B.SC (H) Physics - V Sem
Advanced Mathematical Physics
(32227502)
(Assignment 2023-24)

QUIZIZZ

NAME :

CLASS :

DATE :

MATRIX CHALLENGE
30 Questions

MM: 78

1. Which one is the characteristic equation ?

A [A-mI] = 0

B | A | X= mX

C AX =mX

D | A-mI | = 0

2. Choose the Correct Options

A Sum of the Diagonal Elements of A=Trace of the Eigen value Diagonal matrix D

B Sum of the Eigen Values of A=Determinant of A

C Sum of the Diagonal Elements of A=Trace of transpose of A

D Sum of the Eigen Values of A=Trace of A

3. What is true about singular matrix A?

A |A| is 0

B Its inverse do not exist

C |A| is not 0

D Atleast one of the Eigen Value if 0 implies its singularity

4. Norm of the Row matrix A=[1 2 -2i] is

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5. Eigen Vectors corresponding to distinct Eigen values are

A None of the above

B normalized

C Linearly Independent

D Linearly Dependent

6. What is true about Hermitian matrix?

A Eigen Values are real but the Eigen vectors are not mutually orthogonal

B Transpose Conjugate of A = A

C Transpose Conjugate of A = -A

D Eigen Values are real and the Eigen vectors (for distinct Eigen values) are mutually orthogonal

7. What is true about Unitary Matrix?

A Modulus of each Eigen value is unity

B Eigen value is +1 or -1

C Transpose conjugate of A = inverse of A

D Transpose conjugate of A = A

8. Find the Eigen Values of (in increasing order)

$$\begin{bmatrix} -1 & 0 & 0 \\ 0 & 3 & 0 \\ 0 & 0 & -9 \end{bmatrix}$$

9. Choose the correct options if AB=BA

A If A is diagonal, then B is also diagonal

B All of the above

C $B=A^{-1}$

D A and B commutes wrt multiplication

10. Choose the correct options for matrix A of order 2x3

A Cayley Hamilton Theorem states that A satisfies its own characteristic equation

B None of the above

C inverse of A= adjoint A / |A|

D Both of the above

11. Choose the Correct Option

A Determinant of Hermitian Matrix is Real

B Diagonal Elements of Skew Hermitian Matrix is 0 or purely imaginary

C Every matrix commutes with its inverse

D All of the above

12. If X is the column vector of order n and A is a square matrix of order n, then what is the order of X'AX ?

A n x n

B 1 x n

C 1 x 1

D n x 1

13. A real symmetric matrix of order 3 will have ____ no. of independent components

A 4

B 6

C 8

D 12

14. Tell the nature of this matrix [i i i ; i i i ; i i i]

A Skew Hermitian

B Orthogonal

C Hermitian

D Unitary

15. Which one is orthogonal matrix?

A [cos x -sin x ; -sin x cos x]

B [-cos x sin x ; sin x -cos x]

C [cos x sin x ; sin x cos x]

D [cos x sin x ; -sin x cos x]

16. If A and B are the two Eigen vectors, then the condition for their orthogonality is

A $\bar{A}' B=0$

B $B \bar{A}'=1$

C $\bar{A}' B=1$

D $B \bar{A}'=0$

17. How will you define unitary matrix A?

A $A \bar{A}' = I$

B $\bar{A}' A = I$

C $A' A = I$

D $\bar{A}' = A^{-1}$

18. What is the trace of A= [2 3 6 ; -9 0 8 ; 6 2 3]

A 4

B 5

C -4

D -5

19. $\begin{pmatrix} 1 & 0 & 0 \\ 0 & 0 & 0 \\ 0 & 0 & 5 \end{pmatrix}$ Classify the matrix

A Square matrix, Identity matrix

B Idempotent matrix, Diagonal matrix

C Square matrix, triangular matrix

D Square matrix, Diagonal matrix

20. You can post multiply a 2X3 matrix by which matrix?

A 2X2

B 2X12

C 3X12

D 2X3

21. There are _____ number of elements in 3x6 matrix

22. Which of the following can have imaginary determinant?

A Skew Hermitian

B None

C Hermitian

D Both

23. Choose the correct option(s)

A Similar matrices have same Eigen values

B Diagonalizing matrix of a diagonal matrix is identity matrix

C Similar matrices have same eigen vectors

D Diagonalizing matrix of a diagonal matrix is a null matrix

24. A system of equations will have many solutions if

A No of independent constraints is 0

B no. of independent constraints is equal to unknowns

C no. of independent constraints is less than unknowns

D no. of independent constraints is greater than unknowns

25. Inner Product is

A a scalar quantity

B a vector quantity

C always same as a dot product

D sometimes scalar sometimes vector

26. B=7 x1y1-3 x2y1+8 x1y2+10 y2x2. The matrix representation of this bilinear form is

A [10 -3; -8 7]

B [10 8; -3, 7]

C [7 8; -3 10]

D [7 -3; 8 10]

27. Which of them are Normal Matrix?

A Hermitian

B Unitary

C Skew Hermitian

D Real Orthogonal

28. Zeroth power of any matrix is

A Identity matrix

B matrix itself

C Ones Matrix

D Null matrix

29. Choose the correct option

A $\exp(A) = P.\ \exp(D).\ P^{-1}$

B $P^{-1} D = \exp(A) P$

C $\exp(A) = P^{-1}.\exp(D).\ P$

D $\exp(A) = P^{-1}.\ P.\ \exp(D)$

30. Choose the correct option (s)

A Matrix and its inverse have same eigen vectors

B Matrix and its inverse product is identity matrix provided matrix is singular

C Matrix and its inverse is commutative wrt multiplication

D Matrix and its inverse have same eigen values

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