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

Paper Code : 21311

F-411

B.C.A. (Third Semester)

Examination, 2021

(New Course)

Paper No. 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) Define absolute, relative and percentage errors. An appropriate value of π is given by 3.1428571 and its true value is 3.1415926. Find the absolute and relative errors.

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(b) Find the real root of $x^3-2x-1=0$ between 1 and 2 by bisection method. Compute five iterations.

2. (a) Use Newton-Raphson method to find a root of the equation $x^3-3x-5=0$.

(b) Find the cube root of 18 correct upto three decimal places by Regula Falsi method.

3. (a) Evaluate $\int_0^6 \frac{1}{1+x^2}$ by Simpson's 1/3rd rule by dividing the interval into 6 parts.

(b) Evaluate $\int_3^7 x^2 \log x \, dx$ taking 4 strips by Simpson's 3/8th rule.

4. (a) Use Lagrange's formula to find f(6) from the following table

x	2	5	7	10	12
f(x)	18	180	448	1210	2028

(b) The population (in thousands) of a town in the years 1931, ..., 1971 are as follows :

Year	1931	1941	1951	1961	1971
Population	15	20	27	39	52

Find the population of the town in 1965 by applying Newton's backward formula.

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5. (a) Apply Laplace-Everett's formula to obtain the value of y_{25}, given that : $y_{20}=2854$, $y_{24}=3162$, $y_{28}=3544$, $y_{32}=3992$.

(b) Evaluate sin(0.197) using Stirling's formula from the data given below :

x	sin x
0.15	0.14944
0.17	0.16918
0.19	0.18886
0.21	0.20846
0.23	0.22798

6. (a) Explain the derivation of Lines on Regression.

(b) Solve the following :

(i) Prove that $(1+\Delta)(1-\nabla)=1$.

(ii) Prove that $E=(1-\nabla)^{-1}$.

7. (a) Use Picard's method to obtain y for x=0.1. Given that : $\frac{dy}{dx} = x - y^2$; y=1 at x=0.

(b) Use the Runge-Kutta Method to approximate y for x=0.5 to x=1 using h=0.5 given that x=0 when y=1 and $\frac{dy}{dx} = \frac{1}{x+y}$.

8. (a) Use the Taylor's method to solve the equation $y'=x^2+y^2$ for x=0.25 given y(0)=1.

(b) Write short notes on the following :

(i) Relative Frequency and Cumulative Frequency.

(ii) A discrete variable and a continuous variable.