(b) Solve by Gauss Jordan method
$x + y + z + w = 2$; $2x - y + 2z - w = -5$;
$3x + 2y + 3z + 4w = 7$ and
$x - 2y - 3z + 2w = 5$.

18. (a) If $y' = -y$, $y(0) = 1$ find $y(0.01)$, $y(0.02)$ and $y(0.04)$ by Euler method.

Or

(b) Using Runge - Kutta of fourth order find $y(0.2)$ given $y' = x + y$, $y(0) = 1$.

19. (a) Derive the m.g.f. of Poisson distribution and find the recurrence relation for its moments.

Or

(b) Find the m.g.f. of normal distribution and hence find its β, γ coefficient.

20. (a) Find the coefficient of correlation.

x:	57	59	62	63	64	65	55	58	57
y:	113	117	126	126	130	129	111	116	112

Or

(b) Find the regression equation of y on x.

x:	46	42	44	40	43	41	45
y:	40	38	36	35	39	37	41

S.No. 4198 **NSRCAY 1**

(For candidates admitted from 2003–2004 onwards)

B.C.A. DEGREE EXAMINATION, NOVEMBER 2023.

Part III — Allied

NUMERICAL AND STATISTICAL METHODS

Time : Three hours Maximum : 100 marks

SECTION A — ($10 \times 2 = 20$)

Answer ALL questions.

1. Define transcendental equation.

2. When to use bisection method?

3. Write Newtons backward interpolation formula.

4. Under what condition simultaneous linear equation can be solved by Gauss Jacobi method.

5. Define difference equation.

6. Write predictor formula.

7. Define variance.

8. What is the moment generating function of a binomial distribution?

9. When do we say that the correlation is perfect and positive?

10. Write the relation between regression coefficients and correlation.

SECTION B — (5 × 6 = 30)

Answer ALL questions.

11. (a) Explain Regula Falsi method to find the roots of transcendental equations.

Or

(b) Solve $x^3 - x - 1 = 0$ by bisection method what to three decimal planes.

12. (a) Find y where $x = 32$ by Newtons method

x:	20	25	30	35	40
y:	33	29.5	26.6	23.5	20.5

Or

(b) Using Lagrange's method find $y(2)$.

x:	1	3	4	7
y:	10	15	20	24

13. (a) Solve $y_{n+2} - 4y_{n+1} + 3y_n = 2^n + 3^n$.

Or

(b) Evaluate $\int_0^6 \frac{dx}{1+x}$ by Simpson's one third rule.

14. (a) Find the recurrence relation for the moments of Binomial distribution.

Or

(b) For the exponential distribution $f(x) = \frac{1}{\sigma} e^{x/\sigma}$, $0 < x < \infty$, $\sigma > 0$ find the mean and variance.

15. (a) Find the correlation coefficient.

X:	64	65	66	67	68	69	70
Y:	66	67	65	68	70	68	72

Or

(b) Write the difference between correlation and regression.

SECTION C — (5 × 10 = 50)

Answer ALL questions.

16. (a) Solve $x^3 = 2x + 5$ by iteration method.

Or

(b) Solve $x^3 = 6x - 4$ using Newton - Raphson method between 0 and 1.

17. (a) Solve by Gauss elimination method $3x + 4y + 5z = 18$; $2x - y + 8z = 13$; $5x - 2y + 7z = 20$.

Or