A

(21222)
BCA-V Sem.

(Printed Pages 4)

Roll No. ....

18024

B.C.A. Examination, Dec. 2022

Numerical Methods

(BCA-503)

Time : Three Hours]   [Maximum Marks :75

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

Section - A

(Very Short Answer Questions)

Note : Attempt **all** questions. Each question carries **3** marks. $3 \times 5 = 15$

1. Obtain a real root of the equation $f(x) = x^3 - x - 1 = 0$ using bisection method correct to three decimal places..

2. Define forward difference. Make forward difference table for the following ordered pairs. : (x_0, y_0), (x_1, y_1), (x_2, y_2), (x_3, y_3), (x_4, y_4), (x_5, y_5), (x_6, y_6).

P.T.O.

3. Find the value of $\frac{dy}{dx}$ at $x = 2.2$ for the following ordered pairs :

    (1.0, 2.7183), (1.2, 3.3201), (1.4, 4.0552), (1.6, 4.9530), (1.8, 6.0496), (2.0, 7.3891), (2.2, 9.0250).

4. Solve the following system of linear equations using Gaurs elimination method. :

    $2x + y + z = 10$

    $3x + 2y + 3z = 18$

    $x + 4y + 9z = 16$

5. Solve the equation $\frac{dy}{dx} = x + y^2$, $y = 1$ when $x = 0$ using picard's method.

Section - B

(Short Answer Questions)

Note : Attempt any **two** questions out of the following three questions. Each question carries **7.5** marks. $7.5 \times 2 = 15$

18024/2

6. Find a real root of the equation :

   $f(x) = x^3 - 2x - 5 = 0$ using method of false position.

7. Find the missing term in the following table.

X	Y
0	
1	3
2	9
3	—
4	81

8. Evaluate $I = \int_0^{\Pi/2} \sqrt{\sin x}\ dx$ using Simpson's $\frac{1}{3}$ rule with $h = \frac{\Pi}{12}$

Section - C

(Detailed Answer Questions)

Note : Attempt any **three** questions out of the following **five** question Each question carries **15** marks.

$3 \times 15 = 45$

9. Use Newton-Raphson method to find a real root of the equation $4e^{-x} \sin x - 1 = 0$ correct to 3 decimal places, given that the root lies between 0 and 0.5

10. Using Lagrange's inter polation formula, find the form of the function $y(x)$ from the following table.

x	0	1	3	4
y	-12	0	12	24

11. Use simpson's $\frac{3}{8}$-rule to evaluate $\int_0^1 \frac{1}{1+x} dx$ with $n = \frac{1}{6}$

12. Solve the system of linear equations given below by Gauss's siedel Iterative method

    $10x + 2y + z = 9$

    $2x + 20y - 2z = -44$

    $-2x + 3y + 10z = 22$

13. Using fourth - order Ranga - Kutta method find $y(0.2)$ and $y(0.4)$ correct to four decimal places, given $\frac{dy}{dx}$ $1 + y2$ where $y(0) = 0$

18024/3

P.T.O.

18024/4