

S.No. : 523

BCA 2402

No. of Printed Pages : 05

Following Paper ID and Roll No. to be filled in your Answer Book.

PAPER ID : 21117

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BCA Examination 2021-22

(Even Semester)

NUMERICAL & STATISTICAL TECHNIQUES

Time : Three Hours]

[Maximum Marks : 60

Note :- Attempt all questions.

SECTION – A

1. Attempt all parts of the following : $8 \times 1 = 8$
- (a) Define round off errors.
 - (b) What do you understand by the significant digits?
 - (c) Define absolute error.
 - (d) Explain ill conditioned systems.
 - (e) Define median.

[P. T. O.

- (f) Define frequency curve.
- (g) Define mean for discrete series.
- (h) What do you understand by interpolation?

SECTION – B

2. Attempt any two parts of the following : $2 \times 6 = 12$

- (a) Perform three iterations of bisection method to obtain the smallest positive root of the equation :

$$f(x) = x^3 - 5x + 1 = 0$$

- (b) Apply Gauss-Seidal iteration method to solve the following equations :

$$20x + y - 2z = 17$$

$$3x + 20y - z = -18$$

$$2x - 3y + 20z = 25$$

- (c) Explain graphical representation of a frequency distribution.
- (d) Tabulate the forward difference for given data :

x	1	2	3	4	5	6	7	8
y	1	8	27	64	125	216	343	515

SECTION - C

Note :- Attempt all questions. Attempt any two parts from each questions. $5 \times 8 = 40$

3. (a) Add the following floating point numbers :

(i) .4546 E5 and .5433 E5

(ii) .4546 E3 and .5433 E7

(b) Find the real root of the equation

$$f(x) = x^3 - x - 1 = 0$$

by bisection method (upto 4th approximation).

(c) Use the false position formula repeatedly and obtain roots of the following equation :

$$4x^3 - 2x - 6 = 0$$

4. (a) Solve the following system by Gauss elimination method :

$$x + 4y - z = -5$$

$$x + y - 6z = -12$$

$$3x - y - z = 4$$

[P. T. O.]

- (b) Apply Gauss-Jordan's method to solve the equations :

$$x + y + z = 9$$

$$2x - 3y + 4z = 13$$

$$3x + 4y + 5z = 40$$

- (c) Solve the following equations by Jacobi method (upto 4th approximation) :

$$20x + y - 2z = 17$$

$$3x + 20y - z = -18$$

$$2x - 3y + 20z = 25$$

5. (a) Use Trapezoidal rule to evaluate :

$$\int_0^1 x^3 dx$$

- (b) Define and explain Boole's rule.
(c) Given :

$$y' = x^2 - y, y(0) = 1$$

Find $y(0.1)$, $y(0.2)$ using Runge-Kutta method of second order.

6. (a) Fit a straight line to the following data :

x	1	2	3	4	5
y	5	7	9	10	11

- (b) Define arithmetic mean, geometric mean and harmonic mean.
- (c) Explain different frequency chart.
