

 Virtual University	MTH603-Numerical Analysis (Solved MCQ's) LECTURE FROM (23 to 45)	
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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 $n \times n$ 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 $n \times n$ 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 $A - aI$.

➤ 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 3×3 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
- **Stirling formula**
- Forward difference method

Question # 24 Total Marks: 1

If $n \times n$ 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 $n \times n$ 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



Question No: 37 (Marks: 1)

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



$$\begin{aligned} \delta &= E^{1/2} - E^{-1/2} \\ &= E^{1/2} - E^{-1/2} \\ &= E^{1/2} - E^{-1/2} \end{aligned}$$

Question No: 38 (Marks: 1)

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



$$\delta = E^{1/2} - E^{-1/2}$$



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
- ▶ $S^{t+1} = S^t$

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 $x_0, x_1, \dots, x_r$

- ▶ $r+2$
- ▶ $r+1$
- ▶ r
- ▶ $r-1$

Question No: 41 (Marks: 1)

P in Newton's forward difference formula is defined as

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

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

▶ $\epsilon(x) = y(x) + P_n(x)$

- ▶ $\epsilon(x) = y(x) - P_n(x)$
- ▶ $\epsilon(x) = P_n(x) - y(x)$
- ▶ $\epsilon(x) = y(x) - P_n(x)$
- ▶ $\epsilon(x) = P_n(x) - y(x)$

Question No: 46 (Marks: 1)

Let I denotes the closed interval spanned by $x_0, x_1, x_2, x_3, x_4, x_5, x_6, x_7, x_8$. 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

$$D = \frac{1}{h} \left(\frac{h}{1} + \frac{h^2}{2!} + \frac{h^3}{3!} + \frac{h^4}{4!} + \frac{h^5}{5!} + \dots \right)$$

$$D = \frac{1}{h} \left(\frac{h}{1} + \frac{h^2}{2!} + \frac{h^3}{3!} + \frac{h^4}{4!} + \frac{h^5}{5!} + \dots \right)$$

$$D = \frac{1}{h} \left(\frac{h}{1} + \frac{h^2}{2!} + \frac{h^3}{3!} + \frac{h^4}{4!} + \frac{h^5}{5!} + \dots \right)$$

$$D = \frac{1}{h} \left(\frac{h}{1} + \frac{h^2}{2!} + \frac{h^3}{3!} + \frac{h^4}{4!} + \frac{h^5}{5!} + \dots \right)$$

$$D = \frac{1}{h} \left(\frac{h}{1} + \frac{h^2}{2!} + \frac{h^3}{3!} + \frac{h^4}{4!} + \frac{h^5}{5!} + \dots \right)$$

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 $\int_a^b f(x)dx$, 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	0.2	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

► $k_2 = hf(x + \frac{h}{2}, y + k_1)$

► $k_2 = hf(x + \frac{h}{2}, y + \frac{k_1}{2})$

► $k_2 = hf(x - \frac{h}{3}, y - \frac{k_1}{3})$

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

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 ∞ or $-\infty$ or, in some cases, as both endpoints approach limits.

- TRUE
- 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 $n \times n$ 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**
- at least 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 $n \times n$ 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 $A - aI$.

- 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 $n \times n$ 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 exists and it is unique. Page No.122

- 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
- Stirling 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 $n \times n$ 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

25

Question # 132

Total Marks: 1

Below are all the finite difference methods EXCEPT _____.

- jacobi's method
- newton's backward difference method
- Stirling 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 ($|\det A|$) 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 $n \times n$ matrix. The number x is an eigenvalue of A if there exists a non-zero vector v such that _____.

- $Av = xv$
- **$Ax = xv$**
- $Av + xv = 0$
- $Av = Ax$

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 exists and it is unique.

- TRUE
- FALSE

Question # 145

Total Marks: 1

The characteristics polynomial of a 3×3 identity matrix is _____, if x is the eigen values of the given 3×3 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 $x_0, x_1, x_2, x_3, x_4, x_5, x_6, x_7, x_8$. 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 $f(x_{n+1})$ 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 $n \times n$ 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.

- 4th
- 7th
- 6th
- 5th

Question # 179

Total Marks: 1

In Richardson's extrapolation method, the extrapolation process is repeated until 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 $t=0.04$, $h=0.02$ is

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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

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

Question # 188

Total Marks: 1

The truncation error in Adam's predictor formula is

$$\frac{251}{720} h^5 y_{n+1}'$$

$$\frac{251}{720} h^5 y_n'$$

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$$\frac{19}{720} h^5 y_{n+1}'$$

$$\frac{19}{720} h^5 y_n'$$

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:

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

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 square _____ matrix has an inverse.

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

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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➤ $\hbar D = -\log(1 + \nabla)$

➤ $\hbar D = \log(1 - \nabla)$

➤ $\hbar D = -\log(1 - \nabla)$

Question # 206

Total Marks: 1

Shift operator is defined as

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

