A (Printed Pages 4)

(20222) Roll No. .....

BCA-V Sem.

18024 (CV-III)

B.C.A. Examination, Dec.-2021

Numerical Methods

(BCA-504)

Time : 1½ Hours] *[Maximum Marks : 75*

Note : Attempt questions from **all** Sections as per instructions. Calculator is allowed.

Section-A

(Very Short Answer Questions)

Note : Attempt any **two** questions. Each question carries **7.5** marks.

$2 \times 7.5 = 15$

1. Find a root of the eq $f(x) = x^3 - 4x - 9 = 0$ using the bisection method in four iterations.
2. Find the form of the function from following given data:

x :	0	1	2	3	4
f(x):	3	6	11	18	27

P.T.O.

3. Evaluate $\int_0^6 \frac{dx}{1+x^2}$ by Trapezoidal Rule.
4. Use Euler's Method with h=0.1 to find the solution of $\frac{dy}{dx} = x^2 + y^2$, $y(0)=0$ in the range $0 \le x \le 0.5$
5. Solve by Gauss-elimination method.

   $2x+y+4z=12$

   $8x-3y+2z=23$

   $4x+11y-z=33$

Section-B

(Short Answer Questions)

Note : Attempt any **one** question out of the following three questions. Each question carries **15** marks. $1 \times 15 = 15$

6. By means of Newton's divided difference formula find the value of f(8) and f(15) from the following table.

x:	4	5	7	10	11	13
f(x):	48	100	294	900	1210	2028

7. From the given table. Find $\frac{dy}{dx}$ at x=1.2.

x	y
1.0	2.7183
1.2	3.3201
1.4	4.0552
1.6	4.9530
1.8	6.0496
2.0	7.3891

8. Using Picard's method of successive approximation obtain a solution upto fourth approximation of the equation.

$\frac{dy}{dx} = y + x, y(0) = 1$

Section-C

(Detailed Answer Questions)

Note : Attempt any **two** questions out of the following five questions. Each question carries **22.5** marks.

 $2 \times 22.5 = 45$

9. Find a real root of the equation $x^3 - x^2 - 2 = 0$ by False Position Method.

10. Interpolate by mean of Gauss's formula the population for the year 1936, given the following table.

Year (x)	Population (y) (in thousand)
1901	12
1911	15
1921	20
1931	27
1941	39
1951	52

11. Find the value of the integral $\int_0^1 \frac{dx}{1+x}$ by using Simpson's $\frac{1}{3}$ and $\frac{3}{8}$ rule.

12. Using Runge-Kutta method of fourth order solve $\frac{dy}{dx} = \frac{y^2 - x^2}{y^2 + x^2}$ with $y(0)=1$ at $x=0.2, 0.4$.

13. Find the solution of the system by Gauss-Seidel Method.

$83x + 11y - 4z = 95$

$7x + 52y + 13z = 104$

$3x + 8y + 29z = 71$