

✓ S.No. : 379

BCA 2402

No. of Printed Pages : 05

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

PAPER ID : 21117

Roll
No.

--	--	--	--	--	--	--	--	--	--

BCA Examination 2018-2019

(Even Semester)

NUMERICAL AND STATISTICAL TECHNIQUES

Time : Three Hours]

[Maximum Marks :60

Note :- Attempt all questions.

SECTION - A

1. Attempt all parts.

$$8 \times 1 = 8$$

- What is error? Write the general formula for finding out the error.
- Add the floating point numbers 0.4245E5 and 0.3535E4.
- What is order of convergence of Newton Raphson method.
- Gauss Elimination method reduces augmented matrix into which form?

[P. T. O.]

- (e) What is the relation between the operators E and Δ .
- (f) In Newton Cote's quadrature formula putting $n=3$, which method of numerical integration is derived?
- (g) Find the Airthmatic mean of the following distribution :
- 27, 33, 49, 61, 76, 54, 65, 85
- (h) Explain the difference between Histogram and frequency polygon.

SECTION - B

2. Attempt any two parts : $2 \times 6=12$
- (a) Find the smallest positive root of the equation $x.e^x - \cos x = 0$ using bisection method correct to 3 decimal places.
- (b) Solve the following system of Linear equations by Gauss Jacobi Method.

$$8x - y + z = 18$$

$$2x + 5y - 2z = 3$$

$$x + y - 3z = -16$$

(c) A rod is rotating in a plane. The following table gives the angle (θ) through which the rod has turned for various values of time (t). Find the angular velocity and angular acceleration at $t=0.6$ sec.

t	0	0.2	0.4	0.6	0.8	1.0	1.2
θ	0	0.122	0.493	0.123	2.022	3.2	4.61

- (d) Find the curve of best fit of the type $y = ae^{bx}$ to the following data.

x	1	5	7	9	12
y	10	15	12	15	21

SECTION - C

3. Attempt any two parts : $2 \times 5=10$
- (a) In case of normalized floating point representation associative and distributive laws are not always valid. Give example to prove this statement. *0.75365*
- (b) Round off the number 75365 to four significant digits and calculate absolute, relative and percentage errors.

/P.T.O.

(c) Find the smallest root of the equation $x \cdot \log_{10} x = 1.2$ using regula-falsi method.

4. Attempt any two parts: $2 \times 5 = 10$

(a) Solve the following system of equations using Gauss elimination method.

$$10x + y + z = 12$$

$$x + 10y - z = 10$$

$$x - 2y + 10z = 9$$

(b) Use Stirling's formula to find Y_{35} , given that $Y_{20} = 512, Y_{30} = 439, Y_{40} = 346, Y_{50} = 243$.

(c) Find cubic Lagrange's interpolating polynomial from the following data.

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

5. Attempt any two parts: $2 \times 5 = 10$

(a) Find $f'(6.5)$ and $f''(6.5)$ from the following data.

x	4.5	5	5.5	6	6.5	7
y	9.69	12.9	16.71	21.18	26.37	32.37

(b) Evaluate $\int_0^3 \cos x dx$ by Trapezoidal Rule and Simpson's 1/3 rule.

(c) Find $y(0.1)$ and $y(0.2)$ using second order Runge-Kutta method, Give that

$$\frac{dy}{dx} = y - x, y(0) = 2$$

6. Attempt any two parts: $2 \times 5 = 10$

(a) By the method of least squares, find the straight line that best fits the following data.

x	1	2	3	4	5
y	14	27	40	55	68

(b) Find the mean deviation about median of the following data:

15, 25, 35, 12, 14, 9, 18, 20

(c) Calculate the median of the following data:

AnnualSales	< 10	< 20	< 30	< 40	< 50	< 60
Frequency	4	20	35	55	62	67