

(FOR THE CANDIDATES ADMITTED
DURING THE ACADEMIC YEAR 2022 ONLY)

22UBC1A1

REG.NO. :

N.G.M.COLLEGE (AUTONOMOUS) : POLLACHI

END-OF-SEMESTER EXAMINATIONS : DECEMBER-2022

COURSE NAME: B.C.A

MAXIMUM MARKS: 50

SEMESTER I

TIME : 3 HOURS

PART - III

COMPUTER ORIENTED NUMERICAL AND STATISTICAL METHODS

SECTION – A

(10 X 1 = 10 MARKS)

ANSWER THE FOLLOWING QUESTIONS.

MULTIPLE CHOICE QUESTIONS.

(K1)

- The Bisection method is also known as _____.
a) Binary Chopping
b) Quaternary Chopping
c) Tri region Chopping
d) Hex region Chopping
- Solve the equations using Gauss Jordan method _____.
$$x + 2y + 6z = 44$$
$$3x + 4y + z = 52$$
$$6x - y - z = 38$$

a) $x = 8, y = 4, z = 6$
b) $x = 8, y = 6, z = 4$
c) $x = 4, y = 8, z = 6$
d) $x = 8, y = 6, z = 2$
- Trapezoidal formula is also known as _____.
a) Simpson's rule
b) Co-ordinate method
c) Prismoidal method
d) Average end area method
- Pearson's correlation coefficient = _____ (S represents standard deviation).
a) $(S_x, S_y) / \text{Covariance}(x,y)$
b) $\text{Covariance}^2(x,y) / (S_x, S_y)$
c) $(S_x, S_y)^2 / \text{Covariance}(x,y)$
d) $\text{Covariance}(x,y) / (S_x, S_y)$
- Who introduced the term 'regression'?
a) Karl Pearson
b) R.A Fischer
c) Francis Galton
d) Croxton and Cowden

ANSWER THE FOLLOWING IN ONE (OR) TWO SENTENCES.

(K2)

- Define Horner's Method.
- Mention the limitation of Gauss-Seidel method.
- What are Simpson's 1/3rd rule?
- What do you mean by correlation coefficients?
- What are the properties of regression model?

SECTION – B

(5 X 3 = 15 MARKS)

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

- 11.a) Use the method of false position to find the root of the equation
 $x^3 - 18 = 0$ after three steps correct to three decimal places.

(OR)

- b) Find the four decimal places, the root of the equation $x^3 - 3x + 1 = 0$ that lie between 0 and 1.

(CONTD.....2)

- 12.a) Solve the system of equation by Gauss Elimination method.

$$x + 2y + z = 3, 2x + 3y + 3z = 10, 3x - y + 2z = 13$$

(OR)

- b) Solve the system of equation by Gauss -Seidel method.

$$8x - 3y + 2z = 20, 4x + 11y - z = 33, 6x + 3y + 12z = 35$$

13. a) Evaluate $\int_0^1 \frac{dx}{1+x^2}$ by Trapezoidal rule with $h=0.2$

(OR)

- b) Evaluate $\int_0^1 e^x dx$ by Simpson's 1/3 rule correct to three decimal places with $h=0.1$

14. a) Calculate the co-efficient of correlation between x and y for the following data:

x	10	12	13	16	17	20	25
Y	19	22	26	27	29	33	37

(OR)

- b) Find the rank correlation for the following data:

x	92	89	87	86	86	77	71	63	53	50
Y	86	83	91	77	68	85	52	82	37	57

15. a) The following information is given:

Co-efficient of correlation between x and y is $\frac{8}{15}$

Find i) the regression coefficient of y on x

ii) the regression equation of x on y

(OR)

- b) Find the regression line y on x for the following data.

x	1	3	5	7	9
y	15	18	21	23	22

SECTION – C

(5 X 5 = 25 MARKS)

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

(K4 (Or) K5)

16. a) Find a root of an equation $f(x) = x^3 - x - 1$ using Newton Raphson Method.

(OR)

- b) Find the root of the following polynomial function using the Bisection Method $x^2 - 5$

17. a) Using Gauss Elimination method solve

$$3x + 4y + 5z = 18, 2x - y + 8z = 13, 5x - 2y + 7z = 20$$

(OR)

- b) Solve the system of equations

$$10x - 2y - z - w = 3, -2x + 10y - z - w = 15, -x - y + 10z - 2w = 27, \\ -x - y - 2z + 10w = -9 \text{ Using Gauss-Seidel method.}$$

18. a) By dividing the range into ten equal parts, evaluate $\int_0^{\pi} \sin x \, dx$ by Trapezoidal and Simpson's one-third rule. Verify your answer with integration.

(OR)

- b) Evaluate $\int_{-3}^3 x^4 \, dx$ using Simpson's one-third rule and Simpson's three-eighth rule.

19. a) Fit a straight line trend equation by the method of least squares.

year	1960	1962	1963	1964	1965	1966	1969
value	140	144	160	152	168	176	180

Find the trend value of the missing year 1961.

(OR)

- b) Find the Karl Pearson's co-efficient of the following data.

X	43	44	46	40	44	45	42	38	40	42	57
Y	29	31	19	18	27	27	29	41	30	26	10

- 20.a) Find the equation of regression lines for the following data:

X	25	28	35	32	36	36	29	38	34	32
Y	43	46	49	41	36	32	31	30	33	39

(OR)

- b) For two variables X and Y the equation of the regression lines are $9Y - X - 288 = 0$ and $X - 4Y + 38 = 0$ find
- The mean value of X and y
 - The co-efficient of correlation between X and Y.
 - The ratio of the SD of Y to that of X.
 - The most probable value of Y when $X=145$.
 - The most probable value of when $Y=35$.
