do you understand by Normalization ? Discuss the consequences of normalization. 7

2. (a) What is Error ? How to measure the accuracy of the results ? 6

(b) How error propagates in Addition, Subtraction, Multiplication and Division operations ? 7

UNIT—II

3. (a) How to obtain solution to a non-linear equation ? How to choose in initial approximation while using iterative procedure ? How to terminate an iterative procedure ? 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

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

(b) Derive equation for Newton Raphson method and discuss its convergence. 7

UNIT—III

5. (a) Derive formula for Newton's Forward difference interpolation. 6

(b) For the given table of values, find x(0.39) using Lagrangian interpolation. 7

x	20	25	30	35
y(x)	0.34	0.42	0.5	0.65

6. (a) Derive formula for Newton's Backward difference interpolation. 6

(b) What are the rules for applying Simpson's 1/3rd rule and Simpson's 3/8th rule ? Find integral of f(x) for given points using Simpson's 3/8th rule.

	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0
y	1	1.04	1.09	1.1	1.2	1.3	1.4	1.6	1.8	2.0

7

UNIT—IV

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

   (b) Using Modified Euler's method, find the solution of the following differential equation for x = 1.1, 1.2 and 1.3. Given that y = 1 when x = 1.

   $dy/dx = x + y^2$ 7

8. (a) Express the following as polynomials :

   - $5T_0(x) + 2T_1(x) + 4T_2(x) + 8T_3(x)$
   - $T_0(x) + 2T_1(x) + 4T_2(x)$. 6

   (b) Using Euler method, find solution of the following differential equation for x = 0.1 to 0.5. It is given that y = 0 when x = 0 and h = 0.1

   $dy/dx = 3x + y$ 7

UNIT—V

9. (a) What is a symmetric matrix ? 2

   (b) What is the relationship between relative error and significant digits ? 2

   (c) What is the use of Pivoting ? 2

   (d) How a Predictor corrector method works ? 2

   (e) What are inherent errors ? 2

   (f) Why is Numerical integration required ? 3