



CB – 476

17

II Semester B.C.A. Examination, August/September 2023
(CBCS) (Repeaters) (2014 – 15 and Onwards)
COMPUTER APPLICATIONS
BCA 205 : Numerical and Statistical Methods

Time : 3 Hours

Max. Marks : 100

Instruction : Answer all the Sections.

SECTION – A



(10×2=20)

I. Answer any ten of the following :

- 1) Define Roundoff Error.
- 2) Write the formula for secant method.
- 3) Write the Langrange's interpolation method.
- 4) Write the formula for Newton's Raphson method.
- 5) Construct a forward difference table for the following data :

X	0	1	2	3	4
Y	8	11	9	15	6

- 6) Write the Simpson's $\left(\frac{1}{3}\right)^{\text{rd}}$ formula.
- 7) Write the Newton's Backward interpolation method.
- 8) Explain Gauss-elimination method for system of linear equation.
- 9) Find the geometric mean of the following series 16, 625, 256, 81.
- 10) Find the median of the following data 10, 15, 9, 25, 19.
- 11) Write the alternate formula for Karl Pearson's coefficient of correlation.
- 12) Define conditional probability.

SECTION – B

II. Answer any six of the following :

(6×5=30)

- 13) Find the root of the equation $x^3 - 7x + 5 = 0$ by using bisection method in 6 stages.

P.T.O.



- 14) Estimate $f(7.5)$ from the table :

x	1	2	3	4	5	6	7	8
f(x)	1	8	27	64	125	216	343	512

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

x	5	6	9	11
f(x)	12	13	14	16

- 16) Evaluate $\int_0^6 \frac{dx}{1+x^2}$ by Trapezoidal rule.

- 17) Evaluate $\int_0^6 \frac{dx}{1+x}$ by Simpson's $\left(\frac{3}{8}\right)^{\text{th}}$ rule.

- 18) Solve by Gauss-Jacobi method $x + 2y + z = 3$, $2x + 3y + 3z = 3$, $3x - y + 2z = 13$.

- 19) Solve the system of equation by Crout's LU decomposition method.

$$x_1 + x_2 + x_3 = 1, \quad 4x_1 + 3x_2 - x_3 = 6, \quad 3x_1 + 5x_2 + 3x_3 = 4.$$

- 20) Determine the machine representation of the decimal number 492.234375 in both single precision and double precision.

SECTION - C

- III. Answer **any six** of the following :

(6×5=30)

- 21) Solve the system of equation by Gauss elimination method.

$$x + y + z = 9, \quad 2x + y - z = 0, \quad 2x + 5y + 7z = 52$$

- 22) Solve by Gauss-Seidal method $10x + y + z = 12$, $x + 10y + z = 12$,
 $x + y + 10z = 12$.

- 23) Find the largest eigen value of the matrix $A = \begin{bmatrix} 5 & 4 \\ 1 & 2 \end{bmatrix}$.

- 24) Solve $\frac{dy}{dx} = x^2 + y^2$, $y(0) = 1$ by Picard's method.

- 25) Using Taylor's series find the solution of $x \frac{dy}{dx} = x - y$, $y(2) = 2$ at $x = 2.1$ correct to five decimal places.



26) Solve $\frac{dy}{dx} = x + y$ with initial condition $y = 1$ when $x = 0$ when $x = 0.2$ using Runge Kutta method.

27) Find the mean from the following method by shortcut method.

Marks	30	40	50	60	70	80
No. of Students	8	12	20	10	6	4

28) Compute Harmonic mean of the following series :

x	6	7	8	9	10	11
f	4	6	9	5	2	8

SECTION - D

IV. Answer any four of the following :

(4x5=20)

29) Compute the standard deviation of the following data :

X	43	48	65	57	31	60	37	48	78	54
----------	----	----	----	----	----	----	----	----	----	----

30) Calculate Karl Pearson's coefficient of correlation between the age and weight of the children.

Age	1	2	3	4	5
Weight (kg)	3	4	6	7	12

31) Calculate the rank correlation of the following :

x	4	2	7	5	3	1	8	6
y	8	3	6	5	1	2	7	4

32) State and prove Baye's theorem.

33) Find the probability that in a family of 4 children there will be

i) Atleast one boy

ii) Atleast one boy and atleast one girl.

34) A die is thrown twice and the sum of the number appearing is observed to be 6. What is the conditional probability that the number 4 has appeared at least once ?
