Bachelor of Computer Applications 3rd semester

Paper-BCA-16-304 :

Computer Oriented Numerical Methods

Time : 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-Ito 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.
   (b) What do you understand by Normalization? Discuss the consequences of normalization.
2. (a) What is Error ? How to measure the accuracy of the results ?
   (b) How error propagates in Addition, Subtraction, Multiplication and Division operations?

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

$$2x_1 + 3x_2 + 4x_3 = 20$$
$$4x_1 + 2x_2 + 3x_3 = 17$$
$$X_1 + 4x_2 + 2x_3 = 17$$

4. (a) How to solve a set of simultaneous linear equations using Gauss Seidal Method? Explain with the help of example.
   (b) Derive equation for Newton Raphson method and discuss its convergence.

UNIT-III

5. (a) Derive formula for Newton's Forward difference interpolation.
   (b) For the given table of values, find x(0.39) using Lagrangian interpolation,

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
   (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.

x	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

UNIT-IV

7. (a) How to approximate a function using Taylor series representation ? Give example.
   (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.
   $dy/dx = x+y^2$
8. (a) Express the following polynomials:
   - $5T_0(x)+2T_1(x)+4T_2(x)+8T_3(x)$
   - $T_o(x)+2T_1(x)+4T_2(x)$.
   (b) Using Euler method, find solution of the following differentia equation for x=0.1 to 0.5. It is given that y=0 when x=0 and hou. $dy/dx = 3x + y$

UNIT-V

9. (a) What is a symmetric matrix?
   (b) What is the relationship between relative error and significant digits?
   (c) What is the use of Pivoting?
   (d) How a Predictor corrector method works?
   (e) What are inherent errors?
   (f) Why is Numerical integration required?