

(FOR THE CANDIDATES ADMITTED
DURING THE ACADEMIC YEAR 2025-26 ONLY)

SUBJECT CODE

25UBC1A1

REG.NO. :

B.C.A
SEMESTER I

N.G.M.COLLEGE (AUTONOMOUS) : POLLACHI
END-OF-SEMESTER EXAMINATIONS : NOVEMBER-2025

MAXIMUM MARKS: 75
TIME : 3 HOURS

PART – III

**MATHEMATICS-I : COMPUTER ORIENTED NUMERICAL AND STATISTICAL
METHODS**

SECTION – A

(10 X 1 = 10 MARKS)

ANSWER THE FOLLOWING QUESTIONS.

MULTIPLE CHOICE QUESTIONS.

(K1)

- Which of the following methods has linear rate of convergence?
(a) Regular false (b) Bisection (c) Iteration (d) Newton-Raphson
- When Gauss elimination method is used to solve _____, A is transformed to an upper triangular matrix.
(a) $AX = B$ (b) $AX = I$ (c) A (d) $|A - \lambda x| = I$
- The backward difference operator ∇ is defined as _____
(a) $\nabla y_n = y_n - y_{n-1}$ (b) $\nabla y_n = y_n + y_{n-1}$ (c) $\nabla y_n = y_{n-2} - y_{n-1}$ (d) None of these
- If $\gamma = +1$ the variable are _____.
(a) Perfect (b) perfect and positive (c) perfect and negative (d) uncorrelated
- Correlation coefficient is the _____ mean between the regression coefficients.
(a) Arithmetic (b) Geometric (c) Harmonic (d) all

ANSWER THE FOLLOWING IN ONE (OR) TWO SENTENCES.

(K2)

- Write the formula of Newton-Raphson's method.
- When does the Gauss elimination method fail?
- Write the formula for Newton's backward difference formula.
- Write types of correlation
- Write the uses of regression analysis

SECTION – B

(5 X 5 = 25 MARKS)

ANSWER EITHER (a) OR (b) IN EACH OF THE FOLLOWING QUESTIONS. (K3)

11. a) Solve $x^3 = 2x + 5$ for the positive root by iteration method.

(OR)

- b) Find the smallest positive root of $x^2 - \log_e x - 12 = 0$ by Regula-Falsi method.

12. a) Solve the following system of equations using Gauss seidel iteration method.

$$10x + 2y + z = 9; \quad x + 10y - z = -22; \quad -2x + 3y + 10z = 22$$

(OR)

- b) Solve the following system of equations using Gauss elimination method.

$$2x + y + z = 10; \quad 3x + 2y + 3z = 18; \quad x + 4y + 9z = 16.$$

13. a) Compute the value of y at x=28 from the following data

x	20	23	26	29
y	0.3420	0.3907	0.4384	0.4848

(OR)

- b) Compute the value of f(43) up to three decimal places from the following table using Newton's forward interpolation formula.

x	40	50	60	70	80	90
y=f(x)	184	204	226	250	276	304

- 14.a) Calculate the rank correlation coefficient for the following data:

X	68	64	75	50	64	80	75	40	55	64
Y	62	58	68	45	81	60	68	48	50	70

(OR)

- b) Calculate coefficient of correlation from the following data:

X	12	9	8	10	11	13	7
Y	14	8	6	9	11	12	3

15. a) Calculate the coefficient of correlation and obtain the lines of regression for the following

X	1	2	3	4	5	6	7	8	9
Y	9	8	10	12	11	13	14	16	15

Obtain an estimate of Y which should correspond to the average $X=6.2$.

(OR)

- b) Discuss the comparison of correlation and regression.

SECTION – C (5 X 8 = 40 MARKS)**ANSWER EITHER (a) OR (b) IN EACH OF THE FOLLOWING QUESTIONS.****(K4 (Or) K5)**

16. a) Find the positive root of
- $x^3 - x = 1$
- correct to four decimal places by bisection .

(OR)

- b) Evaluate the roots of the equation
- $x^3 - 3x + 1 = 0$
- has a root between 1 and 2 to three places of decimals.

17. a) Solve the following system of equations by Gauss Jordan method

$$5x - 2y + 3z = 18; \quad x + 7y - 3z = -22; \quad 2x - y + 6z = 22$$

(OR)

- b) Solve the following system of equations by Gauss Jacobi method

$$28x + 4y - z = 32; \quad 3 + 3y + 10z = 24; \quad 2x + 17y + 4z = 35$$

- 18.a) The population of a town is as follows

Year x	1941	1951	1961	1971	1981	1991
Populations in lakhs y	20	24	29	36	46	51

Estimate the populations increase during the period 1946 to 1976

(OR)

- b) Evaluate
- $\int_0^1 \frac{dx}{1+x}$
- using (i) Trapezoidal rule (ii) Simpson's one-third rule (iii) Simpson's three-eight rule (here
- $h=0.6$
-).

- 19.a) Ten competitors in a beauty contest are ranked by three judges in the following order

1st judge	1	6	5	10	3	2	4	9	7	8
2 nd judge	3	5	8	4	7	10	2	1	6	9
3 rd judge	6	4	9	8	1	2	3	10	5	7

Use the rank correlation coefficient to determine which pair of judges has the nearest approach to common tastes in beauty?

(OR)

- b) Calculate the coefficient of correlation and obtain the lines of regression for the following

X	1	2	3	4	5	6	7	8	9
Y	9	8	10	12	11	13	14	16	15

Obtain an estimate of Y which should correspond to the average $X=6.2$.

- 20.a) Calculate The two regression equations from the following data.

X	10	12	13	12	16	15
Y	40	38	43	45	37	43

(OR)

- b) Obtain the equations of the lines of regression for the data

X	65	66	67	67	68	69	70	72
Y	67	68	65	68	72	72	69	71

Also obtain the estimate of X for $Y=70$.