

MCQ1: The following x-y data is given The Newton's divided difference second order polynomial for the above data is given by $f_2(x) = b_0 + b_1x + b_2x^2$
 Answer: -1.0480

MCQ2: The next iterative value of the root of $x^2 - 4 = 0$ is $\hat{x}_{i+1}$... using the Newton-Raphson method with the initial guess is 3.
 Answer: 1.5

MCQ3: Given the table below the divided differences interpolation polynomial $P(x)$ is $\hat{x}_{i+1}$..
 Answer: $x^3 - x + 4$

MCQ4: Given that $m = 12E12 + E - \hat{A}^{12}$ and $d = E \&$
 Answer: $1 + \hat{a}^{22}$

MCQ5: The eigenvalues of the matrix 329751361719 are obtained by solving the cubic equation $\hat{x}_{i+1}$..
 Answer: $\hat{I} \gg 3 - 27 \hat{I} \gg 2 + 167 \hat{I} \gg -285$

MCQ6: The polynomial that passes through the following x-y data is given by $8.125x^2 - 324.75x + 3237$, $\hat{A}^{18} \hat{\alpha}_{00} \hat{\alpha}_{10} \hat{\alpha}_{20} \hat{\alpha}_{30}$ The corresponding polynomial using Newton's divided difference polynomial is given by $\hat{I} \&$ msu
 Answer: 0.2500

MCQ7: $\hat{x}_{i+1} \hat{\alpha}_{i+1} \hat{\alpha}_{i+2} \hat{\alpha}_{i+3} \hat{\alpha}_{i+4} \hat{\alpha}_{i+5}$ is used to denote the process of finding the values inside the interval x_0, x_n
 Answer: Interpolation

MCQ8: Lagrange's interpolation formula is used when computing data of $\hat{x}_{i+1} \hat{\alpha}_{i+1} \hat{\alpha}_{i+2} \hat{\alpha}_{i+3} \hat{\alpha}_{i+4}$ intervals.
 Answer: Equal

MCQ9: Find the Taylor polynomial of $f(x) = \ln \hat{\alpha}_{ij} x$ about $x_0 = 1$.
 Answer: $x - 1 + x - 122 + x - 133$

MCQ10: Using Gauss-Seidel method, solve the system of equations $8111 - 5111 - 4x_1 \&$ m
 Answer: -0.1255

MCQ11: If the determinant of a square matrix A is zero, then matrix A is called.....
 Answer: Zero matrix

MCQ12: The Newton-Raphson method of finding roots of nonlinear equations falls under the category of $\hat{x}_{i+1} \hat{\alpha}_{i+1} \hat{\alpha}_{i+2} \hat{\alpha}_{i+3} \hat{\alpha}_{i+4} \hat{\alpha}_{i+5}$ methods
 Answer: Bracketing

MCQ13: Expression of $\hat{a}^{\pm 3f1}$ as a backward difference is $\hat{x}_{i+1} \hat{\alpha}_{i+1} \hat{\alpha}_{i+2} \hat{\alpha}_{i+3} \hat{\alpha}_{i+4} \hat{\alpha}_{i+5}$
 Answer: $\hat{a}^{\pm 3f4}$

MCQ14: If $A=23-1102$ and $B=11224$

Answer: 9

MCQ15: errors are caused by using approximate formula in computation.

Answer: Inherent

MCQ16: The Newton Raphson method is also called

Answer: Bolzano's Bisection method

MCQ17: If $fx=0$ has a root between a and b then $f(a)$ and $f(b)$ are of signs.

Answer: Opposite

MCQ18: If A is a singular matrix, then

Answer: 1 is an eigenvalue of the matrix A

MCQ19: The Lagrange polynomial that passes through the 3 data points is given

by $2x=L_0x+L_1x$

Answer: -0.071430

MCQ20: The following data of the velocity of a body is given as a function of time. Using quadratic interpolation to the value of the velocity at $t=14.9$ seconds, the three data points of time needed for interpolation are

Answer: 0,15,18

MCQ21: Iteration method is a method

Answer: Direct

MCQ22: To estimate the value of 1.75 from the data given below The interval

$h=$

Answer: -0.05

MCQ23: The following n data points $x_1, y_1, x_2, y_2, \dots$

Answer: Equally spaced

MCQ24: A polynomial of the form $y=ax^2+bx+c$ is called

Answer: linear equation

MCQ25: The Newton-Raphson method formula for finding the square root of a real number R from the equation $x^2-R=0$ is

Answer: $x_{i+1}=x_i^2$

MCQ26: Solving the linear system of equation $2x_1+3x_2-x_3=5, -2x_2-x_3$

Answer: 5

MCQ27: If $f_1=-3, f_3=9, f_4=30, f_6=132$ and the Lagrange's interpolating polynomial is give

Answer: $16x^3-11x^2+34x-24$

MCQ28: If one root of the equation $x^2+px+12=0$ is 4 and the equation $x^2+px+q=0$ have equal roots, then the value of q is _____

Answer: 494

MCQ29: The eigenvalues of the matrix $B=\begin{bmatrix} 10 & 2 & 3 \\ 0 & 4 & 5 \\ 6 & & \end{bmatrix}$ are

Answer: 2, 5, 6

MCQ30: If the Newton's interpolating polynomial $P_4(x)=x^4-3x^3+5x^2-6$. Find the approximate value of $f(1.8)$

Answer: 381

MCQ31: The eigenvalues of $\begin{bmatrix} 5 & 6 & 1 \\ 7 & 10 & 2 \\ 3 & 0 & 7 \end{bmatrix}$ are

Answer: -19, 5, 37

MCQ32: _____ method is used for finding the dominant eigenvalue of a matrix.

Answer: Gauss elimination method

MCQ33: The data of the velocity of a body as a function of time is given as follows: The velocity in m/s at 16s using linear polynomial interpolation is _____.

Answer: 27.867

MCQ34: If $f_1=-3, f_3=9, f_4=30, f_6=132$ and the Lagrange's interpolating polynomial is given

Answer: $16x^3-11x^2+34x-24$

MCQ35: If $m = \frac{1}{n} \sum_{i=1}^n E_i$, where m is the mean operator then $m \&$

Answer: $E \frac{1}{n} \sum_{i=1}^n E_i$

MCQ36: Every polynomial equation of the nth degree has _____ roots

Answer: N

MCQ37: If 1 is an eigenvalue of A, then _____

Answer: A is a singular matrix

MCQ38: The following data of the velocity of a body is given as a function of time The quadratic interpolation $V_t = 8.667t^2 - 349.67t + 3523.18$ approximates the velocity of the body. Find the time in seconds at which the velocity of the body is 35m/s.

Answer: 18.667

MCQ39: The modification of Gauss elimination method is _____

Answer: Gauss Jordan method

MCQ40: If $f_1=-3, f_3=9, f_4=30, f_6=132$ and the Lagrange's interpolating polynomial is given

Answer: $16x^3-11x^2+34x-24$

MCQ41: Consider the function $f(x)=(x-1)(x-2)(x-3)$ in $[0,4]$. Find a point ξ
 Answer: $\frac{3}{4}$

MCQ42: Expression of $\Delta^3 f_1$ as a backward difference is $\Delta^3 f_4$
 Answer: $\Delta^3 f_4$

MCQ43: Let $A = \begin{bmatrix} 1 & 2 & 6 & 5 & 4 & 1 & 7 & 3 & 2 \end{bmatrix}$, then $\det A$
 Answer: -13

MCQ44: One of the roots of the equation $x^3 - 3x^2 + x - 3 = 0$ is $\frac{1}{2}$
 Answer: -1

MCQ45: The eigenvalues of the matrix $A = \begin{bmatrix} 2 & 2 & 1 & 3 \end{bmatrix}$ are
 Answer: 1, 4

MCQ46: If $A = \begin{bmatrix} 2 & 3 & -1 & 1 & 0 & 2 \end{bmatrix}$ and $B = \begin{bmatrix} 1 & 1 & 2 & 2 & 4 \end{bmatrix}$
 Answer: 9

MCQ47: The eigenvalues of a 4×4 matrix A are given as 2, -3, 13, and 7. The $\det A$ then is $\frac{1}{546}$.
 Answer: 546

MCQ48: If a polynomial of degree n has more than n zeros, then the polynomial is $\frac{1}{n!} \frac{d^n f}{dx^n}$
 Answer: Oscillatory

MCQ49: The Newton-Raphson method of finding roots of nonlinear equations falls under the category of $\frac{1}{n!} \frac{d^n f}{dx^n}$ methods
 Answer: bracketing

MCQ50: Solving the linear system of equation $\begin{cases} 2x_1 + 3x_2 - x_3 = 5 \\ -2x_2 - x_3 = 1 \end{cases}$
 Answer: -1

Fill in the Blank (FBQs):

FBQ1: What is the coefficient of x^{-13} from the first three terms of the Taylor polynomial of $f(x) = \ln \frac{1}{x}$ about $x_0 = 1$?
 Answer: $\frac{1}{3}$

FBQ2: Iteration method is a self-correcting method
 Answer: *Correcting*

FBQ3: Solving the linear system of equation $\begin{cases} 2x_1 + 3x_2 - x_3 = 5 \\ -2x_2 - x_3 = 1 \end{cases}$
 Answer: $\frac{1}{3}$

FBQ4: If one root of the equation $x^2 + px + 12 = 0$ is 4 and the equation $x^2 + px + q = 0$ have equal roots, then the value of q is $\frac{1}{12}$
 Answer: $\frac{1}{12}$

FBQ5: The real root of the equation $x^3 - 3x^2 + x - 3 = 0$ is _____.

Answer: *3*

FBQ6: _____ method is used for finding the dominant eigenvalue of a matrix.

Answer: *Power*

FBQ7: The following n data points $x_1, y_1, x_2, y_2, \dots$ _____

Answer: *quadratic spline*

FBQ8: If a polynomial of degree n has more than n zeros, then the polynomial is _____.

Answer: *zero everywhere*

FBQ9: The following x - y data is given The Newton's divided difference second order polynomial for the above data is given by $f_2x = b_0 + b_1x + \dots$

Answer: 4.33

FBQ10: Velocity versus time data for a body is approximated by a second order Newton's divided difference polynomial as $Vt = b_0 + 39.622t - 20 + 0.5540(t - 20)(t - 15)$, 10

Answer: *36.85*

FBQ11: The following data of the velocity of a body is given as a function of time. Using the quadratic interpolation to find the value of the velocity at $t = 14.9$ seconds, the three data points of time needed for interpolation are _____.

Answer: *0, 15, 18*

FBQ12: The Newton-Raphson method of finding roots of nonlinear equations falls under the category of _____ methods.

Answer: *Open*

FBQ13: _____ errors are due to computational procedure.

Answer: *Round off*

FBQ14: The next iterative value of the root of $x^2 - 4 = 0$ using the Newton-Raphson method is _____ to three decimal places if the initial guess is 3.

Answer: *2.167*

FBQ15: The root of the equation $fx = 0$ is found by using the Newton-Raphson method. The initial estimate of the root is $x_0 = 3$, $f_3 = 5$. The angle the line tangent to the function f

Answer: *-0.247*

FBQ16: The highest eigenvalues of $56170 - 19230037$ is _____.

Answer: *37*

FBQ17: The Lagrange polynomial that passes through the 3 data points is given by $f_2x = L_0x^2 + L_1x + \dots$

Answer: *0.50*

FBQ18: If $\begin{bmatrix} -4.5 \\ -41 \end{bmatrix}$ is an eigenvector of $\begin{bmatrix} 8 & -424020 \\ 329751361719 & \end{bmatrix}$

Answer: *4*

FBQ19: The coefficient of λ^2 in cubic equation of the eigenvalues of the matrix $\begin{bmatrix} 329751361719 & \\ & \end{bmatrix}$ is

Answer: *-27*

FBQ20: The eigenvalues of a 4×4 matrix A are given as 2, -3, 13, and 7. The $\det A$ then is

Answer: *546*

FBQ21: If one of the eigenvalues of $A_{n \times 2}$ is zero, it implies the determinant of A is

Answer: *Zero*

FBQ22: If $f_1 = -3$, $f_3 = 9$, $f_4 = 30$, $f_6 = 132$ and the Lagrange's interpolating polynomial is given

Answer: *1/30*

FBQ23: The following data of the velocity of a body is given as a function of time Using quadratic interpolation, $V_t = 8.667t^2 - 349.67t + 3523$, $\frac{1}{18} \leq t \leq \frac{1}{24}$ approximates the velocity of the body. Find the time in seconds at which the velocity of the body is 35m/s to three decimal places.

Answer: *22.294*

FBQ24: If $f_1 = -3$, $f_3 = 9$, $f_4 = 30$, $f_6 = 132$ and the Lagrange's interpolating polynomial is given

Answer: *-4*

FBQ25: The following data of the velocity of a body is given as a function of time One of the interpolant approximations for the velocity from the above data is given as $V_t = 8.6667t^2 - 349.67t + 3523$, $\frac{1}{18} \leq t \leq \frac{1}{24}$ using the above interpolant, the distance in meters covered by the body between $t = \frac{1}{18}$ and $t = \frac{1}{24}$ is

Answer: *10.337*

FBQ26: If $f_1 = -3$, $f_3 = 9$, $f_4 = 30$, $f_6 = 132$ and the Lagrange's interpolating polynomial is given as $P_6(x) =$

Answer: *-3*

FBQ27: If the Newton's interpolating polynomial $P_4(x) = x^4 - 3x^3 + 5x^2 - 6$. The approximate value of $f(x)$ at $x = 2$ is

Answer: *6*

FBQ28: The polynomial that passes through the following x-y data is given by $8.125x^2 - 324.75x + 3237$, $\frac{1}{18} \leq x \leq \frac{1}{24}$ The corresponding polynomial using Newton's divided difference polynomial is given by

Answer: *8.125*

FBQ29: If the Newton's interpolating polynomial $P_4(x) = x^4 - 3x^3 + 5x^2 - 6$. The approximate value of $f(x)$
 Answer: *369*

FBQ30: If $f_1 = -3$, $f_3 = 9$, $f_4 = 30$, $f_6 = 132$ and the Lagrange's interpolating polynomial is given
 Answer: *1/30*

FBQ31: The difference interpolation polynomial and the Lagrange's interpolating polynomial of $f(x)$ are the same.
 Answer: *Divided*

FBQ32: Given the table below the divided differences interpolation polynomial $P(x)$ is $x^3 + cx - 4$. What is c ?
 Answer: *1*

FBQ33: Errors are caused by using approximate formula in computation.
 Answer: *Truncation*

FBQ34: Expression of $\Delta^3 f_1$ as a backward difference is $\Delta^3 f_k$. What is k ?
 Answer: *4*

FBQ35: Expression of $\Delta^2 f_2$ as a backward difference is $\Delta^2 f_n$. Find n .
 Answer: *1*

FBQ36: Given that $m = 12E12 + E$ and $d = E/m$
 Answer: *Md*

FBQ65: In Newton's forward interpolation formula the first two terms will give the Interpolation.
 Answer: *Linear*

FBQ38: In estimating the value of (1.45) from the data given below the interval $h = \dots$
 Answer: 0.1

FBQ39: If $A = 23 - 1102$ and $B = 11224/m$
 Answer: *12*

FBQ40: Let $A = 126541732$, then $\det A = \dots$
 Answer: *-71*

FBQ41: If the determinant of a square matrix A is zero, then matrix A is called
 Answer: *Singular matrix*

FBQ42: Solving the linear system of equation $2x_1 + 3x_2 - x_3 = 5$, $-2x_2 - x_3 = \dots$
 Answer: *-5*

FBQ43: Using the Gauss-seidel method for solving the system of equations
$$\begin{cases} x + y + z = 1 \\ x + 2y + 3z = 2 \\ x + 3y + 4z = 3 \end{cases}$$

Answer: $x = -3.225$

FBQ44: Using Gauss-Seidel method for solving the system of equations
$$\begin{cases} x + y + z = 1 \\ x + 2y + 3z = 2 \\ x + 3y + 4z = 3 \end{cases}$$

Answer: $x = -2.875$

FBQ45: If A is a square matrix, then $\det A = \det A^T = 0$
Answer: singular matrix

FBQ46: If 1 is an eigenvalue of A , then the eigenvalue of A^T is 1 .
Answer: 1

FBQ47: The eigenvalues of the matrix $A = \begin{bmatrix} 2 & 2 & 1 \\ 3 & 4 & 5 \end{bmatrix}$ are $1, 4$.
Answer: $1, 4$

FBQ48: The eigenvalues of the matrix $B = \begin{bmatrix} 1 & 0 & 2 \\ 3 & 0 & 4 \\ 5 & 6 & 0 \end{bmatrix}$ are $1, 3, 6$.
Answer: $1, 3, 6$

FBQ49: The data of the velocity of a body as a function of time is given as follows:

Time (s)	Velocity (m/s)
0	0
4	28.333
8	28.333
12	28.333
16	28.333

The velocity in m/s at 16s using linear polynomial interpolation to three decimal places is 28.333 .
Answer: 28.333

FBQ50: The true value of π is $3.14159265 \dots$. In some mensuration problems the value $22/7$ is commonly used as an approximation to π . The error in this approximation to 6 significant figures is 0.00126449 .
Answer: 0.00126449