MTH603 Midterm Solved MCQS By Junaid

Numerical analysis (Virtual University of Pakistan)

MTH603-Numerical Analysis

MID TERM MCQS

Prepared by: JUNAID MALIK

AL-JUNAID TECH INSTITUTE

1. While solving a system of liner equation, which of the following approach is economical for the computer memory?

- Direction
- Iterative (page 69)
- Analytical
- Graphical

2. The basic idea of relaxation method is to reduce the largest residual to ……..

- One
- Two
- Zero (page 83)
- None of the given choices

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

- Main diagonal (page 104)
- Last column
- Last row
- First row

4. 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

5. A 3 x 3 identity matrix have three and different Eigen values.

- True
- False

6. Which of the following is a reason due to which the LU decomposition of the system of linear equations; x+y = 1, x+y =2 is not possible?

- Associated coefficient matrix is singular
- All values of l's and u's can't be evaluated
- Determinant of coefficient matrix is zero
- All are equivalent

7. Gauss - Jordan Method is similar to …….

- Gauss–Seidel method
- Iteration's method
- Relaxation Method
- Gaussian elimination method (Page 95)

8. While using Relaxation method, which of the following is the largest Residual for 1st iteration on the system; 2x+3y = 1, 3x +2y = - 4 ?

- -4
- 3
- 2
- 1

8. Gauss–Seidel method is also known as method of …….

- Successive displacement (Page 263)
- Iterations
- False position
- None of the given choices

9. Jacobi's Method is a/an……

- Iterative method
- Direct method

10. 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

11. The 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

12. In …… method, a system is reduced to an equivalent diagonal form using elementary transformations.

- Jacobi's
- Gauss-Seidel
- Relaxation
- Gaussian elimination (Page 262)

13. The linear equation: 2x+0y-2=0 has -------- solution/solutions.

- Unique (Page 48)
- No solution
- Infinite many
- Finite many

14. Under elimination methods, we consider, Gaussian elimination and ……methods.

- Gauss-Seidel
- Jacobi
- Gauss-Jordan elimination (Page 48)
- None of the given choices

15. Which of the following method is not an iterative method?

- Jacobi's method
- Gauss-Seidel method
- Relaxation methods
- Gauss-Jordan elimination method

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

- True
- False (page 97)

17. Exact solution of 2/3 is not exists.

- True
- False

18. When the condition of diagonal dominance becomes true in Jacobi's Method.Then its means that the method is …….

- Stable
- Unstable
- Convergent (Page 70)
- Divergent

19. Gauss–Seidel method is similar to …….

- Iteration's method
- Regula-Falsi method
- Jacobi's method
- None of the given choices (Page 263)

20. Sparse matrices arise in computing the numerical solution of …….

- Ordinary differential equations
- Partial differential equations (Page 69)
- Linear differential equations
- Non-linear differential equations

21. While solving by Gauss-Seidel method, which of the following is the first Iterative solution for the system; x-2y =1, x+4y=4 ?

- (1, 0.75)
- (0,0)
- (1,0)
- (0,1)

22. While solving a system of linear equations by Gauss Jordon Method, after all the elementary row operations if there lefts also zeros on the main diagonal then which of the is true about the system?

- System may have unique solutions
- System has no solution
- System may have multiple numbers of finite solutions
- System may have infinite many solutions

23. Numerical methods for finding the solution of the system of equations are classified as direct and …… methods

- Indirect
- Iterative (Page 48)
- Jacobi
- None of the given choices

24. If the Relaxation method is applied on the system; 2x+3y = 1, 3x +2y = - 4, then largest residual in 1st iteration will reduce to -------.

- Zero
- 4
- -1

25. While using Relaxation method, which of the following is the Residuals for 1st iteration on the system; 2x+3y = 1, 3x +2y =4 ?

- (2, 3)
- (3,-2)
- (-2, 3)
- (1, 4)

25. If the order of coefficient matrix corresponding to system of linear equations is 3*3 then which of the following will be the orders of its decomposed matrices; 'L' and 'U'?

- Order of 'L' = 3*1, Order of 'U' = 1*3
- Order of 'L' = 3*2, Order of 'U' = 2*3
- Order of 'L' = 3*3, Order of 'U' = 3*3
- Order of 'L' = 3*4, Order of 'U' = 4*3

26. While solving the system; x–2y = 1, x+4y = 4 by Gauss-Seidel method, which of the following ordering is feasible to have good approximate solution?

Easiest

Complicated (Page 51)

27. 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)

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

- Bisection Method
- Regula Falsi Method
- Secant Method
- all of the given choices (Page 8)

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

- True
- False

30. 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

31. 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 ……

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

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

- 10
- 11

- 12
- 13

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

- Positive
- Negative

34. Differences methods find the _____ solution of the system.

- Numerical
- Analytical

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

- ► 2 (Simpson's 1/3 rule must use an even number of elements')
- ► 3
- ► 5
- ►7

36. Bisection and false position methods are also known as bracketing method and are always

- Divergent
- Convergent (Page 26)

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

- Singular
- None Singular: Every square non-singular matrix will have an inverse.
- Scalar
- Diagonal

38. In interpolation is used to represent the δ Forward difference Δ

- Central difference (Page 117)
- Backward difference

39. The base of the decimal system is _____

- 10
- 2
- 8

- None of the above.

40. Bisection method is …….. method

- ► Open Method
- ► Bracketing Method (page 26)

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

- Same
- Different

42. Eigenvalues of a symmetric matrix are all _____ .

- Real (page 104)
- Complex
- Zero
- Positive

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

- TRUE (Page 69)
- FALSE

44. Below are all the finite difference methods EXCEPT _____.

- Jacobi's method
- Newton's backward difference method
- Stilling formula
- Forward difference method

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

- TRUE
- FALSE

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

- True
- False

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

- True
- False

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

- Diagonal Page No.70
- . Upper triangular
- . Lower triangular
- . Scalar

49. For differences methods we require the set of values.

- True
- False

50. 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

51. Central difference method seems to be giving a better approximation, however it requires more computations. Page No.71

- True
- False

52. Iterative algorithms can be more rapid than direct methods.

- True
- False

53. Central Difference method is the finite difference method.

- True
- False

54. Back substitution procedure is used in …….

- Select correct option:
- Gaussian Elimination Method
- Jacobi's method
- Gauss-Seidel method

- None of the given choices

55. 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

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

- True (Page102)
- False

57. Power method is applicable if the eigen values are _____.

- Real and distinct (Page102)
- Real and equal
- positive and distinct
- negative and distinct

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

- Quadratic (Page174)
- Linear
- Cubic
- Quartic

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

- True
- False

60. The predictor-corrector method an implicit method. (Multi-step methods)

- True (Page 212)
- False

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

- True
- False

62. The Trapezoidal rule is a numerical method that approximates the value of a._____. Indefinite integral

- Definite integral (Page176)
- Improper integral
- Function

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

- Anti derivative
- Derivatives

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

- Diverge
- Converge

65. 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 -∞ or, in some cases, as both endpoints approach limits.

- TRUE
- FALSE

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

- TRUE
- FALSE

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

- Anti derivative
- Derivative

- Error
- Value

68. 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 _____. Chose the correct option :

- Constant
- Finite
- Infinity
- Zero

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

- Converges
- Diverges

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

- TRUE
- FALSE

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

- TRUE
- FALSE

72. Eigenvectors of a symmetric matrix are orthogonal, but only for distinct eigenvalues.

- TRUE
- FALSE

73. 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=xv
- Av + xv=0
- Av = Ax1

- Av = λv

74. In Jacobi's Method, the rate of convergence is quite _____ compared with other methods.

- Slow
- Fast

75. Numerical solution of 2/3 up to four decimal places is _____.

- 0.667
- 0.6666
- 0.6667
- 0.666671

76. Symbol used for forward differences is

- Δ (Page 12)
- δ
- μ

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

- δ =E−E-1
- δ = E+E-1
- δ = E1/2+E1/2
- δ = E1/2 −E1/2 1 1
- $d = E^{\frac{1}{2}} - E^{-\frac{1}{2}} (pag152)$

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

- 1
- 2
- 3 (Page 41)

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

- Exits, unique
- Exists, consistent
- Trivial, unique
- Non trivial, inconsistent

80. Two matrices with the _____ characteristic polynomial need not be similar.

- Same
- Different

81. In …… method, the elements above and below the diagonal are simultaneously made zero.

- Jacobi's
- Gauss-Seidel
- Gauss–Jordon Elimination (Page 59)
- Relaxation

82. Which of the following is equivalent form of the system of equations in matrix form; AX=B ?

- XA = B
- X = B (Inverse of A)
- X = (Inverse of A)B
- BX = A

83. If the determinant of a matrix A is not equal to zero then the system of equations will have…….

- a unique solution
- Many solutions
- Infinite many solutions

- None of the given choices

84. Sparse matrix is a matrix with …….

- Some elements are zero
- Many elements are zero (page 69)
- Some elements are one
- Many elements are one

85. How many Eigen vectors will exist corresponding to the function; Exp(ax) = e^ax, when the matrix operator is of differentiation?

- Infinite many
- Finite Multiple
- None

86. Which of the following is the meaning of partial pivoting while employing the row transformations? Select correct option:

- Making the largest element as pivot (Page 50)
- Making the smallest element as pivot
- Making any element as pivot
- Making zero elements as pivot

87. .Differences methods are iterative methods.

- TRUE
- FALSE

88. Eigenvalues of a _____ matrix are all real.

- Symmetric
- Anti symmetric
- Rectangular
- Triangular

93. If a system of equations has a property that each of the equation possesses one large coefficient and the larger coefficients in the equations correspond to different unknowns in different equations, then which of the following iterative method id preferred to apply?

- Gauss-Seidel method
- Gauss-Jordon method
- Gauss elimination method
- Crout's method

94. For a system of linear equations, the corresponding coefficient matrix has the value of determinant; |A| = 0, then which of the following is true?

- The system has unique solution
- The system has finite multiple solutions
- The system has infinite may solutions
- The system has no solution (Page 48)

95 .For the system; 2x+3y = 1, 3x +2y = - 4, if the iterative solution is (0,0) and 'dxi = 2' is the increment in 'y' then which of the following will be taken as next iterative solution?

- (2,0)
- (0,3)
- (0,2)
- (1,-4)

96. While using Relaxation method, which of the following is increment 'dxi'corresponding to the largest Residual for 1st iteration on the system; 2x+3y = 1, 3x +2y = - 4 ?

- -2
- 2
- 3
- 4

97. If system of equations is inconsistent then its means that it has ……

- No Solutions
- Many solutions Infinite
- Many solutions
- None of the given choices

98. Relaxation Method is a/an …….

- Direct method
- Iterative method

99. How many Eigen values will exist corresponding to the function; Exp(ax) = e^ax, when the matrix operator is of differentiation?

- Finite Multiple
- Infinite many
- Unique
- None

100. The eigenvectors of a square matrix are the non-zero vectors that, after being multiplied by the matrix, remain …… to the original vector.

- Perpendicular
- Parallel
- Diagonal

None of the given choices

101. In Jacobi's method after finding D1, the sum of the diagonal elements of D1 should be …… to the sum of the diagonal elements of the original matrix A.

- Greater than
- Less than
- Same (Page 106)

- Different

102. In the context of Jacobi's method for finding Eigen values and Eigen vectors of a real symmetric matrix of order 2*2, if |-5| be its largest off-diagonal and its two equal diagonal values are '3' then which of the following will be its corresponding argument value 'theta' of Orthogonal Matrix?

- Pi/3
- Pi/6
- Pi/2
- Pi/4

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

- Transcendental Equation (Page 6)
- Algebraic
- Polynomial
- Linear

104. In interpolation is used to represent the d Forward difference?

- Central difference
- Backward difference

105. 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

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

- Independent
- Dependent

107. While using Jacobi method for the matrix

- $A = \begin{bmatrix} 1 & \sqrt{3} & \sqrt{2} \\ \sqrt{3} & 3 & 2 \\ \sqrt{2} & 2 & 3 \end{bmatrix}$
- $\tan 2\theta = \frac{2a_{13}}{a_{33} - a_{11}}$
- $\tan 2\theta = \frac{2a_{23}}{a_{22} - a_{33}}$
- $\tan 2\theta = \frac{2a_{13}}{a_{11} - a_{33}}$
- $\tan 2\theta = \frac{2a_{12}}{a_{11} - a_{22}}$

108. Power method is applicable if the Eigen vector corresponding to pigeon values Ara linearly independent

- 1 TRUE
- 2FALSE

109. In Jacobi method we assume that the_____ element does not vanish

- 1 Diagonal
- 2 off – Diagonal
- 3 Row
- 4 column

110. In Jacobi method that rat off convergence is quit slow compared with other method

- TRUE
- FALSE

111. White solving the system linear equation

x-y=2, -x+y=3 By Jacobi method if (0, 0) be first approximate solution then which of that following is second approximate solution

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

112. The liner equation: 0x+0y = 2 has _____ solution

- unique
- no solution
- infinite many
- finite many

113. When the condition of diagonal dominance become true in Jacobi method then it's means that tha method is

- 1 stable
- 2 un- stable
- 3 convergent
- 4 Divergent

114. A series 16+8+4+2+1 is replaced by the series 16+8+4+2 then it is called

- inherent error
- local round of error
- local truncation error
- typing error

115. Which of the following difference table for the given value of x and y?

X	0.1	0.5	0.9
Y	0.003	0.148	0.37

x	y	Δy	Δy^2
0.1	0.003	0.145	0.077
0.5	0.148	0.222	

-

2

x	y	Δy	Δy^2
0.1	0.003	0.151	0.669
0.5	0.148	0.518	

3

x	y	Δy	Δy^2
0.1	0.003	0.287	0.664
0.5	0.148	0.357	

4

x	y	Δy	Δy^2
0.1	0.003	0.567	0.704
0.5	0.148	0.137	

114. If one root of the equal is 3-7i, than the other root will be

- 1 -3-7i
- 2 -3+7i
- 3 3-7i
- 4 3+7i

115. Which of the following system of equation is diagonally dominance

- $2x+13y+5z=7$
  $8x+y-z=5$
  $x+2y+9z=3$

- $8x+y-z=5$
  $2x+13y+5z=7$
  $x+2y+9z=3$
- $x+2y+9z=3$
  $8x+y-z=5$
- $x+2y+9z=3$
  $8x+y-z=5$
  $x+2y+9z=3$
- $2x+13y+5z=7$

116. $3x^4-2x^2-24=0$ has at least complex root (s)

- 1
- **2**
- 3
- 4

117. While using the relaxation method for finding the solution if the belt given system which of the following increment will be introduce

$6x_1-2x_2+3x_3=1$

- $dx_1=\frac{R_1}{a_{22}}$
- $dx_1=\frac{R_1}{a_{11}}$
- $dx_1=\frac{R_2}{a_{22}}$
- $dx_3=\frac{R_3}{a_{33}}$

118. If. $A=\begin{bmatrix}1 & 2 & 1\\ 0 & 3 & -1\\ 0 & 1 & 2\end{bmatrix}$

1 $A=\begin{bmatrix} -1 & \frac{1}{2} & \frac{1}{2} \\ 0 & -\frac{3}{10} & -\frac{1}{2} \\ 0 & -\frac{1}{2} & -\frac{3}{10} \end{bmatrix}$

2 $A=\begin{bmatrix} 1 & -\frac{1}{2} & -\frac{1}{2} \\ 0 & \frac{3}{10} & \frac{1}{10} \\ 0 & -\frac{1}{2} & -\frac{3}{10} \end{bmatrix}$

3 $A=\begin{bmatrix} 1 & -\frac{1}{2} & \frac{1}{2} \\ 0 & \frac{5}{10} & \frac{1}{10} \\ 0 & -\frac{1}{2} & -\frac{2}{10} \end{bmatrix}$

4 $A=\begin{bmatrix} 0 & -\frac{1}{2} & \frac{1}{2} \\ 1 & \frac{2}{5} & \frac{1}{10} \\ 0 & -\frac{1}{2} & -\frac{2}{10} \end{bmatrix}$

119. Let [A]be a 3+3 real system matrix whit

A $[a_{13}]$ be numerically the largest of diagonal element of then we can construct orthogonal matrix so by Jacobi method as

- $\begin{bmatrix} \cos\theta & 0 & -\sin\theta \\ 0 & 1 & 0 \\ \sin\theta & 0 & \cos\theta \end{bmatrix}$
- $\begin{bmatrix} \cos\theta & 0 & -\sin\theta \\ \sin\theta & 1 & 0 \\ 0 & 0 & \cos\theta \end{bmatrix}$

- $\begin{bmatrix} 1 & 0 & -\sin\theta \\ 0 & -\sin\theta & 0 \\ 0 & 0 & \cos\theta \end{bmatrix}$
- $\begin{bmatrix} 1 & 0 & 0 \\ 0 & -\sin\theta & \cos\theta \\ 0 & \sin\theta & \cos\theta \end{bmatrix}$

120. While using Power method that computed vector

$$u^{(2)} = \begin{pmatrix} 5.571482 \\ 9.57142 \\ 10.9474 \end{pmatrix}$$

- $u^{(2)} = 12.21423 \begin{pmatrix} 0.456142 \\ 0.783628 \\ 1 \end{pmatrix}$
- $u^{(2)} = 9.57142 \begin{pmatrix} 0.456142 \\ 1 \\ 0.783628 \end{pmatrix}$
- $u^{(2)} = 5.57142 \begin{pmatrix} 1 \\ 0.456142 \\ 0.783628 \end{pmatrix}$
- $u^{(2)} = 3.523498 \begin{pmatrix} 1 \\ 1.717928 \\ 2.937987 \end{pmatrix}$

121. Let [A]be a 3×3 real symmetric matrix with $|a_{12}|$be then numerically largest off _ diagonal element then using Jacobi method value of θ can be found by

- $\tan 2\theta = \dfrac{2a_{23}}{a_{33} - a_{22}}$
- $\tan 2\theta = \dfrac{2a_{23}}{a_{22} - a_{33}}$

- $\tan 2\theta = \frac{2a_{12}}{a_{11} - a_{22}}$
- $\tan 2\theta = \frac{2a_{13}}{a_{11} - a_{33}}$

122. The number system that has a base 2 is called _ system

- octal
- Binary
- Decimal
- Hexadecimal

123. Which of the following system equation diagonally dominant

- $\begin{aligned} 3x &+y &+z &= 3 \\ x &+y &+5z &= 2 \\ 2x &+5y &-z &= 4 \end{aligned}$
- $\begin{aligned} x &+y &+5z &= 2 \\ 3x &+y &+z &= 3 \\ 2x &+5y &-z &= 4 \end{aligned}$
- $\begin{aligned} 2x &+5y &+z &= 4 \\ 3x &+y &+z &= 3 \\ x &+y &-5z &= 5 \end{aligned}$
- $\begin{aligned} 3x &+y &+z &= 3 \\ 2x &+5y &-z &= 4 \\ x &+y &+5z &= 2 \end{aligned}$

124. If a system of equation has a property that each of the equation possesses one large coefficient and the larger coefficients in the equation correspond to different unknown in different equation then which of the following iterative method id preferred to apply?

- Gauss Jordon method
- Gauss Seidel method
- Gauss elimination method
- courts method

125. While using Jacobi method for the matrix

$$\begin{bmatrix} 1 & \frac{1}{4} & \frac{1}{2} \\ \frac{1}{4} & \frac{1}{3} & \frac{1}{4} \\ & & \end{bmatrix}$$

- $\tan 2\theta = \dfrac{2a_{13}}{a_{33} - a_{11}}$
- $\tan 2\theta = \dfrac{2a_{23}}{a_{22} - a_{33}}$
- $\tan 2\theta = \dfrac{2a_{13}}{a_{11} - a_{33}}$
- $\tan 2\theta = \dfrac{2a_{12}}{a_{11} - a_{22}}$

126. While using Jacobi method for the matrix

$$\begin{bmatrix} 1 & \frac{1}{4} & \frac{1}{2} \\ \frac{1}{4} & \frac{1}{3} & \frac{1}{4} \\ & & \end{bmatrix}$$

- $\begin{bmatrix} 1 & 0 & 0 \\ 0 & \cos 0.4480 & -\sin 0.4480 \\ 0 & \sin 0.4480 & \cos 0.4480 \end{bmatrix}$
- $\begin{bmatrix} 0 & \sin 0.4480 & \cos 0.4480 \\ 0 & \cos 0.4480 & -\sin 0.4480 \\ 0 & 0 & 1 \end{bmatrix}$
- $\begin{bmatrix} \cos 0.4480 & 0 & -\sin 0.4480 \\ 0 & 1 & 0 \\ \sin 0.4480 & 0 & \cos 0.4480 \end{bmatrix}$

- $\begin{bmatrix} \cos 0.4480 & 0 & 0 \\ 0 & -\sin 0.4480 & 0 \\ 0 & 0 & 1 \end{bmatrix}$

127. While using the relaxation method for finding the solution of the following system

$5x_1 + x_2 - 3x_3 = 5$

$X_1 + 5x_2 + 2x_3 = 7$ with the initial vector (0;0;0;0) the residuals wound be

- $R_1 = 2, R_2 = 1, R_3 = 1$
- $R_1 = 1, R_2 = 3, R_3 = 2$
- $R_1 = 5, R_2 = 7, R_3 = 3$
- $R_1 = 3, R_2 = 2, R_3 = 1$

128. In Jacobi method the rate of convergent is quite _____ compared with other method

- Slow
- Fast

129. In the context of Jacobi method for finding Eigen values and Eigen vector of a real symmetric matrix of order 2*2 if |-5| be it's largest off diagonal then which of the following will be it's corresponding off diagonal value of orthogonal matrix

- cos (theta), -cos (theta)
- sin (theta), - cos (theta)
- sin (theta) – sin (theta)
- -sin(theta), cos (theta)

130. Which method required is derivative of that solution

- Bisection method
- Regular falsi method
- Muller method

- Newton Raphson method

131. If the Relaxation method is applied on the system 2x+3y=1 3x+2y=-4 then largest residual in 1st iteration will reduce to

Select the correct option

- 1 zero
- 2. 4
- 3. -1
- 4 -1

132. The number system that has a base 8 is called _ system

- Decimal
- octal
- Binary
- Hexadecimal

133. If the determinant of a matrix A is not equal to zero then the system of equation will have

- a unique solution
- many solution
- infinite many solution
- none of the given choice

134. In Gauss Seidel method each equation of the system is solved for the unknown with _ coefficient in terms of remaining unknown

- smallest
- largest
- any largest
- any negative

135. Which of the following system of equation diagonally dominant

- $3x+y+z=3$
  $2x+5y-z=4$
  $x+y+x=3$
- $3x+y+z=3$
  $2x+y+z=4$
- $x+5y-z=3$
  $2x+y+z=4$
  $3x+y+z=3$
- $x+5y-z=2$
  $2x+y+z=4$
- $3x+y+z=3$

136. While using Power method from the resultant normalize vector

$$u^{(5)}=12.4817\begin{pmatrix}0.436521\\0.625431\\1.0\end{pmatrix}$$

We have the largest Eigen value and the corresponding eigenvector as

- $\lambda=0.625431,(x)=\begin{pmatrix}0.436521\\0.625431\\1.0\end{pmatrix}$
- $\lambda=12.4817,(x)=\begin{pmatrix}0.436521\\0.625431\\1.0\end{pmatrix}$
- $\lambda=0.436521,(x)=\begin{pmatrix}0.436521\\0.625431\\1.0\end{pmatrix}$
- $\lambda=12.4817,(x)=\begin{pmatrix}1.0\\0.625431\\0.436521\end{pmatrix}$

137. Let[A]be a 3× 3 real symmetric matrix which

$[a_{13}]$

Be a numerically the largest off – Diagonal element then we can construct orthogonal metric S1 Jacobi method as

- $\begin{bmatrix} \cos\theta & 0 & -\sin\theta \\ \sin\theta & 0 & \cos\theta \\ 0 & 1 & 0 \end{bmatrix}$
- $\begin{bmatrix} \cos\theta & 0 & -\sin\theta \\ 0 & 1 & 0 \\ \sin\theta & 0 & \cos\theta \end{bmatrix}$
- $\begin{bmatrix} \cos\theta & 0 & -\sin\theta \\ \sin\theta & 0 & \cos\theta \\ 0 & 0 & 1 \end{bmatrix}$
- $\begin{bmatrix} 1 & 0 & 1 \\ \sin\theta & 0 & \cos\theta \\ 0 & 0 & 1 \end{bmatrix}$

138. A 3×3 identity metric have three and _ Eigen values

- Same
- Different

139. Back substitution procedure is used

- Gaussian Elimination method
- 2. Jacobi method
- none of the given choice
- Gauss Seidel method

140. Which method is required a derivative of a solution

Select the correct option

- Regular falsi method
- Neuton Raphson method
- Muller method
- Bisection method

141. If a system of equation has a property that each of the equation possesses one large coefficient in the equations correspond to different unknown in different equation then which of the following iterative method id preferred to apply?

- Crout s method
- Gauss Seidel method
- Gauss – Jordan method
- Gauss elimination method

142. While using Power method form the resultant normalize vector

$$u^{(3)} = 3.17890\begin{pmatrix}1.0\\1.231926\\1.421389\end{pmatrix}$$

We have the largest Eigen value and the corresponding eigenvector as

- $\lambda = 3.17890, (X) = \begin{pmatrix}1.231926\\1.0\\1.421389\end{pmatrix}$
- $\lambda = 3.17890, (X) = \begin{pmatrix}1.0\\1.231926\\1.421389\end{pmatrix}$
- $\lambda = 3.17890, (X) = \begin{pmatrix}1.421389\\1.231926\\1.0\end{pmatrix}$
- $\lambda = 3.17890, (X) = \begin{pmatrix}1.0\\1.421389\\1.231926\end{pmatrix}$

143. While using the Gauss -Seidel method for finding the solution of equation the following system

$$3x + y + z = 11$$
$$2x + 5y + z = 16$$
$$x + y + 5z = 4$$

- $x = 1 - \frac{2}{3}y - \frac{2}{3}z$
  $y = 1 - \frac{3}{2}y - \frac{3}{2}z$
  $z = 1 - \frac{y}{2} - \frac{x}{2}$
- $x = \frac{1}{3}(11 - y - z)$
  $y = \frac{1}{5}(16 - 2x - z)$
  $z = \frac{1}{5}(4 - x - z)$
- $x = \frac{1}{3}(11 - y - z)$
  $y = \frac{1}{5}(4 - x - z)$
  $z = \frac{1}{5}(16 - 2x - z)$
- $x = \frac{1}{3}(4 - x - z)$
  $y = \frac{1}{5}(411 - y - z)$
  $z = \frac{1}{5}(16 - 2x - z)$

143. If the point element happens to be a zero then the i-th column elements are searched for the numerically _ element

Select the correct option

- Largest
- Smallest

144. Which of the following system of linear equation has a strictly diagonally dominant coefficient matrix

- $6x_1 \quad -2x_2 + 3x_3 \quad = 1$
  $-2x_1 \quad +7x_2 + 2x_3 \quad = 5$
  $x_1 \quad x_2 - 5x_3 \quad = -13$
- $-2x_1 \quad 7x_2 + 2x_3 \quad = 5$
  $6x_1 \quad -2x_2 + 3x_3 \quad = 1$
  $x_1 \quad x_2 - 5x_3 \quad = -13$
- $-2x_1 \quad 7x_2 + 2x_3 \quad = -13$
  $6x_1 \quad -2x_2 + 3x_3 \quad = 5$
  $x_1 \quad x_2 - 5x_3 \quad = 1$
- $-2x_1 \quad 7x_2 + 2x_3 \quad = -13$
  $6x_1 \quad x_2 + x_3 \quad = 5$
  $x_1 \quad -2x_2 + 3x_3 \quad = 1$

145. Which of the following method is not an iterative method ?

- 1 Jacobi s'method
- 2 Gauss Seidel method
- Gauss -Jorden elimination method
- Relaxation method

146. If the Relaxation method is applied on the system 2x + 3y =1 3x +2y=-4 then largest residual in 1^{st}

- zero
- -1
- 4
- -1

147. While using the relaxation method for finding the solution of the following system

$8x_1 \quad +3x_2 \quad -2x_3 = 5$
$4x_1 \quad +7x_2 \quad +2x_3 = 9$
$3x_1 \quad +5x_2 \quad +9x_3 = 2$

With the initial vector (0;0;0;) the residual would be

- $R_1 = 2, R_2 = 1, R_3 = 1$
- $R_1 = 1, R_2 = 3, R_3 = 2$
- $R_1 = 5, R_2 = 9, R_3 = 2$
- $R_1 = 3, R_2 = 2, R_3 = 1$

148. While using Power method the computed vector

$$u^{(1)} = \begin{pmatrix} 12 \\ -6 \\ -2 \end{pmatrix}$$

Will be normalize from as

- $$u^{(1)} = -2\begin{pmatrix} -\frac{12}{2} \\ \frac{6}{2} \\ 1 \end{pmatrix}$$
- $$u^{(1)} = 12\begin{pmatrix} -\frac{12}{2} \\ \frac{6}{2} \\ 1 \end{pmatrix}$$
- $$u^{(1)} = 12\begin{pmatrix} 1 \\ -\frac{6}{12} \\ -\frac{2}{12} \end{pmatrix}$$

- $u^{(1)} = 12\begin{pmatrix} 1 \\ -\frac{3}{12} \\ -\frac{6}{12} \end{pmatrix}$

149. In full providing we interchange rows and columns such that the element in the matrix of the variable also get charged

- 1 largest
- 2Middle
- 3smallest
- none of the given choice

150. For the system 2x+3y=1 3x + 2y =-4 if the iterative solution is (0 ; 0,) and dxi =2 is the increment in y then which of the following will bi taken as next iterative so

- 1(0;3)
- **2(0;2)**
- 3(1;4)
- 4(2;0)

151. While using Relaxation method which of the following is increment " dxi; corresponding to the largest Residual for 1st iteration on the system 2x + 3y =1 3x + 2y =-4 ?

- 3
- .-2
- 4
- 2

152. In Jacobi method we assume that the……. Element does not vanish

- Row
- column

- off – diagonal
- diagonal.

153. Power method is applicable if the Eigen vector corresponding to Eigen value are linearly independent

- TRUE
- False

154. If the determinant of the matrix A is equal to zero then the system of equation will have ….

- No solution or infinitely many solution
- unique solution
- infinite many solution
- no solution

155. How many Eigen vector will exist corresponding to the function ExP(ax)=e^ax when the matrix operator is off differentiation?

- 1 infinity many
- 2none
- 3. Unique
- 4 finite multiple

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

- False
- True

157. Which of the following system linear equation has a strictly diagonally dominant co efficient matrix ?

- $$\begin{aligned} 4x_1 &+2x_2 &-1x_3 &= -4 \\ x_1 &+5x_2 &+1x_3 &= 10 \\ x_1 &+x_2 &+3x_3 &= 2 \end{aligned}$$

- $4x_1 + 2x_2 - 5x_3 = -4$
  $x_1 + 5x_2 - 1x_3 = 10$
  $x_1 + x_2 + 3x_3 = 2$
- $x_1 + 5x_2 - 5x_3 = -4$
  $4x_1 + 2x_2 - 1x_3 = 10$
  $x_1 + x_2 + 3x_3 = 2$
- $x_1 + 5x_2 - 5x_3 = -4$
  $x_1 + 2x_2 + 3x_3 = 10$
  $4x_1 + 2x_2 - 1x_3 = 10$

158. Exact solution 2/3 is not exist?

- 1 False
- 2 True

159. The Gauss -sedial method is applicable to strictly diagonally dominant or symmetric…definite matrix A

- Positive
- Negative

60 question

While using Jacobi method for the matrix

$$\begin{bmatrix} 2 & 0 & 0 \\ 0 & 2 & 1 \\ 0 & 1 & 2 \end{bmatrix}$$

The value of the theta θ can be found as

- $\tan 2\theta = \frac{2a_{13}}{a_{33} - a_{11}}$
- $\tan 2\theta = \frac{2a_{23}}{a_{22} - a_{11}}$
- $\tan 2\theta = \frac{2a_{13}}{a_{11} - a_{33}}$

- $\tan 2\theta = \dfrac{2a_{23}}{a_{22} - a_{33}}$