

Section—C

(Long Answer Type Questions)

Note : Attempt any two questions. Each question carries 12 marks.

6. Find the value of x when $x^3 - 6x + 4 = 0$ by Newton-Raphson method.

7. Solve the following system of equations by using Gauss elimination method :

$$2x + y + z = 10$$

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

$$x + 4y + 9z = 16$$

8. Using Runge-Kutta method find $y(1)$ and $y(2)$ correct to 4 decimal places.

Given :

$$\frac{dy}{dx} = y - x$$

with $y(0) = 2$.

9. Find the first derivatives of the function tabulated below at the point $x = 1.1$:

x	$f(x)$
1	0
1.2	0.128
1.4	0.544
1.6	1.296
1.8	2.432
2.0	4.00

BCA-504(N)

2,500

Roll No. 0802508

File
05/12/20

BCA-504(N)

B. C. A. (Fifth Semester)

EXAMINATION, Nov./Dec., 2018

(New Course)

Paper Fourth

NUMERICAL METHODS

Time : Three Hours]

[Maximum Marks : 75

Note : Attempt questions from all Sections as directed.

Inst. : The candidates are required to answer only in serial order. If there are many parts of a question, answer them in continuation.

Section—A

(Short Answer Type Questions)

Note : Attempt all questions from this Section. Each question carries 3 marks.

1. (A) Prove that :

$$D = \frac{1}{n} \left(\nabla + \frac{\nabla^2}{3} + \frac{\nabla^3}{3} + \dots \right)$$

(B) Find the function whose first difference is e^x .

- (C) Find the form of the function from the following table :

x	y
3	6
5	24
7	58
9	108
11	174

- (D) Show that n th order divided difference $f(x_0, x_1, x_2, \dots, x_n)$ for the function $f(x) = \frac{1}{x}$ is equal to $\frac{(-1)^n}{x_0, x_1, x_2, \dots, x_n}$.

- (E) Explain Gauss-Siedel's method for solving linear equation.

- (F) Define Descartes' rule for sign.

- (G) Find the derivate of $f(x)$ at $x = .4$ from the following table :

x	f(x)
0.1	1.10517
0.2	1.22140
0.3	1.34986
0.4	1.49182

- (H) Evaluate $\int_0^6 \frac{dx}{1+x^2}$ using Simpson's $\frac{1}{3}$ rule.

- (I) Explain Bisection method for finding root of the equation.

Section—B

(Long Answer Type Questions)

Note : Attempt any two questions. Each question carries 12 marks.

2. Using Lagrange's interpolation formula, find the polynomial form of the function $f(x)$ tabulated as below :

x	f(x)
0	2
1	3
2	12
5	147

3. Apply Bessel's interpolation formula to find a polynomial :

x	f(x)
2	7
3	9
4	12
5	16

4. Given $\sin 45^\circ = 0.7071$, $\sin 50^\circ = 0.7660$, $\sin 55^\circ = 0.8192$, $\sin 60^\circ = 0.8660$. Find $\sin 52^\circ$.
5. Using Euler's method, find an appropriate value of y corresponding to $x = 1$. Given $\frac{dy}{dx} = x + y$ and $y = 1$ when $x = 0$.