PUNE VIDYARTHI GRIHA'S

COLLEGE OF SCIENCE AND TECHNOLOGY

Affiliated to University of Mumbai

Question Bank

Class: S.Y.B. Sc.CS **Semester: IV**

Subject: Linear Algebra using Python

UNIT 1

1. The absolute value of 3+4i is _____
   - A. 4
   - B. 5
   - C. 6
   - D. 0
2. In GF(2),1+1 is equal to ___
   - A. 1
   - B. 0
   - C. 1 and 0
   - D. 2
3. i=______
   - A. 1
   - B. -1
   - C. square root of -1
   - D. 0
4. Galois field contain ____ elements
   - A. 0
   - B. 1
   - C. 2
   - D. 3
5. The _____ form of complex number is z=x+iy
   - A. polar
   - B. exponential
   - C. cartesian
   - D. complex
6. If z=2+3i the IzI= _____
   - A. 13
   - B. square root of 13
   - C. square root of 12
   - D. 12
7. _____ form of complex number is z=r(Cos θ+isin θ)

A. polar
B. exponential
C. cartesian
D. complex

8. θ is called the _____ of z
   A. amplitude
   B. arguement
   C. both amplitude and arguement
   D. modulus
9. x is called the ____ part in z=x+iy
   A. real
   B. imaginary
   C. partial
   D. complex

10. y is called the ____ part in z=x+iy
    A. real
    B. imaginary
    C. partial
    D. complex
11. (2+3i)+(4+7i)=_______
    A. 5i+11
    B. 5+11i
    C. 6+10i
    D. 6i+10
12. ___________ is a set V over the field F with binary operation + and .
    A. vector space
    B. span
    C. subspace
    D. field
13. ________ is a subspace of V which is called as trivial subspace
    A. 0
    B. 1
    C. both 0 and 1
    D. 2
14. The square root of 8-6i is _________
    A. 3+i and 3-i
    B. 3-i and -3+i
    C. -3+i and -3-i
    D. 3+i and -3-i
15. (R,+,.) is _______
    A. field
    B. vector space
    C. subspace
    D. linear span
16. If for x, y belongs to V and + is commutative in V then x+y=______
    A. x+y
    B. y+x

C. y-x
D. x-y

17. Let V be a Vector Space and W be a non empty subset of V.bThen W is ______of V iff a.X+b.Y belongs to W where x,y belongs to W and a,b are real numbers
    A. field
    B. vector space
    C. subspace
    D. linear span
18. If z=7+i then conjugate of z is ______
    A. -7-i
    B. 7-i
    C. -7+i
    D. 7+i
19. If z_1=2+i and z_2=2-i then $z_1.z_2$=_____
    A. 4
    B. 5
    C. 6
    D. 8
20. Conjugate of z=2+3i is _______
    A. 2-3i
    B. -2-3i
    C. -2+3i
    D. 2+3i
21. There are ______ forms of complex number z
    A. 1
    B. 2
    C. 3
    D. 4
22. The absolute value of the number z = 1-i is:
    A. 2
    B. 0
    C. $\sqrt{2}$
    D. 4
23. A non empty subset W of a vector space V over field F is called a _______ of V
    A. Linear combination
    B. Basis
    C. Span
    D. Subspace
24. The _______ of two subspace is a subspace of V
    A. Union
    B. Intersection
    C. Linear combination
    D. Span
25. The dot product of vectors u=(1,-1,2) and v=(2,-3,4) is ______
    A. 11
    B. 12
    C. 13

D. 18

26. If u=(1,2,3) and v=(2,7,-5) then ||u||=______
    A. 14
    B. $\sqrt{14}$
    C. 6
    D. 36
27. If u=(1,2,3) and v=(2,7,-5) then ||v||=______
    A. 78
    B. $\sqrt{78}$
    C. 14
    D. 4
28. The set of all linear combination of finite elements of S is called as _______ of S
    A. Linear span
    B. Basis
    C. Subspace
    D. Vector space
29. What is a complex number?
    A. A very small number that can't be expressed as a point on a two-dimensional plane.
    B. A number of the form a + bi, where a and b are real numbers, and i = √(-1).
    C. A number that involves real numbers a and b, where a/b is always an irrational number.
    D. A number of the form ai + b, where the difference between ai and b = √(-1)
30. How do we find the complex conjugate of a complex number a + bi?
    A. We change the sign of bi.
    B. We change the sign of a.
    C. We don't do anything.
    D. We change the sign of both a and bi.
31. In GF(2),1+1+1+1 is equal to ___
    A. 1
    B. 0
    C. 1 and 0
    D. 4
32. 0 is a subspace of V which is called as _______subspace
    A. Trivial
    B. Zero
    C. Binary
    D. whole
33. Which of the following is a complex number in standard form?
    A. 3 - 4i
    B. 4i
    C. 12
    D. -8i
34. Find the product and simplify your answer. (4 + 9i)(4 - 9i)
    A. 97
    B. -65
    C. 97 + 72i
    D. -65 + 72i

35. The angle between two vectors is given as ______
   A. ||u||||v|| cosθ
   B. Uv
   C. u/vcosθ
   D. u/v
36. i^2= ____
   A. 1
   B. -1
   C. 0
   D. 2
37. r is called as ______
   A. amplitude
   B. modulus
   C. arguement
   D. angle
38. If z_1 = -2 - 3i and z_2 = 2 + 4i, what is $z_1 + z_2$?
   A. 2+3 i
   B. 1
   C. i
   D. 0
39. If u=(1,5) and v=(4,-2) then dot product is ____
   A. 5
   B. -6
   C. 4
   D. 8
40. A non empty subset W of a ________V over field F is called a subspace of V
   A. vector space
   B. Linear combination
   C. Basis
   D. Span
41. If u=(2,9) and v=(7,11) then u+v is ______
   A. (11,20)
   B. (9,20)
   C. (2,20)
   D. (5,20)
42. _______ field contains two elements
   A. Galois
   B. Vector
   C. Complex
   D. Integer
43. The set of all linear combination of ______elements of S is called as linear span of S
   A. Infinite
   B. Finite
   C. Vector
   D. Scalar
44. W is said to be _______ of v is ax+by∈W
   A. Vector space
   B. Subspace

C. Linear combination
D. Linear span

45. Norm of (2,-1,3) is ______
A. 14
B. $\sqrt{14}$
C. 28
D. 15

46. In GF(2),1.1+1.1 is equal to ___
A. 1
B. 0
C. -1
D. 2

47. A vector in which most of the component are zero is called _______ vector
A. Zero
B. Unit
C. Sparse
D. Trivial

48. ||u||=1 , it is called as ______ vector
A. Zero
B. Unit
C. Sparse
D. Trivial

49. z=3+4i , 3 is called the _____ part
A. real
B. imaginary
C. simple
D. complex

50. z=3+4i , 4i is called the _____ part
A. real
B. imaginary
C. simple
D. complex

UNIT 2

51. The determinant of identity matrix is?
A. 1
B. 0
C. Depends on the matrix
D. I

52. If determinant of a matrix A is Zero than ___________
A. A is a Singular matrix
B. A is a non-Singular matrix
C. A is zero matrix
D. A is null matrix

53. The Inverse exist only for _________ matrices.
A. Singular
B. Nonsingular

C. Symmetric
D. Skew symmetric

54. A symmetric matrix is a one in which?
    A. All diagonal elements are zero
    B. All diagonal elements are 1
    C. $A = A^T$
    D. $A = -A^T$
55. A matrix having one row and many columns is known as?
    A. Row matrix
    B. Column matrix
    C. Diagonal matrix
    D. Scalar matrix

56. If A is a lower triangular matrix then A^T is a __________
    A. Upper triangular matrix
    B. Lower triangular matrix
    C. Diagonal matrix
    D. Scalar matrix
57. There are ____ methods to find inverse of matrix
    A. 1
    B. 2
    C. 3
    D. 4
58. For matrix A if $A.A^T = I$, where I is identity matrix then A is?
    A. Orthogonal matrix
    B. Nilpotent matrix
    C. Idempotent matrix
    D. Scalar matrix
59. A matrix having many rows and one column is known as?
    A. Row matrix
    B. Column matrix
    C. Diagonal matrix
    D. Scalar matrix
60. A square matrix A = [aij]nxn, if aij = 0 for i > j then that matrix is known as ________
    A. Upper triangular matrix
    B. Lower triangular matrix
    C. Unit matrix
    D. Identity matrix
61. Any _______ equation in n variables can be written in matrix form as AX=B
    A. Linear
    B. Homogeneous
    C. Nonhomogeneous
    D. trivial
62. Linear function is also known as ______
    A. Linear map
    B. Operator

C. Transformation
D. Subspace

63. Ker f=0 iff f is _____
A. Injective
B. Surjective
C. Bijective
D. Isomorphic

64. Kernel of a linear function is ______
A. Vectorspace
B. Subspace
C. Linear span
D. Map

65. Image of a linear function is ______
A. Vectorspace
B. Subspace
C. Linear span
D. Map

66. A set of vectors are said to be linearly independent if all the scalars are _____
A. 1
B. 0
C. Same
D. Positive

67. A set of vectors are said to be ___________ if there exist atleast one nonzero scalar
A. linearly independent
B. linearly dependent
C. linear combination
D. linear span

68. A system of single nonzero vector is always _______
A. linearly independent
B. linearly dependent
C. linear combination
D. linear span

69. Basis of V is always ______
A. linearly independent
B. linearly dependent
C. linear combination
D. linear span

70. Linear combination of elements of B is equal to _____
A. Vector space
B. Subspace
C. Linear span
D. Map

71. Basis of R^2 consist of _____ vectors
A. 1
B. 2

C. 3
D. 4

72. Basis of R^3 consist of _____ vectors
   A. 1
   B. 2
   C. 3
   D. 4
73. __________ of vector space is defined as the number of vectors in the basis
   A. Basis
   B. Dimension
   C. Linear span
   D. Map

74. Number of non zero rows in the matrix determine the_______
   A. eigen value
   B. eigen vector
   C. rank
   D. basis
75. Rank is equal to the number of ______________ rows in row echelon form
   A. linearly independent
   B. linearly dependent
   C. linear combination
   D. linear span
76. The dimension of row space is called the _____ of matrix A
   A. Rank
   B. Nullity
   C. Kernel
   D. Image
77. The dimension of null space is called the _____ of matrix A
   A. Rank
   B. Nullity
   C. Kernel
   D. Image
78. Rank(T)+Nullity(T)=________
   A. Basis of V
   B. Dim of V
   C. L(V)
   D. Subspace of V
79. _________ is denoted by S^0
   A. Rank
   B. Nullity
   C. Annihilator
   D. Image
80. A linear equation with right side equal to zero is called ______equation
   A. Linear system
   B. Saturated

C. Homogeneous
D. Non homogeneous

81. A linear equation with right side not equal to zero is called ______
    A. Linear system
    B. Saturated
    C. Homogeneous
    D. Non homogeneous
82. The number of elements in the basis set of a vector space V is called _______ of the vector space
    A. Basis
    B. Dimension
    C. Image
    D. Kernel
83. Any set containing ______ vector is always linearly independent
    A. zero
    B. Unit
    C. 2
    D. More than 2
84. Set of all ____________ of vectors is called linear span
    A. Linear system
    B. linear combination
    C. linear operator
    D. linear map
85. For matrix A, $(A^T)^T$ is equals to ___________
    A. A
    B. A^T
    C. Zero
    D. 1
86. If the number od rows is equal to the number of column then it is called as ______ matrix
    A. Scalar
    B. Square
    C. Diagonal
    D. Identity
87. _____ conditions are important for basis
    A. 1
    B. 2
    C. 3
    D. 4
88. A set of vectors are said to be linearly dependent if there exist ______ one nonzero scalar
    A. Atleast
    B. Atmost
    C. Maximum
    D. Minimum
89. Rank of a identity matrix of order 2x2 is_____
    A. 1
    B. 2

C. 3
D. 4

90. Rank of a identity matrix of order 3x3 is______
   A. 1
   B. 2
   C. 3
   D. 4
91. A ________ is a sequence of vertices and edges
   A. Walk
   B. Path
   C. Trial
   D. Cycle

92. A ______ is a walk in which no vertex is repeated
   A. Path
   B. Cycle
   C. Circuit
   D. Trial
93. A walk is a ________ in which the starting and ending points are same
   A. Cycle
   B. Path
   C. Trial
   D. Circuit
94. The solution set of the _________ linear system is called null space of A
   A. Homogeneous
   B. Nonhomogeneous
   C. Similar
   D. Dissimilar
95. If A is a upper triangular matrix then A^T is a _________
   A. Upper triangular matrix
   B. Lower triangular matrix
   C. Diagonal matrix
   D. Scalar matrix
96. A path is a walk in which no ______ is repeated
   A. Vertex
   B. Edge
   C. Points
   D. lines
97. The solution set of the homogeneous linear system is called _______ space of A
   A. Null
   B. Rank
   C. echelon
   D. kernel
98. ________ form of complex no is z = r.eiθ
   A. cartesian
   B. polar

C. exponential
D. complex

99. The additive identity in vector space addition is ______
A. 1
B. 0
C. -1
D. -v

100. θ is called the ___________ of z
A. argument
B. modulus
C. rank
D. null space

UNIT 3

101. | A – λI | = 0 is called ________ equation
A. Quadratic
B. Linear
C. Characteristic
D. NULL

102. A vector space together with inner product is called _____________ space
A. Vector
B. Inner product
C. Null
D. Subspace

103. Two vectors are orthogonal to each other if their inner product space is ________
A. 1
B. 0
C. -1
D. V

104. λ is called ___________
A. eigen value
B. eigen vector
C. constant
D. variable

105. The product of all eigen values of the matrix is equal to the ________ of the matrix
A. Determinant
B. Rank
C. Null space
D. image

106. A rectangular array of m rows & n columns is called ___________
A. Matrix
B. Rank
C. Image
D. Kernel

107. _____________ is a method for solving a system of linear equations

A. Row echelon
B. Gauss elimination
C. Adjoint method
D. Rank

108. The __________ of a vector v is denoted by ||v||

A. Norm
B. Image
C. Rank
D. kernel

109. If u=(2,3,-1) and v=(6,-3,-2) then d(u,v))=______

A. $\sqrt{48}$
B. $\sqrt{53}$
C. 48
D. 53

110. If u=(1,0,2,-4) and v=(0,3,4,2) then $||u+v||^2$=________

A. 5
B. 10
C. 50
D. 40

111. If u and v are orthogonal to w then ________ is orthogonal to w

A. U+v
B. U-v
C. Uv
D. u/v

112. Two vectors are parallel to each other if <u, v>=______

A. 1
B. 0
C. -1
D. uv

113. Two vectors are perpendicular to each other if <u, v>=______

A. 1
B. 0
C. -1
D. uv

114. If a vector v is orthogonal to every vector w$\in W$ then ________

A. V.w=0
B. V+w=0
C. V-w=0
D. v/w=0

115. An ___________ of A is a vector which satisfies Av= ϡv

A. Eigen value
B. Eigen vector
C. Rank
D. nullity

116. If A=$\begin{bmatrix} 3 & -1 & 1 \\ -1 & 3 & -1 \\ 1 & -1 & 3 \end{bmatrix}$ then eigen values are _______

A. λ=1,1,5
B. λ=2,2,5
C. λ=1,2,5
D. λ=1,5,5

117. If A=$\begin{bmatrix} 1 & -3 \\ -4 & 5 \end{bmatrix}$ then eigen values are ______
A. λ=1,7
B. λ=-1,7
C. λ=-1,-7
D. λ=1,-7

118. If A=$\begin{bmatrix} 1 & 2 \\ 4 & 3 \end{bmatrix}$ then eigen values are ______
A. λ=-1,5
B. λ=2,5
C. λ=-1,2
D. λ=5,3

119. If A=$\begin{bmatrix} 1 & 1 & 3 \\ 1 & 5 & 1 \\ 3 & 1 & 1 \end{bmatrix}$ then eigen values are ______
A. λ=-2,3,6
B. λ=1,2,3
C. λ=1,3,4
D. λ=-1,3,5

120. If A is a _________________, then its eigen values are the diagonal elements
A. Upper triangular matrix
B. Lower triangular matrix
C. Scalar matrix
D. Diagonal matrix

121. A matrix A of order n is diagonalizable, iff it has n ______________ eigen vectors
A. linearly independent
B. linearly dependent
C. linear combination
D. linear span

122. A square matrix B of order n is said to be __________ to A if $B=P^{-1}AP$
A. Similar
B. Dissimilar
C. Inverse
D. Rank

123. If B is similar to A then it has same ____________
A. Eigen values
B. Rank
C. Nullity
D. Kernel

124. Solve the following equation by Gauss elimination method
x+ z=-1 ; y+ z=-4 ; 4x+y+z=0 then the values of x,y,z are ________
A. 1,2,3
B. 1,-2,-2

C. 1,-1,-1
D. 1,1,1

125. Solve the following equation by Gauss elimination method
x+y+ z=2 ; 2x-3y+ 2z=-1 ; x+y-3z=6 then the values of x,y,z are ________

A. 1,2,3
B. 1,2,-1
C. 1,1,1
D. 1,2,-4

126. The eigenvalues of a 4× 4 matrix [A] are given as 2,–3,13, and 7. The det(A) is_____

A. 546
B. 19
C. 25
D. 50

127. What is Eigen value?

A. A vector obtained from the coordinates
B. A matrix determined from the algebraic equations
C. A scalar associated with a given linear transformation
D. It is the inverse of the transform

128. Two vectors are ________ to each other if <u, v>=1

A. Parallel
B. Perpendicular
C. Similar
D. Dissimilar

129. Two vectors are ________ to each other if <u, v>=0

A. Parallel
B. Perpendicular
C. Similar
D. Dissimilar

130. The goal of Gauss elimination method is to reduce the coefficient matrix to a _____________ matrix

A. Diagonal
B. Identity
C. lower triangular
D. upper triangular

131. In Gaussian elimination method, original equations are transformed by using ____________

A. Column operations
B. Row Operations
C. Mathematical Operations
D. Subset Operation

132. The Elimination process in Gauss Elimination method is also known as ______________

A. Forward Elimination
B. Backward Elimination
C. Sideways Elimination
D. Crossways Elimination

133. How the transformation of coefficient matrix A in Gauss Elimination method to upper triangular matrix is done?

A. Elementary row transformations
B. Elementary column transformations
C. Successive multiplication
D. Successive division

134. Find the values of x, y, z in the following system of equations by gauss Elimination Method.

A. 2, 4, 6
B. 2, 7, 6
C. 3, 4, 6
D. 2, 4, 5

135. The __________of all eigen values of the matrix is equal to the determinant of the matrix

A. Sum
B. Product
C. Difference
D. division

136. The angle between vector u=(1,2,1) and v=(3,1,2) is _______

A. $Cos^{-1}(7/184)$
B. $Cos^{-1}(1/184)$
C. $Cos^{-1}(5/184)$
D. $Cos^{-1}(3/184)$

137. The angle between vector u=(1,1,0) and v=(0,0,1) is ______

A. $\frac{\pi}{2}$
B. $\frac{\pi}{6}$
C. $\frac{\pi}{3}$
D. $\frac{\pi}{4}$

138. $| A - \lambda I |X= 0$ will give ________

Eigen value

Characteristic equation

Eigen vector

Rank

139. If u=(1,2,3,4) and v=(2,3,4,5) and w=(4,5,6,7) then <u,v> is _______

A. 28
B. 38
C. 58
D. 48

140. If u=(1,2,3,4) and v=(2,3,4,5) and w=(4,5,6,7) then <v,w> is _______

A. 25

B. 55
C. 68
D. 37

141. If a matrix is in echelon form, the non zero rows form the ______ of row space
A. Basis
B. Rank
C. Image
D. Nullity

142. $||x||$ ______0
A. $\geq$
B. $\leq$
C. $\neq$
D. =

143. The projection vector of u=(1,-1,1) along v=(1,2,0) is ______
A. $(\frac{-1}{2},\frac{2}{5},0)$
B. (1,0,1)
C. (1,1,0)
D. (0,1,1)

144. The projection vector of u=(2,-1,1) along v= (1,2,0) is ______
A. 1
B. 2
C. 3
D. 0

145. If $A=\begin{bmatrix}1 & 2\\ 3 & 4\end{bmatrix}$ then $|A|$=_____
A. 2
B. -2
C. 4
D. 6

146. The equation for __________ is $||u+v||^2=||u||^2+||v||^2$
A. Inner product space
B. Basis
C. Pythagoras theorem
D. Gauss elimination

147. The angles between the vectors is given by _______
A. Cos θ
B. Sin θ
C. Tan θ
D. cot θ

148. $||x||=0$ if x______0
A. >
B. <
C. =
D. $\neq$

149. A _________ matrix B of order n is said to be similar to A if $B=P^{-1}AP$
A. Square
B. Scalar

C. Diagonal

D. Unit

150. If u=(1,2,3) then unit vector is____

A. $(\frac{1}{\sqrt{14}},\frac{2}{\sqrt{14}},\frac{3}{\sqrt{14}})$

B. (1,2,3)

C. $(\frac{1}{14},\frac{2}{14},\frac{3}{14})$

D. (1,4,9)