

C.U.SHAH UNIVERSITY

Winter Examination-2022

Subject Name: Computer Oriented Numerical Methods

Subject Code: 4CS02ICN2

Branch: B.Sc.I.T.

Semester: 2

Date: 20/09/2022

Time: 11:00 To 02:00

Marks: 70

Instructions:

- (1) Use of Programmable calculator & any other electronic instrument is prohibited.
- (2) Instructions written on main answer book are strictly to be obeyed.
- (3) Draw neat diagrams and figures (if necessary) at right places.
- (4) Assume suitable data if needed.

Q-1

Attempt the following questions:

(14)

- a) If $A = \begin{bmatrix} 2 & 5 \\ 1 & 2 \end{bmatrix}$ then $A^{-1} =$ _____ (01)
- (a) $\begin{bmatrix} 2 & -5 \\ -1 & 2 \end{bmatrix}$ (b) $\begin{bmatrix} 2 & 5 \\ -1 & 2 \end{bmatrix}$ (c) $\begin{bmatrix} 5 & -2 \\ -2 & 1 \end{bmatrix}$ (d) $\begin{bmatrix} 5 & 2 \\ 2 & 1 \end{bmatrix}$
- b) If $A^T = -A$, then the matrix A is known as _____ (01)
- (a) Symmetric matrix (b) Diagonal matrix
(c) Scalar matrix (d) Skew-Symmetric matrix
- c) If $A = \begin{bmatrix} 2 & 1 \\ 1 & 3 \end{bmatrix}$ then $adj(A) =$ _____ (01)
- (a) $\begin{bmatrix} 3 & 1 \\ -1 & 2 \end{bmatrix}$ (b) $\begin{bmatrix} 2 & -1 \\ -1 & 3 \end{bmatrix}$ (c) $\begin{bmatrix} 3 & -1 \\ -1 & 2 \end{bmatrix}$ (d) $\begin{bmatrix} 4 & -1 \\ -3 & 1 \end{bmatrix}$
- d) Solution of the linear equations $x + 3y = 4$ & $3x + y = 4$ is _____ (01)
- (a) (1, -1) (b) (-1, -1) (c) (1,1) (d) (2,2)
- e) If $x = 2$ and $y = 2$ is solution of the linear equations $2x + 3y = k$, then value $k =$ _____ (01)
- (a) 10 (b) 11 (c) 12 (d) 13
- f) $y_2 - 2y_1 + y_0 =$ _____ (01)
- (a) $\Delta^2 y_1$ (b) $\Delta^2 y_0$ (c) $\Delta^2 y_2$ (d) All
- g) The value of $\Delta^2 y_0$ from the following data is _____ (01)
- | | | | | |
|---|---|---|---|---|
| x | 1 | 2 | 3 | 4 |
| y | 1 | 2 | 3 | 4 |
- (a) 1 (b) 2 (c) 0 (d) 3
- h) The root of the equation $x^2 - 2x + 1$ lies in? (01)
- (a) (1,3) (b) (2,3) (c) (-1,2) (d) All
- i) _____ is The root of the equation $x^2 - 5x + 6$. (01)
- (a) -2 (b) -3 (c) 2 (d) 4
- j) Define: Upper triangular matrix. (01)
- k) Define: Skew- Symmetric matrix. (01)
- l) Solve the linear equations $x + y = 2$ and $2x + 3y = 5$. (01)
- m) If $(x, y) = (2, -2)$ is solution of $kx + y = 2$ then find value of k. (01)



n) Find the root of the equation $x^2 - 6x + 9 = 0$ (01)

Attempt any four questions from Q-2 to Q-8

Q-2 Attempt all Questions (14)

a) If $A = \begin{bmatrix} 1 & 0 & 4 \\ 2 & -3 & -1 \\ 1 & 2 & 1 \end{bmatrix}$ then find $Adj(A)$. (05)

b) If $A = \begin{bmatrix} 1 & 3 & -4 \\ 3 & 4 & 0 \\ -1 & 4 & 2 \end{bmatrix}$ and $B = \begin{bmatrix} 1 & 2 & 3 \\ -1 & -2 & -3 \\ 0 & 0 & 1 \end{bmatrix}$ then find AB and BA . (05)

c) If $A = \begin{bmatrix} 1 & 1 & -1 \\ 1 & -3 & 9 \\ 1 & 3 & -4 \end{bmatrix}$ then find A^{-1} . (04)

Q-3 Attempt all Questions (14)

a) Solve system of linear equations by using Gauss-elimination method (05)
 $3x + y - z = 3$, $x - 2y + 9z = 8$, $2x - 8y + z = -5$

b) Solve system of linear equations by using Gauss-Jordan elimination method (05)
 $10x + y + z = 12$, $2x + 10y + z = 13$, $x + y + 5z = 7$

c) Solve the linear equations by using Gauss-elimination method (04)
 $3x - 4y = -1$ and $5x + y = 29$.

Q-4 Attempt all Questions (14)

a) Construct a forward difference table of the following data and find the value $\Delta^2 y_2, \Delta^3 y_1$. (05)

x	0	1	2	3	4
y	10	15	20	25	30

b) Find the value of $y(2)$ and $y(4)$ by using Newton's forward interpolation formula for the following data. (05)

x	1	3	5	7
y	3	14	19	21

c) Construct a backward difference table of the following data. (04)

x	8	10	12	14	16
Y	100	190	325	540	896

Q-5 Attempt all Questions (14)

a) Find the root of the equation $x^3 - x - 11 = 0$ correct to four decimal places using Bisection method. (05)

b) Find the root of the equation $x^3 + 2x^2 + 10x - 20 = 0$ correct to four decimal places using Newton Raphson method. (05)

c) Find the root of the equation $x^3 - 4x - 9 = 0$ correct to four decimal places using method of False Position. (04)

Q-6 Attempt all questions (14)

a) Evaluate $\int_0^{10} \frac{dx}{1+x^2}$ by using Trapezoidal rule. (05)

b) Solve $\frac{dy}{dx} = 1 - y$, $y(0) = 0$ and $h = 0.1$ in the range $0 \leq x \leq 0.3$ using Euler's method. (05)

c) Evaluate $\int_0^{10} \frac{dx}{1+x^2}$ by using Simpson's 1/3 rule. (04)



Q-7

Attempt all questions

(14)

a) If $A = \begin{bmatrix} 1 & 0 & 4 \\ 3 & 2 & 1 \\ 4 & 4 & 4 \end{bmatrix}$ and $B = \begin{bmatrix} 3 & 1 & 2 \\ 7 & 0 & 5 \\ 2 & 2 & -2 \end{bmatrix}$ then find a matrix C such that $2A + C = B$. (05)

b) If $A = \begin{bmatrix} 1 & 4 & 9 \\ 4 & 5 & 6 \end{bmatrix}$ and $B = \begin{bmatrix} 1 & 4 \\ 4 & 5 \\ 9 & 6 \end{bmatrix}$ then find AB . (05)

c) If $A = \begin{bmatrix} 1 & 5 \\ 0 & 1 \end{bmatrix}$ then find A^{-1} and $Adj(A)$. (04)

Q-8

Attempt all questions

(14)

a) Find the root of the equation $x^3 - 2x - 5 = 0$ correct to four decimal places using method of False Position. (05)

b) Solve the linear equations by using Gauss-elimination method $3x - 4y = -1$ and $5x + y = 29$. (05)

c) Tabulate the forward difference table for the following data.

x	1	2	3	4	5	6	7
y	1	8	27	64	125	216	343

(04)

