MTH603-NUMERICAL ANALYSIS
Solved MCQS for Final terms papers
Solved by JUNAID MALIK and Team



AL-Junaid Institude

Contact no: 03041659294

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Website Link
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Gmail
junaidfazal08@gmail.com

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ALL answers are verified if found any mistake then Correct ACCORDINGLY

Question # 1 Total Marks: 1

The determinant of a diagonal matrix is the product of the diagonal elements.

- True
- False

Question # 2 Total Marks: 1

Power method is applicable if the eigen vectors corresponding to eigen values are linearly independent.

- True
- false

Question # 3 Total Marks: 1

A 3 x 3 identity matrix have three and different eigen values.

- True
- False

Question # 4 Total Marks: 1

If n x n matrices A and B are similar, then they have the different eigenvalues (with the same multiplicities).

- True
- False

Question # 5 Total Marks: 1

The Jacobi's method is a method of solving a matrix equation on a matrix that has ____ zeros along its main diagonal.

- No
- At least one

Question # 6 Total Marks: 1

An eigenvector V is said to be normalized if the coordinate of largest magnitude is equal to _____.

- Unity
- zero

Question # 7 Total Marks: 1

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The Gauss-Seidel method is applicable to strictly diagonally dominant or symmetric positive definite matrices A.

- True
- False

Question # 8 Total Marks: 1

The determinant of a _____ matrix is the product of the diagonal elements.

- Diagonal CLOSELY
- Upper triangular
- Lower triangular
- Scalar

yeh charon options theek hain….
You can confirm it from internet…

Question # 9 Total Marks: 1

Eigenvalues of a symmetric matrix are all _____.

- Real
- Zero
- Positive
- Negative

Question # 10 Total Marks: 1

The Power method can be used only to find the eigen value of A that is largest in absolute value—we call this eigen value the dominant eigen value of A.

- True
- False

Question # 11 Total Marks: 1

P-C method is derived by employing

- Newton's backward difference interpolation formula
- Newton's forward difference interpolation formula
- Newton's divided difference interpolation formula
- None of the given choices

Question # 12 Total Marks: 1

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For differences methods we require the set of values.

- True
- False

Question # 13 Total Marks: 1

If n x n matrices A and B are similar, then they have the different eigenvalues (with the same multiplicities).

- True
- False

Question # 14 Total Marks: 1

If x is an eigen value corresponding to eigen value of V of a matrix A. If a is any constant, then x – a is an eigen value corresponding to eigen vector V is an of the matrix A - a I.

- True
- False

Question # 15 Total Marks: 1

Central difference method seems to be giving a better approximation, however it requires more computations.

- True
- False

Question # 16 Total Marks: 1

Iterative algorithms can be more rapid than direct methods.

- True
- False

Question # 17 Total Marks: 1

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Central Difference method is the finite difference method.

- True
- False

Question # 18 Total Marks: 1

Exact solution of 2/3 is not exists.

- TRUE
- FALSE

Question # 19 Total Marks: 1

The Jacobi's method is a method of solving a matrix equation on a matrix that has _____ zeros along its main diagonal.

- no
- atleast one

Question # 20 Total Marks: 1

A 3 x 3 identity matrix have three and _____eigen values.

- same
- different

Question # 21 Total Marks: 1

Eigenvalues of a symmetric matrix are all _____ .

- real
- complex
- zero
- positive

Question # 22 Total Marks: 1

The Jacobi iteration converges, if A is strictly diagonally dominant.

- TRUE
- FALSE

Question # 23 Total Marks: 1

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Below are all the finite difference methods EXCEPT _____.

- jacobi's method
- newton's backward difference method
- Stirlling formula
- Forward difference method

Question # 24 Total Marks: 1

If n x n matrices A and B are similar, then they have the same eigenvalues (with the same multiplicities).

- TRUE
- FALSE

Question # 25 Total Marks: 1

If A is a nxn triangular matrix (upper triangular, lower triangular) or diagonal matrix , the eigenvalues of A are the diagonal entries of A.

- TRUE
- FALSE

Question # 26 Total Marks: 1

The global error in Simpson's 3/8 rule is of

- $o(h^2)$
- $o(h^3)$
- $o(h^4)$
- None of the given choices

Question # 27 Total Marks: 1

Two matrices with the same characteristic polynomial need not be similar.

- TRUE
- FALSE

Question # 28 Total Marks: 1

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Which of the following period strategic management was considered to be cure for all problems?

- Mid 1950s to mid 1960s
- Mid 1960s to mid 1970s
- Mid 1970s to mid 1980s
- Mid 1980s to mid 1990s

Question # 29 Total Marks: 1

Which of the following is not a pitfall an organization should avoid in strategic planning?

Select correct option:

- Failing to involve key employees in all phases of planning
- Involving all managers rather than delegating planning to a planner
- Top managers not actively supporting the strategic planning process
- Doing strategic planning only to satisfy accreditation or regulatory requirements

Question # 30 Total Marks: 1

which of the following are the factors that concern the nature and direction of the economy in which a firm operates? Select correct option:

- Technological
- Ecological
- Social
- Economic

Question # 31 Total Marks: 1

Which of the following best describes this statement; "a Systematic and ethical process
for gathering and analyzing information about the competition's activities and general
business trends to further a business' own goals"?

Select correct option:

- External assessment
- Industry analysis

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- Competitive intelligence program
- Business ethics

Question # 32 Total Marks: 1

According to Porter, which strategy offers products or services to a small range of customers at the lowest price available on the market?
Select correct option:

- Low cost
- Best value
- Cost focus

Question # 33 Total Marks: 1

Long-term objectives includes all of the following EXCEPT:

- Measurable
- Reasonable
- Varying
- Consistent

Question # 34 Total Marks: 1

Which one of the following is NOT is a basic mission of a competitive intelligence program?

- To provide a general understanding of an industry
- To provide a general understanding of a company's competitors
- To identify industry executives who could be hired by the firm
- To identify potential moves a competitor might make that would endanger a firm

Question # 35 Total Marks: 1

While preparing an External Factor Evaluation Matrix, a total score of 0.8 indicates that:

- Firm is taking advantages of strengths and avoiding threats
- Firm is taking no advantage of opportunities and is avoiding threats
- Firm is not taking advantages of opportunities and is not avoiding threats
- Firm is taking advantage of opportunities and is avoiding the threats

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Question No 36 (Marks: 1)

Symbol used for forward differences is

- ∇
- Δ
- δ
- μ

Question No: 37 (Marks: 1)

The relationship between central difference operator and the shift operator is given by

- $\delta = E - E^{-1}$
- $\delta = E + E^{-1}$
- $\delta = E^{\frac{1}{2}} + E^{-\frac{1}{2}}$
- $\delta = E^{\frac{1}{2}} - E^{-\frac{1}{2}}$

Question No: 38 (Marks: 1)

Muller's method requires --------starting points

- 1
- 2
- 3
- 4

Question No: 39 (Marks: 1)

If S is an identity matrix, then

- $S^{-1} = S$

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- $S^t = S$
- $All\ are\ true$
- $S^{-1} = S^t$

Question No: 40 (Marks: 1)
If we retain r+1 terms in Newton's forward difference formula, we obtain a polynomial of degree ---- agreeing with y_x at $x_0, x_1, ..., x_r$

- r+2
- r+1
- r
- r-1

Question No: 41 (Marks: 1)
P in Newton's forward difference formula is defined as

- $p = (\frac{x - x_0}{h})$
- $p = (\frac{x + x_0}{h})$
- $p = (\frac{x + x_n}{h})$
- $p = (\frac{x - x_n}{h})$

Question No: 42 (Marks: 1)
Octal number system has the base ----------

- 2
- 8
- 10
- 16

Question No: 43 (Marks: 1)
Newton's divided difference interpolation formula is used when the values of the independent variable are

- Equally spaced
- Not equally spaced

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► Constant
► None of the above

Question No: 44 (Marks: 1)
Given the following data

x	0	1	2	4
$f(x)$	1	1	2	5

Value of $f(2,4)$ is

► 1.5

► 3
► 2

► 1

Question No: 45 (Marks: 1) If $y(x)$ is approximated by a polynomial $p_n(x)$ of degree n then the error is given by

► $\varepsilon(x) = y(x) + P_n(x)$
► $\varepsilon(x) = y(x) - P_n(x)$
► $\varepsilon(x) = P_n(x) - y(x)$
► $\varepsilon(x) = y(x) \times P_n(x)$

Question No: 46 (Marks: 1)

Let I denotes the closed interval spanned by $x_0, x_1, x_2, x_3, x_4, x_5, x_6, x_7, \bar{x}$. Then $F(x)$ vanishes ------times in the interval I.

► n-1
► n+2

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- n
- n+1

Question No: 47 (Marks: 1) - Please choose one

Differential operator in terms of forward difference operator is given by

- $D = \frac{1}{h}(\Delta + \frac{\Delta^2}{2!} + \frac{\Delta^3}{3!} + \frac{\Delta^4}{4!} + \frac{\Delta^5}{5!} + ...)$
- $D = \frac{1}{h}(\Delta + \frac{\Delta^2}{2} + \frac{\Delta^3}{3} + \frac{\Delta^4}{4} + \frac{\Delta^5}{5} + ...)$
- $D = \frac{1}{h}(\Delta - \frac{\Delta^2}{2} + \frac{\Delta^3}{3} - \frac{\Delta^4}{4} + \frac{\Delta^5}{5} - ...)$
- $D = \frac{1}{h}(\Delta - \frac{\Delta^2}{2!} + \frac{\Delta^3}{3!} - \frac{\Delta^4}{4!} + \frac{\Delta^5}{5!} - ...)$

Question No: 48 (Marks: 1) - Please choose one

Finding the first derivative of $f(x)$ at x=0.4 from the following table:

x	0.1	0.2	0.3	0.4
$f(x)$	1.10517	1.22140	1.34986	1.49182

Differential operator in terms of ----------will be used.

- Forward difference operator
- Backward difference operator
- Central difference operator
- None of the given choices

Question No: 49 (Marks: 1) - Please choose one

For the given table of values

x	0.1	0.2	0.3	0.4	0.5	0.6
$f(x)$	0.425	0.475	0.400	0.452	0.525	0.575

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$f'(0.1)$, using two-point equation will be calculated as.....

- -0.5
- 0.5
- 0.75
- -0.75

Question No: 50 (Marks: 1) In Simpson's 1/3 rule, $f(x)$ is of the form

- $ax+b$
- ax^2+bx+c
- ax^3+bx^2+cx+d
- $ax^4+bx^3+cx^2+dx+e$

Question No: 51 (Marks: 1) - Please choose one

$$I=\int_a^b f(x)dx$$

While integrating , h, width of the interval, is found by the formula----.

- $\frac{b-a}{n}$
- $\frac{b+a}{n}$
- $\frac{a-b}{n}$
- None of the given choices

Question No: 52 (Marks: 1) - Please choose one

To apply Simpson's 1/3 rule, valid number of intervals are.....

- 7
- 8
- 5
- 3

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Question No: 53 (Marks: 1) - Please choose one

For the given table of values

x	02	0.3	0.4	0.5	0.6	0.7
$f(x)$	0.425	0.475	0.400	0.452	0.525	0.575

$f''(0.2)$, using three-point equation will be calculated as ……

- ► 17.5
- ► 12.5
- ► 7.5
- ► -12.5

Question No: 54 (Marks: 1) - Please choose one

To apply Simpson's 1/3 rule, the number of intervals in the following must be

- ► 2
- ► 3
- ► 5
- ► 7

Question No: 55 (Marks: 1) - Please choose one

To apply Simpson's 3/8 rule, the number of intervals in the following must be

- ► 10
- ► 11
- ► 12
- ► 13

Question No: 56 (Marks: 1) - Please choose one

If the root of the given equation lies between a and b, then the first approximation to the root of the equation by bisection method is ……

- ➢ $\frac{(a+b)}{2}$
- ➢ $\frac{(a-b)}{2}$

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- $\frac{(b-a)}{2}$
- None of the given choices

Question No: 57 (Marks: 1) - Please choose one

.....lies in the category of iterative method.

- Bisection Method
- Regula Falsi Method
- Secant Method
- None of the given choices

Question No: 58 (Marks: 1) - Please choose one

For the equation $x^3 + 3x - 1 = 0$, the root of the equation lies in the interval.....

- (1, 3)
- (1, 2)
- (0, 1)
- (1, 2)

Question No: 59 (Marks: 1) - Please choose one

Rate of change of any quantity with respect to another can be modeled by

- An ordinary differential equation
- A partial differential equation
- A polynomial equation
- None of the given choices

Question No: 60 (Marks: 1) - Please choose one

If

$$\frac{dy}{dx} = f(x, y)$$

Then the integral of this equation is a curve in

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- None of the given choices

- xt-plane
- yt-plane
- xy-plane

Question No: 61 (Marks: 1) - Please choose one

In solving the differential equation

$$y' = x + y \;;\; y(0.1) = 1.1$$

$h = 0.1$, By Euler's method $y(0.2)$ is calculated as

- 1.44
- 1.11
- 1.22
- 1.33

Question No: 62 (Marks: 1) - Please choose one

In second order Runge-Kutta method

k_1 is given by

- $k_1 = hf(x_n, y_n)$
- $k_1 = 2hf(x_n, y_n)$
- $k_1 = 3hf(x_n, y_n)$
- None of the given choices

Question No: 63 (Marks: 1) - Please choose one

In fourth order Runge-Kutta method, k_2 is given by

- $k_2 = hf(x_n + \frac{h}{2}, y_n + \frac{k_1}{2})$
- $k_2 = hf(x_n + \frac{h}{3}, y_n + \frac{k_1}{3})$
- $k_2 = hf(x_n - \frac{h}{3}, y_n - \frac{k_1}{3})$

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- $k_2 = hf(x_n - \frac{h}{2}, y_n - \frac{k_1}{2})$

Question No: 64 (Marks: 1) - Please choose one

In fourth order Runge-Kutta method, k_4 is given by

- $K_4=hf(x_n+2h, y_n+2K_3)$
- $K_4=hf(x_n-h, y_n-K_3)$
- $K_4=hf(x_n+h, y_n+K_3)$
- None of the given choices

Question No: 65 (Marks: 1) - Please choose one

Adam-Moulton P-C method is derived by employing

- Newton's backward difference interpolation formula
- Newton's forward difference interpolation formula
- Newton's divided difference interpolation formula
- None of the given choices

Question no. 66 Total Marks: 1

The need of numerical integration arises for evaluating the definite integral of a function that has no explicit _____ or whose antiderivative is not easy to obtain.

- Antiderivative
- Derivatives

Question # 67 Total Marks: 1

In Runge – Kutta Method, we do not need to calculate higher order derivatives and find greater accuracy.

- TRUE
- FALSE

Question # 68 Total Marks: 1

An indefinite integral may _____ in the sense that the limit defining it may not exist.

- diverge
- converge

Question # 69 Total Marks: 1

The Trapezoidal Rule is an improvement over using rectangles because we have much less "missing" from our calculations. We used _____

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to model the curve in trapezoidal Rule.

- straight lines
- curves
- parabolas
- constant

Question # 70 **Total Marks:** 1

An improper integral is the limit of a definite integral as an endpoint of the interval of integration approaches either a specified real number or 8 or -8 or, in some cases, as both endpoints approach limits.

- TRUENo
- FALSE

Question # 71 **Total Marks:** 1

Euler's Method numerically computes the approximate derivative of a function.

- FALSE
- TRUE

Question # 72 **Total Marks:** 1

If we wanted to find the value of a definite integral with an infinite limit, we can instead replace the infinite limit with a variable, and then take the limit as this variable goes to _____.

- constant
- finite
- infinity
- zero

Question # 73 **Total Marks: 1**

Bisection method is …….. method

- Bracketing Method
- Open
- Random
- none

Question # 74 **Total Marks: 1**

Newton Raphson method is …….. method

- Bracketing Method
- Open
- Random
- None

Question # 75 **Total Marks: 1**

Eigenvalue is

- Real
- Vector
- odd

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- even

Question # 76 **Total Marks: 1**

For Simpson's 1/3 rule no.of intervals must be

- 2 (even)
- 3
- 5
- 7

Question # 77 **Total Marks: 1**

For Simpson's 1/3 rule valid no.of intervals are

- 1
- 3
- 5
- 8

Question # 78 **Total Marks: 1**

For Simpson's 3/8 rule no.of intervals must be

- 10
- 11
- 12 multiple of three
- 14

Question # 79 **Total Marks: 1**

The determinant of a diagonal matrix is the product of the diagonal elements.

- TRUE
- FALSE

Question # 80 **Total Marks: 1**

Power method is applicable if the eigen vectors corresponding to eigen values are linearly independent.

- TRUE
- FALSE

Question # 81 **Total Marks: 1**

To apply simpson's 3/8 rule, the number of intervals can be

- 4
- 7
- 9 (multiple of three)
- 8

Question # 82 **Total Marks: 1**

If n x n matrices A and B are similar, then they have the different eigenvalues (with the same multiplicities).

- TRUE
- FALSE

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Question # 83 **Total Marks: 1**

The Jacobi's method is a method of solving a matrix equation on a matrix that has _____ zeros along its main diagonal.

- no
- atleast one

Question #84 **Total Marks: 1**

An eigenvector V is said to be normalized if the coordinate of largest magnitude is equal to _____.

- unity
- zero

Question # 85 **Total Marks: 1**

The Gauss-Seidel method is applicable to strictly diagonally dominant or symmetric positive definite matrices A.

- TRUE
- FALSE

Question # 86 **Total Marks: 1**

The determinant of a _____ matrix is the product of the diagonal elements.

- diagonal
- upper triangular
- lower triangular
- scalar

Question # 87 **Total Marks: 1**

Eigenvalues of a symmetric matrix are all _____.

- real
- zero
- positive
- negative

Question # 88 **Total Marks: 1**

The Power method can be used only to find the eigenvalue of A that is largest in absolute value—we call this eigenvalue the dominant eigenvalue of A.

- TRUE
- FALSE

Question # 89 **Total Marks: 1**

The Jacobi's method is a method of solving a matrix equation on a matrix that has no zeros along its main diagonal.

- TRUE
- FALSE

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Question # 90 **Total Marks: 1**

In fourth order Runge-Kutta method, K_1 is given by

- $K_1 = hf(x_n, y_n)$
- $K_1 = 2hf(x_n, y_n)$
- $K_1 = 3hf(x_n, y_n)$
- None of the given choices

Question # 91 **Total Marks: 1**

If there are (n+1) values of y corresponding to (n+1) values of x, then we can represent the function f (x) by a polynomial of degree

- n+2
- n+1
- n
- n-1

Question # 92 **Total Marks: 1**

For differences methods we require the set of values.

- TRUE
- FALSE

Question # 93 **Total Marks: 1**

If n x n matrices A and B are similar, then they have the different eigenvalues (with the same multiplicities).

- TRUE
- FALSE

Question # 94 **Total Marks: 1**

If x is an eigen value corresponding to eigen value of V of a matrix A. If a is any constant, then x – a is an eigen value corresponding to eigen vector V is an of the matrix A - a I.

- TRUE
- FALSE

Question # 95 **Total Marks: 1**

Central difference method seems to be giving a better approximation, however it requires more computations.

- TRUE
- FALSE

Question # 96 **Total Marks: 1**

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The Power method can be used only to find the eigenvalue of A that is largest in absolute value—we call this eigenvalue the dominant eigenvalue of A.

- TRUE
- FALSE

Question # 97 **Total Marks: 1**

Iterative algorithms can be more rapid than direct methods.

- FALSE
- TRUE

Question # 98 **Total Marks: 1**

Central Difference method is the finite difference method.

- TRUE
- FALSE

Question # 99 **Total Marks: 1**

A 3 x 3 identity matrix have three and different eigen values.

- TRUE
- FALSE

Question # 100 **Total Marks: 1**

Eigenvalues of a symmetric matrix are all _____.

- Zero
- Real
- positive
- negative

Question # 101 **Total Marks: 1**

An eigenvector V is said to be normalized if the coordinate of largest magnitude is equal to zero.

- TRUE
- FALSE

Question # 102 **Total Marks: 1**

Exact solution of 2/3 is not exists.

- TRUE
- FALSE

Question # 103 **Total Marks: 1**

The Gauss-Seidel method is applicable to strictly diagonally dominant or symmetric _____ definite matrices A.

- **positive**
- negative

Question #104 **Total Marks: 1**

Differences methods find the _____ solution of the system.

- **numerical**

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- Analytical

Question # 105 **Total Marks: 1**

While deriving Trapezoidal rule, we approximate f (x) in the form_____

- ax+b
- ax^2+bx+c
- ax^3+bx^2+cx+d
- $ax^4+bx^3+cx^2+dx+e$

Question #106 **Total Marks: 1**

The Power method can be used only to find the eigen value of A that is largest in absolute value—----------we call this eigen value the dominant eigen value of A.

- TRUE
- **FALSE**

Question #107 **Total Marks: 1**

The Jacobi's method is a method of solving a matrix equation on a matrix that has no zeros along its _____.

- main diagonal
- last column
- last row
- first row

Question #108 **Total Marks: 1**

If A is a nxn triangular matrix (upper triangular, lower triangular) or diagonal matrix , the eigenvalues of A are the diagonal entries of A.

- TRUE
- FALSE

Question # 109 **Total Marks: 1**

A 3 x 3 identity matrix have three and different eigen values.

- TRUE
- **FALSE**

Question # 110 **Total Marks: 1**

Differences methods find the _____ solution of the system.

- **numerical**
- Analytical

Question # 111 **Total Marks: 1**

The Power method can be used only to find the eigenvalue of A that is largest in absolute value—we call this eigenvalue the dominant eigenvalue of A.

- **TRUE**
- FALSE

Question # 112 **Total Marks: 1**

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If n x n matrices A and B are similar, then they have the different eigenvalues (with the same multiplicities).

- TRUE
- FALSE

Question # 113 **Total Marks: 1**

Eigenvalues of a _____ matrix are all real.

- symmetric
- antisymmetric
- rectangular
- triangular

Question # 114 **Total Marks: 1**

By using determinants, we can easily check that the solution of the given system of linear equation exits and it is unique.

- TRUE
- FALSE

Question # 115 **Total Marks: 1**

The dominant eigenvector of a matrix is an eigenvector corresponding to the eigenvalue of largest magnitude (for real numbers, smallest absolute value) of that matrix.

- TRUE
- FALSE

Question # 116 **Total Marks: 1**

Eigenvalues of a symmetric matrix are all _____ .

- real
- complex
- zero
- positive

Question # 117 **Total Marks: 1**

Below are all the finite difference methods EXCEPT _____.

- jacobi's method
- newton's backward difference method
- Stirlling formula
- Forward difference method

Question # 118 **Total Marks: 1**

The central difference method is finite method.

- True
- False

Question # 119 **Total Marks: 1**

Power method is applicable if the eigen vectors corresponding to eigen values are linearly _____.

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- independent
- dependent

Question # 120 **Total Marks: 1**

Central difference method seems to be giving a better approximation, however it requires more computations.

- TRUE
- FALSE

Question # 121 **Total Marks: 1**

The Jacobi iteration _____, if A is strictly diagonally dominant.

- converges
- diverges

Question # 122 **Total Marks: 1**

Power method is applicable if the eigen values are _____.

- real and distinct
- real and equal
- positive and distinct
- negative and distinct

Question # 123 **Total Marks: 1**

Determinant of a diagonal matrix is the product of the diagonal elements.

- TRUE
- FALSE

Question # 124 **Total Marks: 1**

The Gauss-Seidel method is applicable to strictly diagonally dominant or symmetric positive definite matrices A.

- TRUE
- FALSE

Question # 125 **Total Marks: 1**

If n x n matrices A and B are similar, then they have the _____ eigenvalues (with the same multiplicities).

- **same**
- different

Question # 126 **Total Marks: 1**

An eigenvector V is said to be normalized if the coordinate of largest magnitude is equal to _____.

- **unity**
- zero

Question # 127 **Total Marks: 1**

Exact solution of 2/3 is not exists.

- TRUE

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- FALSE

Question # 128 **Total Marks: 1**

The Jacobi's method is a method of solving a matrix equation on a matrix that has _____ zeros along its main diagonal.

- no
- atleast one

Question # 129 **Total Marks: 1**

A 3 x 3 identity matrix have three and _____eigen values.

- same
- different

Question # 130 **Total Marks: 1**

Eigenvalues of a symmetric matrix are all _____ .

- real
- complex
- zero
- positive

Question # 131 **Total Marks: 1**

The Jacobi iteration converges, if A is strictly diagonally dominant.

- TRUE
- FALSE

Question # 132 **Total Marks: 1**

Below are all the finite difference methods EXCEPT _____.

- jacobi's method
- newton's backward difference method
- Stirlling formula
- Forward difference method

Question # 133 **Total Marks: 1**

If n x n matrices A and B are similar, then they have the same eigenvalues (with the same multiplicities).

- TRUE
- FALSE

Question # 134 **Total Marks: 1**

If A is a nxn triangular matrix (upper triangular, lower triangular) or diagonal matrix , the eigenvalues of A are the diagonal entries of A.

- TRUE
- FALSE

Question # 135 **Total Marks: 1**

Two matrices with the same characteristic polynomial need not be similar.

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- TRUE
- FALSE

Question # 136 **Total Marks:** 1

The determinant of a _____ matrix is the product of the diagonal elements.

- diagonal
- upper triangular
- lower triangular
- scalar

Question # 137 **Total Marks:** 1

The absolute value of a determinant (|detA|) is the product of the absolute values of the eigenvalues of matrix A

- TRUE
- FALSE

Question # 138 **Total Marks:** 1

Central difference method seems to be giving a better approximation, however it requires more computations.

- TRUE
- FALSE

Question # 139 **Total Marks:** 1

The Power method can be used only to find the eigenvalue of A that is largest in absolute value—we call this eigenvalue the dominant
eigenvalue of A.

- TRUE
- FALSE

Question # 140 **Total Marks:** 1

Let A be an n ×n matrix. The number x is an eigenvalue of A if there exists a non-zero vector v such that _____.

- Av = xv
- Ax = xvPage
- Av + xv=0
- Av = Ax

Question # 141 **Total Marks:** 1

The Jacobi's method is a method of solving a matrix equation on a matrix that has no zeros along its main diagonal.

- TRUE
- FALSE

Question # 142 **Total Marks:** 1

Given the following data

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x	0	1	4
y=f(x)	2	1	4

Value of first order divided difference y(0,1) is

- -1
- 1
- 2
- 4

Question # 143 **Total Marks:** 1

Central Difference method is the finite difference method.

- TRUE
- FALSE

Question # 144 **Total Marks:** 1

By using determinants, we can easily check that the solution of the given system of linear equation exits and it is unique.

- TRUE
- FALSE

Question # 145 **Total Marks: 1**

The characteristics polynomial of a 3x 3 identity matrix is _____, if x is the eigen values of the given 3 x 3 identity matrix. where symbol ^ shows power.

- (x-1)^3
- (x+1)^3
- x^3-1
- x^3+1

Question # 146 **Total Marks: 1**

The Inverse of a matrix can only be found if the matrix is

- Singular
- Non singular
- Scalar
- Diagonal

Question # 147 **Total Marks: 1**

If f (x) contains trigonometric, exponential or logarithmic functions then this equation is known as

- Transcendental equation
- Algebraic
- Polynomial
- Linear

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Question # 148 **Total Marks: 1**

In interpolation is used to represent the δ

- Forward difference
- Central difference
- Backward difference

Question # 149 **Total Marks: 1**

The base of the decimal system is _____

- 10
- 0
- 2
- 8
- None of the above.

Question # 150 **Total Marks: 1**

Bisection method is …….. method

- Open Method
- Bracketing Method

Question # 151 **Total Marks: 1**

Which method is not used to solve problems related to integration?

- Runge-Kutta Method
- Simpson's 1/3rd rule
- Trapezoidal rule.

Question # 152 **Total Marks:** 1

Adams – Bashforth is a multistep method.

- True
- False

Question # 153 **Total Marks: 1**

Generally, Adams methods are superior if output at _____ points is needed.

- Many
- Two
- Single
- At most

Question # 154 **Total Marks: 1**

In Trapezoidal rule, the integral is computed on each of the subintervals by using linear interpolating formula, i.e. for n = 1 and then summing them up to obtain the desired integral.

- True
- False

Question # 155 **Total Marks: 1**

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A third order ordinary differential equation can be reduced to a system of _____ first order ordinary differential equations.

- **0**
- **1**
- **2**
- **3**

Question # 156 **Total Marks: 1**

Euler's Method numerically computes the approximate _____ of a function.

- antiderivative
- derivative
- value
- error

Question # 157 **Total Marks:** 1

Multistep method does not improves the accuracy of the answer at each step.

FALSE

TRUE

Question # 158 **Total Marks:** 1

The trapezoidal rule is a numerical method that approximates the value of a _____.

- indefinite integral
- definite integral
- improper integral
- function

Question # 159 **Total Marks:** 1

Simpson's rule is a numerical method that approximates the value of a definite integral by using _____ polynomials.

- quadratic
- linear
- cubic
- quartic

Question # 160 **Total Marks: 1**

In Simpson's Rule, we use parabolas to approximate each part of the curve. This proves to be very efficient as compared to Trapezoidal rule.

- True
- False

Question # 161 **Total Marks: 1**

The first langrange polynomial with equally spaced nodes produced the formula for _____.

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- Simpson's rule
- Trapezoidal rule
- Newton's method
- Richardson's method

Question # 162 **Total Marks: 1**

The need of numerical integration arises for evaluating the indefinite integral of a function that has no explicit antiderivative or whose antiderivative is not easy to obtain.

- TRUE
- FALSE

Question # 163 **Total Marks: 1**

The Trapezoidal Rule is an improvement over using rectangles because we have much less "missing" from our calculations. We used _____ to model the curve in trapezoidal Rule.

- straight lines
- curves
- parabolas
- constant

Question # 164 **Total Marks: 1**

The Euler method is numerically unstable because of _____ convergence of error.

- slow
- fast
- moderate
- no

Question # 165 **Total Marks: 1**

In integrating $\int_1^2 x^2 dx$, by dividing the interval into eight equal parts, width of the interval should be

- 0.125
- 0.250
- 0.500
- 0.825

Question # 166 **Total Marks: 1**

Let I denotes the closed interval spanned by $x_0, x_1, x_2, x_3, x_4, x_5, x_6, x_7, \bar{x}$. Then $F(x)$ vanishes ------times in the interval I.

- 6

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- 9
- 7
- 8

Question # 167 **Total Marks: 1**

The minimum interval in which the root of the equation $x^2-3x+1=0$ is

- (0,1)
- (1,2)
- (2,4)
- (0,2)

Question # 168 **Total Marks: 1**

The quantity of error which is present in the statement of the problem itself, before finding its solution is called

- Inherent error
- Local round off error
- Local truncation error
- Tying error

Question # 169 **Total Marks: 1**

In Regula Falsi Method two points x_n and x_{n+1} are chosen such that f (x_n) and f ($_{n+1}$) have _____ signs.

- +ve
- -ve
- Opposite
- Same

Question # 170 **Total Marks: 1**

Regula Falsi Method lies in the category of_____

- Iterative method
- Bracketing method
- Random method
- Graphical method

Question # 171 **Total Marks: 1**

Secant method converges_____ than bisection

- Faster
- Slower
- Equally
- None of the given choices

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Question # 172 **Total Marks: 1**

Muller's method is a generalization of:

- Bisection method
- Iteration method
- Secant method
- Regula Falsi Method

Question # 173 **Total Marks: 1**

Diagonal dominance of a coefficient matrix is strictly checked in:

- Muller's method
- Bisection method
- Jacobi's method
- Newton-Raphson method

Question # 174 **Total Marks: 1**

It can be verified that for matrix A= $\begin{bmatrix} 1 & 2 & 3 \\ 4 & 5 & 6 \\ 7 & 8 & 9 \end{bmatrix}$

- $AA^{-1}=I$, I= identity matrix
- $AA^{-1}=D$, D =diagonal matrix
- $AA^{-1}=S$, S =symmetric matrix
- $AA^{-1}=Z$, Z =orthogonal matrix

Question # 175 **Total Marks: 1**

If [A] is an n×n real symmetric matrix, its eigenvalues are real, and there exists an orthogonal matrix [S] such that the diagonal matrix (D) is given by:

- $[D]=[S]^{-1}[A][S]$
- $[D]=[S]^{-1}[S][A]$
- $[D]=[S]^{2}[A][S]$
- None of the above

Question # 176 **Total Marks: 1**

Given the the following data

x	1	2	-4

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f (x)	3	-5	-4

Which formula is useful in finding the interpolating polynomial?

- Newton's backward difference formula
- Lagrange's interpolation formula
- None of the given choices
- Newton's forward difference formula

Question # 177 **Total Marks: 1**

The magnitude of truncation error in Milne's predictor formula is

- $\frac{1}{90}h\Delta^4 y_0'$
- $\frac{1}{90}h\Delta^3 y_0'$
- $\frac{28}{90}h\Delta^3 y_0'$
- $\frac{28}{90}h\Delta^4 y_0'$

Question # 178 **Total Marks: 1**

If f (x)= $5x^6+6x^5-7x^3-9x^2+4x-3$, then its derivative is zero for all x.

- 4^{th}
- 7^{th}
- 6^{th}
- 5^{th}

Question # 179 **Total Marks: 1**

In Richardson's extrapolation method, the extrapolation process is repeated 8until accuracy is achieved, this is called extrapolation to the_____

- Limit
- Function
- Arbitrary value of 'h'
- None of the given choices

Question # 180 **Total Marks: 1**

While deriving Simpson's 3/8 rule, we approximate f (x) in the form_____

- ax+b
- ax^2+bx+c

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- ax^3+bx^2+cx+d
- $ax^4+bx^3+cx^2+dx+e$

Question # 181 **Total Marks: 1**

When we apply simpson's 3/8 rule, the number of intervals n must be:

- Even
- Odd
- Multiple of 3
- Multiple of 8

Question # 182 **Total Marks: 1**

In integrating $\int_0^1 e^{2x}dx$ by dividing into eight equal parts, width of the interval should be.....

- 0.250
- 0.500
- 0.125
- 0.625

Question # 183 **Total Marks: 1**

Romberg's integration method is _____ than Trapezoidal and Simpson's rule.

- None of the given choices
- More accurate
- Less accurate
- Equally accurate

Question # 184 **Total Marks: 1**

A fourth order ordinary differential equation can be reduced to a system of fourth_____ order ordinary differential equations

- First
- Second
- Third
- Fourth

Question # 185 **Total Marks: 1**

Given $\frac{dy}{dt}=\frac{y-t}{y+t}$ with the initial condition y=1.02 at t=0.02. Using Euler's method, y at t= 0.04, h=0.02 i

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- 3.0392
- 2.0392
- 1.0392
- 0.0392

Question # 186 **Total Marks: 1**

In solving the differential equation

Y' =x+y, y (0.1)= 1.1

h=0.1, By Euler's method y (0.2) is calculated as:

- 1.44
- 1.11
- 1.22
- 1.33

Question # 187 **Total Marks: 1**

To solve the ordinary differential equation

$$3\frac{dy}{dx} + xy^2 = \sin x, y(0) = 5,$$

by Runge-Kutta 2nd order method, you need to rewrite the equation as

- $\frac{dy}{dx} = \sin x - xy^2, y(0) = 5$
- $\frac{dy}{dx} = \frac{1}{3}\left(\sin x - xy^2\right), y(0) = 5$
- $\frac{dy}{dx} = \frac{1}{3}\left(-\cos x - \frac{xy^3}{3}\right), y(0) = 5$
- $\frac{dy}{dx} = \frac{1}{3}\sin x, y(0) = 5$

Question # 188 **Total Marks: 1**

The truncation error in Adam's predictor formula is

$$\frac{251}{720}h\nabla^4 y_{n+1}'$$

$$\frac{251}{720}h\nabla^4 y_n'$$

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$\frac{19}{720}h\nabla^4 y_{n+1}'$

$\frac{19}{720}h\nabla^4 y_n'$

Question # 189 **Total Marks: 1**

In solving the differential equation

$Y' = x^2 + 2xy$; $y(0) = 1$

h=0.1, By Euler's method y (0.1) is calculated as

- 1
- 2
- 3
- 4

Question # 190 **Total Marks: 1**

In solving the differential equation

$Y' = x^2 + 2y$; $y(1) = 3$

h=1, By Euler's method y (2) is calculated as

- 4
- 6
- 8
- 10 not sure

Question # 191 **Total Marks: 1**

In integrating $\int_0^{\frac{\pi}{2}} \sin x dx$, by dividing the interval into four equal parts, width of the interval should be:

- π
- $\frac{\pi}{2}$
- $\frac{\pi}{4}$
- $\frac{\pi}{8}$

Question # 192 **Total Marks: 1**

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The minimum interval in which the root of the equation $x^2 - 3x + 1 = 0$ lie is:

- (0,1)
- (1,2)
- (2,4)
- (0,2)

Question # 193 **Total Marks: 1**

If the root the given equation lies between a and b, then the first approximate to the root of the equation by bisection method.....

- $\frac{(a+b)}{2}$
- $\frac{(a-b)}{2}$
- $\frac{(b-a)}{2}$
- None of the given choices

Question # 194 **Total Marks: 1**

If 8+7i is the root of a quadratic equation f(x)=0, then the other root of the equation will be:

- 8-7i
- -8-7i
- -8+7i
- 8

Question # 195 **Total Marks: 1**

If there are two roots of the equation and one root is 2+3i , then the other root will be:

- 2+3i
- 2-3i
- 3+2i
- 3-2i

Question # 196 **Total Marks: 1**

In crout's reduction method the elements of the main diagonal of upper triangular matrix are taken as

- 0

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- 1
- -1
- None of the given choices

Question # 197 **Total Marks: 1**

In Gauss-seidal method, the new approximation calculated is:

- Used in the next iteration for next approximation
- Instantly replaced by the previous one
- Never used again
- None of the given choices

Question # 198 **Total Marks: 1**

In relaxation method, for fast convergence all the terms should be taken to one side and then reordering should be done so that the largest coefficient should appear on the

- End of rows
- Beginning of the rows
- Diagonal
- None of the given choices

Question # 199 **Total Marks: 1**

Every squre _____ matrix has an inverse.

- Singular
- Non-Singular
- Zero
- None of the above

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Question # 200 **Total Marks: 1**

If $S=\begin{pmatrix}1 & 2 & 3\\ 6 & 4 & 7\\ 8 & 6 & 5\end{pmatrix}$, then

- $S^{-1}=S^{T}$
- $S^{T}=S$
- $I=S$
- None of the given choices

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Question # 201 **Total Marks: 1**

A 3×3 matrix [A] is said to be orthogonal if

- $[A]^{-1}[A]= I$
- $[A^T][A]=I$
- $[A^T][A]=0$
- None of the given choices

Question # 202 **Total Marks: 1**

Jacobi's method for finding the eigen values can be applied to:

- Real and symmetric matrix
- Real and unsymmetric matrix
- Real and complex unsymmetric matrix
- None of the given choices

Question # 203 **Total Marks: 1**

Lagrange's interpolation formula is used when the values of the independent variable are:

- Equally spaced
- Not equally spaced
- Constant
- None of the above

Question # 204 **Total Marks: 1**

From the following table of values

x	1.3	1.5	1.7	1.9	2.1	2.3
y	2.9648	2.6599	2.3333	1.9922	1.6442	1.2969

Estimation of y' (1.3) will be done using the formula of differential operator in terms of

- Backward difference operator
- Central difference operator
- None of the given choices
- Forward difference operator

Question # 205 **Total Marks: 1**

Relationship between differential operator and backward difference operator is given by

- $hD= \log(1+\nabla)$

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- $hD = -\log(1+\nabla)$

- $hD = \log(1-\nabla)$
- $hD = -\log(1-\nabla)$

Question # 206 **Total Marks: 1**

Shift operator is defined as

- Ef (x)= f (x-h)
- Ef (x)= -f (x-h)
- Ef (x)= -f (x+h)
- Ef (x)= f (x+h)

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