Total No. of Questions : 8] | Total No. of Printed Pages : 4

Paper Code : 21311

F-411

B.C.A. (Third Semester) Examination, 2021-22

(New Course)

Paper - BCA-301-N

Computer Oriented Numerical Analysis

Time : Three Hours] *[Maximum Marks : 70*

Note : Attempt any **five** questions. **All** questions carry equal marks.

1. (a) Discuss the comparison of Newton Raphson with Regula Falsi method.

   (b) Using Lagrange's interpolation formula express $(x^2+6x-1)/(x-1)(x-4)(x-6)$ as a sum of partial fractions.

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

   (b) Write an algorithm to fit a regression line of Y on X by least squares.

3. (a) Given 2 1 $dy/dx=1+y^2$, with $y(0)=0$, $y(0.2)=0.20274$, $y(0.4)=0.4228$ and $y(0.6)=0.6841$. Compute $y(0.8)$ using predictor-corrector method.

   (b) Obtain a relation of the form $y=ab^x$ for the data.

X	2	3	4	5	6
Y	8.3	15.4	33.1	65.2	126.4

   By method of least squares

4. What is the difference between direct method and iterative method of find solution of non-linear equations?

5. (a) State the following two formulae for interpolation (i) Bessel's Formula (ii) Newton's forward difference Formula.

(b) Derive formula for Newton's Forward difference interpolation.

6. (a) Obtain the smallest positive root of the equation $x^3-5x+1=0$, by using three iterations of bisection method.

(b) For solving a system of linear equations.

$a_{11}x_1+a_{12}\ x_2+a_{13}x_3=b_1$;

$a_{21}\ x_1+a_{22}\ x_2+a_{23}x_3=b_2$

and

$a_{31}\ x_1+a_{32}\ x_2+a_{33}x_3=b_3$,

by iterative Gauss–Jacobi Method, with initial approximations, $x_1 = 0 = x_2 = x_3$ give formulas for next approximations of x_1, x_2 and x_3.

7. (a) Using Euler's method, tabulate the solution of the Initial Value Problem (IVP) $y'= -3ty^2$, $y(0) = 1$ in the interval [0, 1], using $h = 0–2$.

(b) Explain Simpson's one-third rule.

8. (a) If $f(0) = 8$, $f(1) = 68$ and $f(5) = 123$, construct a divided difference table.

(b) Difference between Lagrange Interpolation and Difference tables.

(c) give formula for trapezoidal rule.

(d) Derive dy/dx and d^2y/dx^2 from Stirling formula.

(e) Explain polynomial regression of order 2 with example?

(f) Explain the concept of pivoting.

(g) What are the various ranges of coefficient of correlation? Explain with their name.