

65223

**Second Semester B.C.A. Degree Examination,  
September/October 2021**

(CBCS Scheme)

**Computer Science**

**NUMERICAL AND STATISTICAL METHODS**

Time : 3 Hours]

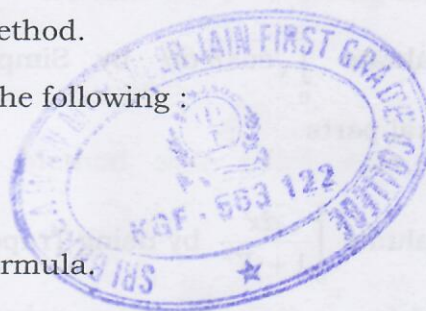
[Max. Marks : 100

Instructions to Candidates : Answer All Sections.

SECTION - A

I. Answer any **TEN** questions of the following : (10 × 2 = 20)

1. Multiply  $0.5543E 12 \times 0.4111E - 15$ .
2. Define Relative and Absolute Error.
3. Write the formula for Newton's Raphson Method.
4. Construct the forward difference table for the following :  
X: 1 2 3 4 5  
f(X) : 10 26 58 112 194
5. Write the Newton's forward interpolation formula.
6. Write the Simpson's  $\frac{3^{th}}{8}$  Rule formula.
7. Explain Gauss Elimination Method for solving system of linear equations.
8. Calculate the Arithmetic Mean from the following data :  
40, 50, 55, 78, 58, 60, 73, 35, 43, 48.
9. Find the coefficient of variation given that mean is 39.5 and standard deviation is 9.58.
10. Define Conditional Probability.
11. Write the Alternative formula to calculate Karl Pearson's coefficient of correlation.
12. From a pack of 52 cards, what is the probability of drawing one card that it is either king or queen?



## SECTION - B

II. Answer any **SIX** questions of the following :

(6 × 5 = 30)

13. Find a real root of the equation  $X^3 - 2X - 5 = 0$  using Bisection method in five iterations. (5)

14. Find a polynomial of degree two which taken the values. (5)

$$X: \quad 0 \quad 1 \quad 2 \quad 3 \quad 4 \quad 5 \quad 6 \quad 7$$

$$f(X): 1 \quad 2 \quad 4 \quad 7 \quad 11 \quad 16 \quad 22 \quad 29$$

15. Using Lagrange's interpolation formula find  $f(10)$  from the following data : (5)

$$X: \quad 5 \quad 6 \quad 9 \quad 11$$

$$f(X): 12 \quad 13 \quad 14 \quad 16$$

16. Evaluate  $\int_0^{\frac{\pi}{2}} \sqrt{\cos \theta} d\theta$  by Simpson's  $\frac{1^{rd}}{3}$  rule by dividing  $\left[0, \frac{\pi}{2}\right]$  into six equal parts. (5)

17. Evaluate  $\int_0^6 \frac{dx}{1+X^2}$  by using Trapezoidal Rule by taking  $h=1$ . (5)

18. Solve the system of Linear Equations by Crout's LU decomposition method : (5)

$$2X_1 + 3X_2 + X_3 = -1$$

$$5X_1 + X_2 + X_3 = 9$$

$$3X_1 + 2X_2 + 4X_3 = 11.$$

19. Solve the system of equations by Gauss Seidal method : (5)

$$10X + Y + Z = 12$$

$$2X + 10Y + Z = 13$$

$$2X + 2Y + 10Z = 14.$$

20. Determine the machine representation of the decimal number 52.234375. (5)

## SECTION - C

III. Answer any **SIX** questions of the following : (6 × 5 = 30)

21. Solve the system of equations by Gauss Elimination Method : (5)

$$X + Y + Z = 9$$

$$X - 2Y + 3Z = 8$$

$$2X + Y - Z = 3.$$

22. Solve the system of equations by Gauss Jacobi's Method : (5)

$$10X + 2Y + Z = 9$$

$$X + 10Y - Z = -22$$

$$-2X + 3Y + 10Z = 22.$$

23. Find largest Eigen value and corresponding Eigen vector of  $A = \begin{bmatrix} 5 & 4 \\ 1 & 2 \end{bmatrix}$  by power method. Do only five iterations. (5)

24. Use Taylor's Series Method to find  $Y$  at  $X = 1.1$  and  $1.2$  considering terms upto third degree given  $\frac{dy}{dx} = x + y$  and  $y(1) = 0$ . (5)

25. Solve  $\frac{dy}{dx} = Y - X^2$ ,  $Y(0) = 1$  by Picard's Method upto third approximation. Hence find  $Y(0.2)$ . (5)

26. By using Runge-Kutta Method of fourth order, solve  $\frac{dy}{dx} = 3X + \frac{Y}{2}$  with  $Y(0) = 1$  by taking  $h = 0.2$ . (5)

27. Find the Geometric Mean from the following data : (5)

C.I : 20 - 30 30 - 40 40 - 50 50 - 60 60 - 70

f : 5 13 7 11 4

28. State and prove Bayes Theorem. (5)

## SECTION - D

IV. Answer any **FOUR** questions of the following : (4 × 5 = 20)

29. Find the co-efficient of correlation for the following data : (5)

X: 92 89 87 86 83 77 71 63 53 50

Y: 86 83 91 77 68 85 52 82 37 57

30. Find the Karl Pearson's coefficient of Skewness from the following data : (5)

$X$ : 3 4 5 6 7 8 9 10

$f$ : 7 10 14 35 102 136 43 8

31. Find the Median for the following data : (5)

$C.I.$  : 5 - 10 10 - 15 15 - 20 20 - 25 25 - 30 30 - 35 35 - 40 40 - 45 45 - 50

$f$  : 7 15 24 31 42 30 26 15 10

32. Find the Probability that a family of 4 children there will be

(a) atleast one boy

(b) atleast one boy and one girl.

Assume that probability of male birth is  $\frac{1}{2}$ . (5)

33. Show that the following distribution represents a discrete probability distribution. Find its mean and variance : (5)

$X_i$  : 10 20 30 40

$P(X_i)$  :  $\frac{1}{8}$   $\frac{3}{8}$   $\frac{3}{8}$   $\frac{1}{8}$

34. Obtain the function of the normal probability curve to the following data : (5)

$X_i$ : 5 6 7 8 9 10 11

$f_i$ : 2 5 8 12 7 4 3