MTH501 Final TERM MEGA FILE

Linear Algebra (Virtual University of Pakistan)

MTH501 FINAL TERM MEGA FILE
BY SHINING STAR
(VISIT VURANK FOR MORE)

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For any subspace W of a vector space V, which one is not the axiom for subspace.

0 must be in W.

For all u, v in W and u – v must be in W.

For all u, v in W and u.v must be in W.

For any scalar k and u in W then k.u in W.

Which one is not the axiom for vector space?

0 + u = u

0.u = u

1.u = u

u + v = v + u

The Gauss-Seidel method is applicable to strictly diagonally dominant matrix.

TRUE

FALSE

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

At what condition det(AB)=(detA)(detB) is possible?

When A and B are n x n matrices

When A is a row matrix

When A and B are m x n matrices

When B is a column matrix

For any 3x3 matrix A where det (A) = 3, then det (2A) = ________.

24

20

15

6

If a multiple of one row of a square matrix A is added to another row to produce a matrix B, then which of the following condition is true?

detB = detA

detB = k detA

detA detB = 0

detA detB = detA

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

While using the Cramer's rule, if determinant D = 0, and other determinant is not zero then how many solutions are there?

Many solutions

No solution

Two solutions

One solution

Which of the following is all permutations of {1,2}?

(1,2,2,1)

Question # 1 of 10 (Start time: 09:52:17 PM) Total Marks: 1
By using determinants, we can easily check that the solution of the given system of linear equation exits and it is unique.
Select correct option:

FALSE
TRUE

Question # 2 of 10 (Start time: 09:53:11 PM) Total Marks: 1
If a multiple of one row of a square matrix A is added to another row to produce a matrix B, then which of the following condition is true?
Select correct option:

detB = k detA
detB = detA
detA detB = 0
detA detB = detA

Question # 3 of 10 (Start time: 09:54:09 PM) Total Marks: 1
At what condition the Cramer's formula is valid for linear systems?
Select correct option:

When matrix is n x n
When det(A) is equal to zero
When matrix is m x n
When det(A) in not equal to zero

Question # 4 of 10 (Start time: 09:54:44 PM) Total Marks: 1
A matrix has not the same determinant if we add a multiple of a column to another column.
Select correct option:

TRUE
FALSE

Question # 5 of 10 (Start time: 09:55:30 PM) 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.
Select correct option:

TRUE
FALSE

Question # 6 of 10 (Start time: 09:56:10 PM) Total Marks: 1
Which of the following is the volume of the parallelepiped determined by the columns of A where A is a 3 x 3 matrix?
Select correct option:

|det A|
[A]
det A
A^(-1) ,that is inverse of A

Question # 7 of 10 (Start time: 09:57:25 PM) Total Marks: 1
For any 3x3 matrix A where det (A) = 3, then det (2A) = ________.
Select correct option:

24
20
15
6

Question # 8 of 10 (Start time: 09:58:24 PM) Total Marks: 1
Which one is not the axiom for vector space?
Select correct option:

0 + u = u
0.u = u
1.u = u
u + v = v + u

Question # 9 of 10 (Start time: 09:58:58 PM) Total Marks: 1
Which of the following is NOT the axiom for vector space where u, v, w in V are set of vectors and l, m, n are scalars?
Select correct option:

u + (v + w) = (u + v) + w
u.v =v.u
l (u + v)= l u + l v
(l +m) u= I u+ m u

Question # 10 of 10 (Start time: 09:59:48 PM) Total Marks: 1
If two rows or columns of a square matrix are identical, then det (A)wil be _______.
Select correct option:

zero
non zero
one
positive

Question # 1 of 10 (Start time: 10:30:38 PM) Total Marks: 1
If A is strictly diagonally dominant, then A is _________.
Select correct option:

invertible
singular
symmetric
scalar

Question # 2 of 10 (Start time: 10:31:17 PM) Total Marks: 1
The Gauss-Seidel method is applicable to strictly diagonally dominant matrix.
Select correct option:

TRUE
FALSE

Question # 3 of 10 (Start time: 10:32:00 PM) Total Marks: 1
If the absolute value of each diagonal entry exceeds the sum of the absolute values of the other entries in the same row then a matrix A is called:
Select correct option:

invertible
strictly diagonally dominant
diagonally
scalar

Question # 4 of 10 (Start time: 10:33:26 PM) 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.
Select correct option:

TRUE
FALSE

Question # 5 of 10 (Start time: 10:33:52 PM) Total Marks: 1
Which one is not the axiom for vector space?
Select correct option:

0 + u = u
0.u = u
1.u = u
u + v = v + u

Question # 6 of 10 (Start time: 10:34:16 PM) Total Marks: 1
Let W = {(x, y) such that x, y in R and x = y}. Is W a vector subspace of plane.
Select correct option:

YES
NO

Question # 7 of 10 (Start time: 10:34:58 PM) Total Marks: 1
If A is a triangular matrix, then det(A) is the product of the entries on the ________.
Select correct option:

main diagonal of A
first two rows of A
diagonal of A
first two columns of A

Question # 8 of 10 (Start time: 10:35:59 PM) Total Marks: 1
By using determinants, we can easily check that the solution of the given system of linear equation exits and it is unique.
Select correct option:

FALSE
TRUE

Question # 9 of 10 (Start time: 10:36:55 PM) Total Marks: 1
If a matrix A is invertible than adj(A) is also invertible.
Select correct option:

TRUE
FALSE

Question # 10 of 10 (Start time: 10:37:57 PM) Total Marks: 1
If all the entries of a row or a column of a square matrix are zero, then det (A) will be _____________.
Select correct option:

zero
infinity
one
non zero

/w EPDw UKMTY2

/w EWBgLTm9GL

BC090201047 : Muhmmad Asif

Time Left 57 sec(s)

Quiz Start Time: 08:32 PM

Question # 3 of 10 (Start time: 08:34:27 PM) Total Marks: 1

A matrix A and its transpose have the same determinant.

Select correct option:

TRUE

FALSE

Click here to Save Answer & Move to Next Question

/w EPDw UKMTY2

/w EWCgKEw r6D

BC090201047 : Muhmmad Asif

Time Left 48 sec(s)

Quiz Start Time: 08:32 PM

Question # 5 of 10 (Start time: 08:36:08 PM) Total Marks: 1

If a system of equations is solved using the Jacobi's method , then which of the following is the most appropriate answer about the matrix M that is derived from the coefficient matrix ?

Select correct option:

- All of its entries on the diagonal must be zero.
- All of its entries below the diagonal must be zero.
- All of its entries above the diagonal must be zero.
- All of its entries below and above the diagonal must b

Click here to Save Answer & Move to Next Question

/w EPDw UKMTY2

/w EWCgLzyYf+C

BC090201047 : Muhmmad Asif

Time Left 66 sec(s)

Quiz Start Time: 08:32 PM

Question # 6 of 10 (Start time: 08:37:37 PM) Total Marks: 1

If A is a square matrix, then the Minor of entry ith row and jth column is to be the determinant of the sub matrix that remains when the ith row and jth column of A are:

Select correct option:

added

deleted

multiplied

divided

Click here to Save Answer & Move to Next Question

/w EPDw UKMTY2

/w EWCgLH9+aFE

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Time Left 36 sec(s)

Quiz Start Time: 08:32 PM

Question # 7 of 10 (Start time: 08:38:54 PM) Total Marks: 1

If M=[3] then which of the following is the determinant of the matrix M?

Select correct option:

1

[1]

3

[3]

Click here to Save Answer & Move to Next Question

For which of the matrix, the Gauss-Seidel method is applicable

/w EPDw UKMTY2

/w EWCgKH3vLPI

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Time Left 71 sec(s)

Quiz Start Time: 08:32 PM

Question # 9 of 10 (Start time: 08:41:21 PM) Total Marks: 1

Which of the following is all permutations of {1,2}?

Select correct option:

(1,2)

(2,1)

(1,2,2,1)

(1,2) and (2,1)

Click here to Save Answer & Move to Next Question

/w EPDw UKMTY2

/w EWCgLN0luJD

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Time Left 56 sec(s)

Quiz Start Time: 08:32 PM

Question # 10 of 10 (Start time: 08:42:29 PM) Total Marks: 1

If M is a square matrix having two rows equal then which of the following about the determinant of the matrix is true?

Select correct option:

det (M) is not equal to ' 1'

det (M)=1f linearly dependent

det (M) is not equal to ' 0'

det (M)=0

Click here to Save Answer & Move to Next Question

Time Left 37 sec(s)

Quiz Start Time: 05:46 PM

Question # 1 of 10 (Start time: 05:46:20 PM)

If a system of equations is solved using the Gauss-Seidel method, then which of the following is the most appropriate answer about the matrix M that is derived from the coefficient matrix ?

Select correct option:

All of its entries on the diagonal must be zero.

All of its entries below the diagonal must be zero.

All of its entries above the diagonal must be zero. true

All of its entries below and above the diagonal must b

-

Time Left 81 sec(s)

Quiz Start Time: 05:46 PM

Question # 3 of 10 (Start time: 05:48:07 PM)

Let W = {(1, y) such that y in R}. Is W a vector subspace of plane.

Select correct option:

YES

NO

true

-

Time Left 89 sec(s)

Quiz Start Time: 05:46 PM

Question # 4 of 10 (Start time: 05:48:39 PM)

Which of the following is the volume of the parallelepiped determined by the columns of A where A is a 3 x 3 matrix?

Select correct option:

|det A|

true

[A]

det A

A^(-1) ,that is inverse of A

-

Time Left 89 sec(s)

Quiz Start Time: 05:46 PM

Question # 5 of 10 (Start time: 05:50:05 PM)

At what condition the Cramer's rule fails?

Select correct option:

When the determinant of the coefficient matrix is not z

When matrix is n x n

When the determinant of the coefficient matrix is zerc

true

The coefficient matrix A is not invertible

-

Time Left 74 sec(s)

Quiz Start Time: 05:46 PM

Question # 6 of 10 (Start time: 05:50:21 PM)

All the lines those passes through origin are not the subspace of a plane.

Select correct option:

FALSE

true

TRUE

-

Time Left 79 sec(s)

Quiz Start Time: 05:46 PM

Question # 7 of 10 (Start time: 05:50:55 PM)

A matrix A and its transpose have the same determinant.

Select correct option:

TRUE

true

FALSE

-

Time Left 83 sec(s)

Quiz Start Time: 05:46 PM

Question # 8 of 10 (Start time: 05:51:08 PM)

Cramer's rule is a formula for solving systems of equations by __________.

Select correct option:

matrix inversion

determinants

true

comparison

substitutions

-

Time Left 83 sec(s)

Quiz Start Time: 05:46 PM

Question # 9 of 10 (Start time: 05:51:30 PM)

If a system of equations is solved using the Jacobi's method , then which of the following is the most appropriate answer about the matrix M that is derived from the coefficient matrix ?

Select correct option:

- All of its entries on the diagonal must be zero.
- All of its entries below the diagonal must be zero.
- All of its entries above the diagonal must be zero.
- All of its entries below and above the diagonal must b

-

Time Left 87 sec(s)

Quiz Start Time: 05:46 PM

Question # 10 of 10 (Start time: 05:52:59 PM)

Which of the following is all permutations of {1,2}?

Select correct option:

(1,2)

(2,1)

(1,2,2,1)

(1,2) and (2,1) true

Consider a system of linear equations A x =b where A is a3 ×3 matrix having 3 pivot positions, then which

statement is false about the system Ax =b

(a) System has unique solution.

(b) Rank of the matrix is 3.

(c) There is only one free variable in solution of that system.

(d) The associated homogeneous system Ax =0 has only trivial system.

If a finite set S of non zero vectors span a vector space V, then some subset of S is a basis for V.

1. True

2. **false**

Angle between the vectors $x = \begin{bmatrix} 1 \\ 0 \\ 0 \\ 0 \end{bmatrix}$ & $y = \begin{bmatrix} 1 \\ 1 \\ 1 \\ 1 \end{bmatrix}$ is,

(a) $\frac{\pi}{2}$

(b) π

(c) 0

(d) $\frac{\pi}{3}$

If λ is an eigenvalue of the invertible matrix A then an eigenvalue of A^{-1} will be

(a) λ^{-1}

(b) $\frac{1}{\lambda^2}$

(c) λ^2

(d) Can't be determined.

D

If rank of a3 x 5 matrix is 3 then dimension of its Null space is

(a) 0

(b) 3

(c) 2

(d) We can't say anything

If $\{v_1, v_2, v_3, \ldots, v_n\}$be the orthogonal set of vectors then which statement(s) must be true.

I. $v_i \cdot v_j = 0$ for all.

II. $v_i \cdot v_i > 0$ for all i and $v_i \neq 0$.

III. Set$\{c_1 v_1, c_2 v_2, c_3 v_3, \ldots, c_n v_n\}$

1 I only.
2 I and II only.
3 II and III only
4 All of the three.

1

If matrix A has zero as an eigenvalue then which statement(s) about A must be true.

I. Matrix A is not invertible.

II. Matrix A will also have an eigenvalue 2.

III. Matrix is diagonalizable.

1 II and III only.

2 I only. (true)

3 II and III only.

4 All three.

A Linear transformation $T:R^2 \to R^2$ is such that

$T[e_1] = \begin{bmatrix} 1 \\ 1 \end{bmatrix}$ & $T[e_2] = \begin{bmatrix} 0 \\ -1 \end{bmatrix}$ then $T\begin{bmatrix} 1 \\ -3 \end{bmatrix}$ is,

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

2 $\begin{bmatrix} 1 \\ -3 \end{bmatrix}$

3 $\begin{bmatrix} 3 \\ 5 \end{bmatrix}$

4 $\begin{bmatrix} 1 \\ 4 \end{bmatrix}$

A linear transformation T : $R^2 \to R^2$ defined by T(x) = $\begin{bmatrix} 0 & -1 \\ 1 & 0 \end{bmatrix}\begin{bmatrix} x_1 \\ x_2 \end{bmatrix} = \begin{bmatrix} -x_2 \\ x_1 \end{bmatrix}$, u= $\begin{bmatrix} 4 \\ 1 \end{bmatrix}$, v= $\begin{bmatrix} 2 \\ 3 \end{bmatrix}$ then the image of u+v is

- $\begin{bmatrix} 4 \\ 6 \end{bmatrix}$
- $\begin{bmatrix} 4 \\ -6 \end{bmatrix}$
- $\boxed{\begin{bmatrix} -4 \\ 6 \end{bmatrix}}$
- $\begin{bmatrix} 2 \\ 4 \end{bmatrix}$

In the set S = { $\begin{bmatrix} x-2t \\ x+t \\ 3t \end{bmatrix}$;x , t in R } then its dimension is

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

Let A = $\begin{bmatrix} 1 & -3 & -2 \\ -5 & 9 & 1 \end{bmatrix}$ and u= $\begin{bmatrix} 5 \\ 3 \\ -2 \end{bmatrix}$, then u is in

- Column space of A
- Null space of A
- Row space of A
- None of them

Let B = { b_1 , b_2 } and C={ c_1 , c_2 } for a vector space V such that $b_1 = 4c_1 + c_2$ and $b_2 = -6c_1 + c_2$. Suppose $x = 3b_1 + b_2$ and $[x]_B = \begin{bmatrix} 3 \\ 1 \end{bmatrix}$

then $[x]_C$ will be

- $\begin{bmatrix} 6 \\ 4 \end{bmatrix}$
- $\begin{bmatrix} -4 \\ 6 \end{bmatrix}$
- $\begin{bmatrix} -6 \\ 4 \end{bmatrix}$
- $\begin{bmatrix} -6 \\ -4 \end{bmatrix}$

Consider a basis B = { b_1 , b_2 } for R^2 where $b_1 = \begin{bmatrix} 1 \\ 0 \end{bmatrix}$ and $b_2 = \begin{bmatrix} 1 \\ 2 \end{bmatrix}$ and suppose x is in R^2 has the Coordinate vector $[x]_B = \begin{bmatrix} -2 \\ 3 \end{bmatrix}$ then the value x is

- $\begin{bmatrix} -1 \\ 6 \end{bmatrix}$
- $\begin{bmatrix} -6 \\ 1 \end{bmatrix}$
- $\begin{bmatrix} -1 \\ -6 \end{bmatrix}$
- $\begin{bmatrix} 1 \\ 6 \end{bmatrix}$

In the matrix equation $Ax = b$ if the order of A is 4×3 and of b is 4×1 then the order of the column vector x is

1 x 3

3 x 1

3 x 3

4 x 1

Transpose of row vectors of a 3×3 identity matrix

► Span $\mathbb{R}^4$

► are basis for any subspace of $\dim \geq 4$

► are linearly dependent

► are linearly independent

Determinant of a non-invertible(singular) matrix always

►vanish

►unity

►non zero negative

►non zero positive

Rank of a zero matrix of any order is

►zero

►three

▶four

▶nine

Roots of characteristic equation; $(\lambda+1)^2 = 0$ are of multiplicity

▶Zero

▶One

▶**Two**

▶Three

If there are two vectors parallel to x and $y-axes$ respectively then both vectors

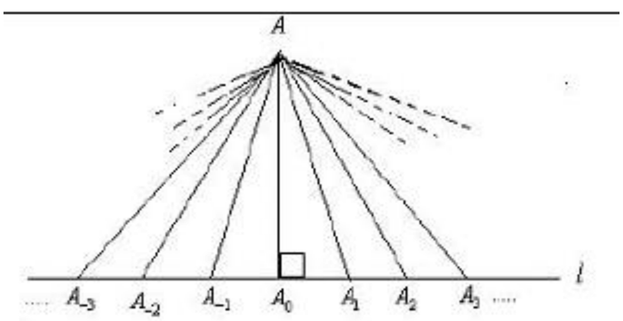
▶**Are orthogonal**

▶Having their inner product zero

▶Can span a subspace while both passing through the origin

▶All above statements are equivalent

Which path in the following figure can give the least square distance and its corresponding least square error from the a line l



► AA_{-1} or any path to the left of A_{-1}

► AA_1 or any path to the right of A_1

► Unique path AA_0 for which AA_0 is orthogonal to line l

► None of these

Linear equation $0x + 0y = 5$ has

►Infinite many solutions

►**Empty solution**

►Unique, non-trivial solution

►Unique, trivial solution

$$T\begin{bmatrix} x_1 \\ x_2 \end{bmatrix} = \begin{bmatrix} x_1 + x_2 \\ x_1 \\ -x_2 \end{bmatrix}$$

is an example of transformation from

► $\mathbb{R}^3 \to \mathbb{R}^2$

► $\boxed{\mathbb{R}^2 \to \mathbb{R}^3}$

► $\mathbb{R}^2 \to \mathbb{R}^2$

► $\mathbb{R}^3 \to \mathbb{R}^3$

Dimension of zero vector space $\{0\}$ is

►**Not defined**

►One

►Zero

►Arbitrary

$$\begin{pmatrix} 1 & 2 \\ 2 & 4 \end{pmatrix}$$

As the rank of a matrix is number of its pivot columns then the rank of $\begin{pmatrix} 1 & 2 \\ 2 & 4 \end{pmatrix}$ is

►4

►2

►1

►Inconclusive

If there exists a matrix for which characteristic equation is $\lambda^3 = 1$ then the roots of the equation are

► $\boxed{1, \frac{-1 \pm \sqrt{-3}}{2}}$

► 1

► ± 1

► $\varphi = \{\}$

Distance between the vector $\begin{bmatrix} 1 \\ 2 \end{bmatrix}$ and its reflection about $x_2 -$ axis is

- ▶ Zero
- ▶ 4
- ▶ $\sqrt{2}$
- ▶ 2

Vector u is not an eigen vector of a matrix A if

- ▶ There exists λ such that $Au = \lambda u$
- ▶ There does not exist λ such that $Au = \lambda u$
- ▶ $Au = 0$
- ▶ $Au = \begin{bmatrix} 1 \\ 1 \end{bmatrix}$

Linear equation $0x + 0y = 5$ has

▶Infinite many solutions

▶Empty solution

►Unique, non-trivial solution

►Unique, trivial solution

Question No: 1 (Marks: 2) - Please choose one
The characteristics polynomial for the matrix A= $\begin{bmatrix} 2 & 7 \\ 7 & 2 \end{bmatrix}$ is ► $\lambda^2 - 4\lambda - 45$ ► $\lambda^2 + 4\lambda - 45$ ► $\lambda^2 + 4\lambda + 45$ ► $\lambda^2 - 4\lambda + 45$

Question No: 2 (Marks: 2) - Please choose one

Let A=PAP^{-1} then what will be A^4 where A= $\begin{bmatrix} 5 & 7 \\ 2 & 3 \end{bmatrix}$, D= $\begin{bmatrix} 2 & 0 \\ 0 & 1 \end{bmatrix}$

- ▶ $\begin{bmatrix} 226 & -525 \\ 90 & -209 \end{bmatrix}$
- ▶ $\begin{bmatrix} -525 & -226 \\ 90 & -209 \end{bmatrix}$
- ▶ $\begin{bmatrix} 266 & -525 \\ -209 & 90 \end{bmatrix}$
- ▶ None of the other

Question No: 3 (Marks: 2) - Please choose one

The origin of the dynamical system x_{k+1}=Ax_k for the matrix A= $\begin{bmatrix} .8 & .3 \\ -.4 & 1.5 \end{bmatrix}$ is

- ▶ Attractor

- Repellor
- Saddle point
- None of them

Question No: 4 (Marks: 2) - Please choose one

The distance between the vectors u=(7,1) and v=(3,2)is

- $\sqrt{-17}$
- $\sqrt{17}$
- $\sqrt{7}$
- $\sqrt{-7}$

Question No: 5 (Marks: 2) - Please choose one

$$\begin{bmatrix} 3 \\ -2 \\ 1 \\ 3 \end{bmatrix} \begin{bmatrix} -1 \\ 3 \\ -3 \\ 4 \end{bmatrix} \begin{bmatrix} 3 \\ 8 \\ 7 \\ 0 \end{bmatrix}$$

The vectors , , are

- ▶ Parallel
- ▶ **Orthogonal**
- ▶ Not Orthogonal
- ▶ Not parallel

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

Reduced echelon form of the matrix $\begin{bmatrix} 1 & 2 & 3 \\ 2 & 3 & 4 \end{bmatrix}$ is

▶ $\begin{bmatrix} 1 & 2 & 3 \\ 0 & 0 & 1 \end{bmatrix}$

▶ $\begin{bmatrix} 1 & 0 & 3 \\ 0 & 0 & 1 \end{bmatrix}$

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

►

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

►

Question No: 2 (Marks: 1) - Please choose one

A matrix that results from applying a single elementary row operation to an identity matrix is called

►Invertible matrix

►Singular matrix

►Scalar matrix

►Elementary matrix

Question No: 3 (Marks: 1) - Please choose one

For an n×n matrix $(A^t)^t$ =

►A^t

►A

►A^{-1}

►$(A^{-1})^{-1}$

Question No: 4 (Marks: 1) - Please choose one

What is the largest possible number of pivots a 4×6 matrix can have?

►4 (true)

▶6

▶10

▶0

Question No: 5 (Marks: 1) - Please choose one

The characteristic polynomial of a 5×5 matrix is $\lambda^5 - 4\lambda^4 - 45\lambda^3 = 0$,the eigenvalues are

▶0,-5, 9

▶0,0,0,5,9

▶0,0,0,-5,9 (true)

▶0,0,5,-9

Question No: 6 (Marks: 1) - Please choose one

Find the characteristic equation of the given matrix

$$\begin{bmatrix} 6 & 8 & 5 & 4 \\ 0 & 2 & -8 & 7 \\ 0 & 0 & 9 & 6 \\ 0 & 0 & 0 & 6 \end{bmatrix}$$

► $(6-\lambda)(2-\lambda)(9-\lambda)=0$

► $(6-\lambda)(8-\lambda)(5-\lambda)(4-\lambda)=0$

► $(6-\lambda)^2(2-\lambda)(9-\lambda)=0$

► $(6-\lambda)(6-\lambda)(7-\lambda)(4-\lambda)=0$

Question No: 7 (Marks: 1) - Please choose one

A is diagonalizable if $A = PDP^{-1}$ Where

► D is any matrix and P is an invertible matrix

▶D is a diagonal matrix and P is any matrix

▶D is a diagonal matrix and P is invertible matrix

▶D is a invertible matrix and P is any matrix

Question No: 8 (Marks: 1) - Please choose one

The inverse of an invertible lower triangular matrix is

▶lower triangular matrix

▶upper triangular matrix

▶diagonal matrix

Question No: 9 (Marks: 1) - Please choose one

If P is a parallelepiped in R^3, then

{volume of T (P)} = |detA|. {volume of P}

▶Where T is determined by a 2×2 matrix A

▶Where T is determined by a 2×3 matrix A

▶Where T is determined by a 3×3 matrix A

▶Where T is determined by a 3×2 matrix A

Question No: 10 (Marks: 1) - Please choose one

Let A be a $n\times m$ matrix of rank r then row space of A has dimension

▶$m-r$

▶$n-r$

▶r

► nm

Question No: 11 (Marks: 1) - Please choose one

The dimension of the vector space P_4 is

►4

►3

►5

►1

Question No: 12 (Marks: 1) - Please choose one

Let $u=(3,-2), v=(4,5)$ .For the weighted Euclidean inner product $\langle u,v\rangle = 4u_1v_1 + 5u_2v_2$

$\langle v,u\rangle =$

►2

►-2

►3

►-3

Question No: 13 (Marks: 1) - Please choose one

Let A be $n \times n$ matrix whose entries are real. If λ is an eigenvalue of A with x a corresponding eigenvector in $\mathbb{C}^n$, then

► $A\overline{\boldsymbol{x}} = \lambda\overline{\boldsymbol{x}}$

► $A\overline{\boldsymbol{x}} = \overline{\lambda}\overline{\boldsymbol{x}}$

► $A\overline{\boldsymbol{x}} = \overline{\lambda}x$

► $A\overline{\boldsymbol{x}} = \lambda^{-1}\overline{\boldsymbol{x}}$

Question No: 14 (Marks: 1) - Please choose one

Suppose that $A=\begin{bmatrix}1.25 & -.75\\ -.75 & 1.25\end{bmatrix}$ has eigenvalues 2 and 0.5 .Then origin is a

▶Saddle point

▶Repellor

▶Attractor

Question No: 15 (Marks: 1) - Please choose one

Which one is the numerical method used for approximation of dominant eigenvalue of a matrix.

▶Power method

▶Jacobi's method

▶Guass Seidal method

▶Gram Schmidt process

Question No: 16 (Marks: 1) - Please choose one

The matrix equation $A^T A\hat{x} = A^T b$ represents a system of linear equations commonly referred to as the

▶normal equations for x

▶normal equations for $\hat{x}$

▶normal equations for A

▶normal equations for b

Question No: 17 (Marks: 1) - Please choose one

Let A have eigenvalues 2, 5, 0,-7, and -2. Then the dominant eigenvalue for A is

▶ $\lambda = 5$

▶ $\lambda = 0$

▶ $\lambda = -7$

▶ $\lambda = 2$

Question No: 18 (Marks: 1) - Please choose one

If W is a subspace of $\mathbb{R}^m$, then the transformation $T:\mathbb{R}^m \to W$ that maps each vector x in $\mathbb{R}^m$ into its orthogonal x in W is called the orthogonal projection of

▶ $\mathbb{R}^m$ in $\mathbb{R}^m$

▶ $\mathbb{R}^m$ in W

▶ $\mathbb{R}^m$ in x

Question No: 19 (Marks: 1) - Please choose one

If $V = \mathbb{R}^n$, $B = \{b_1, b_2\}$ and $C = \{c_1, c_2\}$ then row reduction of $\begin{bmatrix} c_1 & c_2 & b_1 & b_2 \end{bmatrix}$ to $\begin{bmatrix} I & P \end{bmatrix}$

Produces a matrix P that satisfies

► $[x]_B = P[x]_B$ for all x in V

► $[x]_C = P[x]_B$ for all x in V

► $[x]_B = P[x]_C$ for all x in V

► $[x]_B = [x]_C$ for all x in V

Question No: 20 (Marks: 1) - Please choose one

The Casorati matrix for the signals $\boldsymbol{1^k}$, $(\boldsymbol{-2})^k$ and $\boldsymbol{3^k}$ is

$$\begin{bmatrix} 1^k & (-2)^k & 3^0 \\ 1^{k+1} & (-2)^{k+1} & 3^1 \\ 1^{k+2} & (-2)^{k+2} & 3^2 \end{bmatrix}$$

►

$$\begin{bmatrix} 1^k & (-2)^k & 3^k \\ 1^{k+1} & (-2)^{k+1} & 3^{k+1} \\ 1^{k+2} & (-2)^{k+2} & 3^{k+2} \end{bmatrix}$$

►

$$\begin{bmatrix} 1^0 & (-2)^k & 3^k \\ 1^1 & (-2)^{k+1} & 3^{k+1} \\ 1^2 & (-2)^{k+2} & 3^{k+2} \end{bmatrix}$$

►

Which statement about the set S is false where S = {(1, 1, 3), (2, 3, 7),(2, 2, 6)}

(a) The set S contain an element which is solution of the equation 5x – y- z = 0

(b) The Set S is linearly independent.

(c) The set S contain two elements which are multiple of each other.

(d) The Set S is linearly dependent.

How many subspaces R_2 have?

(a) only two: {0} and R_2

(b) Only four: {0} x- axis and y -axis and R_2

(c) Infinitely many.

(d) None of the above.

The set of vectors {(5,0,0), (7,2,-6), (9,4,-8)} is,

- a) Linearly independent
- **b) Linearly dependent**
- c) Basis of R^3

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

If A is a 2×2 matrix, the area of the parallelogram determined by the columns of A is

► A^{-1}

► **det A**

► adj A

Question No: 2 (Marks: 1) - Please choose one

Cramer's rule leads easily to a general formula for

► **the inverse of an $n\times n$ matrix A**

► the adjugate of an $n\times n$ matrix A

► the determinant of an $n\times n$ matrix A

Question No: 3 (Marks: 1) - Please choose one

The transpose of an lower triangular matrix is

► lower triangular matrix

► **upper triangular matrix**

► diagonal matrix

Question No: 4 (Marks: 1) - Please choose one

The transpose of an upper triangular matrix is

► **lower triangular matrix**

► upper triangular matrix

► diagonal matrix

Question No: 5 (Marks: 1) - Please choose one

Let A be a square matrix of order 3×3 with $\det(A) = 21$, then $\det(2A) =$

► **168**

► 186

► 21

► 126

Question No: 6 (Marks: 1) - Please choose one

A basis is a linearly independent set that is as large as possible.

- ▶ **True**
- ▶ False

Question No: 7 (Marks: 1) - Please choose one

Let A be an $m \times n$ matrix. If for each b in $\mathbb{R}^m$ the equation Ax=b has a solution then

- ▶ **A has pivot position in only one row (may be this option is true)**
- ▶ Columns of A span $\mathbb{R}^m$
- ▶ Rows of A span $\mathbb{R}^m$

Question No: 8 (Marks: 1) - Please choose one

Reduced echelon form of the matrix $\begin{bmatrix} 1 & 2 & 3 \\ 2 & 3 & 4 \end{bmatrix}$ is

- ▶ $\begin{bmatrix} 1 & 2 & 3 \\ 0 & 0 & 1 \end{bmatrix}$
- ▶ $\begin{bmatrix} 1 & 0 & 3 \\ 0 & 0 & 1 \end{bmatrix}$

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

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

►

Question No: 22 (Marks: 3)

---

find that is invertible or not $T(X_1,X_2)=T(6X_1 +8X_2 , 5X_1 -8X_2)$

Question No: 23 (Marks: 3)

Find the volume of parallelogram of the vertices (1,2,4) (2,4,-7) and (-1,-3,20

Question No: 24 (Marks: 2)

Which of the following is true? If V is a vector space over the field F.(justify your answer)

(a) $\{x+y/x\in V, y\in V\}=V$

(b) $\{x+y/x\in V, y\in V\}=V\times V$

(c) $\{\lambda v/v\in V, \lambda\in F\}=F\times V$

Question No: 25 (Marks: 5)

Let

$\begin{bmatrix}1\\0\\-2\end{bmatrix}, \begin{bmatrix}3\\2\\-4\end{bmatrix}, \begin{bmatrix}-3\\-5\\1\end{bmatrix}$. is this in R^3 or not?

Question No: 26 (Marks: 5)

Justify that A^2=I if A=$\begin{bmatrix}1 & 0\\3 & -1\end{bmatrix}$, if and only M^2=I. justify your answer by portioned matrix of M

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

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

If A is a 2×2 matrix, the area of the parallelogram determined by the columns of A is

► A^{-1}

► **det A**

► adj A

Question No: 2 (Marks: 1) - Please choose one

Cramer's rule leads easily to a general formula for

► **the inverse of an $n\times n$ matrix A**

► the adjugate of an $n \times n$ matrix A

► the determinant of an $n \times n$ matrix A

Question No: 3 (Marks: 1) - Please choose one

The transpose of an upper triangular matrix is

► lower triangular matrix

► upper triangular matrix

► **diagonal matrix**

Question No: 4 (Marks: 1) - Please choose one

Let A be a square matrix of order 3×3 with $\det(A) = 21$, then $\det(2A) =$

► **168**

► 186

► 21

► 126

Question No: 5 (Marks: 1) - Please choose one

A basis is a linearly independent set that is as large as possible.

► **True**

► False

Question No: 6 (Marks: 1) - Please choose one

Col A is all of $\mathbb{R}^m$ if and only if

► the equation $Ax = 0$ has a solution for each b in $\mathbb{R}^m$

► **the equation $Ax = b$ has a solution for each b in $\mathbb{R}^m$**

► the equation $Ax = b$ has a solution for a fixed b in $\mathbb{R}^m$.

Question No: 7 (Marks: 1) - Please choose one

If $A = \begin{bmatrix} A_{11} & A_{12} \\ A_{21} & A_{22} \end{bmatrix}$ and $B = \begin{bmatrix} B_1 \\ B_2 \end{bmatrix}$, then the partitions of A and B

► are not conformable for block multiplication

► **are conformable for AB block multiplication**

► are not conformable for BA block multiplication

Question No: 8 (Marks: 1) - Please choose one

Two vectors are linearly dependent if and only if they lie

► on a line parallel to x-axis

► **on a line through origin**

► on a line parallel to y-axis

Question No: 9 (Marks: 1) - Please choose one

The equation x = p + t v describes a line

► through v parallel to p

► through p parallel to v

► **through origin parallel to p**

Question No: 10 (Marks: 1) - Please choose one

Let A be an $m \times n$ matrix. If for each b in $\mathbb{R}^m$ the equation Ax=b has a solution then

► **A has pivot position in only one row**

► Columns of A span $\mathbb{R}^m$

► Rows of A span $\mathbb{R}^m$

Question No: 11 (Marks: 1) - Please choose one

$$\begin{aligned} x_1 - 2x_2 + \quad x_3 &= 8 \\ 2x_2 - 7x_3 &= \ \ 0 \\ -4x_1 + 3x_2 + 9x_3 &= -6 \end{aligned}$$

Given the system the augmented matrix for the system is

$$\begin{bmatrix} 1 & -2 & 1 \\ 0 & 2 & -7 \\ -4 & 3 & 9 \end{bmatrix}$$

► $\begin{bmatrix} 1 & -2 & 1 & 0 \\ 0 & 2 & -7 & 8 \\ -4 & 3 & 9 & -6 \end{bmatrix}$

► $\begin{bmatrix} 1 & -2 & 1 \\ 0 & 2 & -8 \\ -4 & 5 & 9 \end{bmatrix}$

►

► $\begin{bmatrix} 1 & -2 & 1 & 8 \\ 0 & 2 & -7 & 0 \\ -4 & 3 & 9 & -6 \end{bmatrix}$

Question No: 12 (Marks: 1) - Please choose one

Consider the linear transformation T such that $\begin{bmatrix} 1 & 2 & 0 \\ 0 & 1 & 0 \\ 1 & 0 & 0 \end{bmatrix}$ is the matrix of linear transformation then $T\begin{bmatrix} 2 \\ 4 \\ 6 \end{bmatrix}$ is

$$\begin{bmatrix} 10 \\ 4 \\ 2 \end{bmatrix}$$

►

$$\begin{bmatrix} 1 \\ 0 \\ 9 \end{bmatrix}$$

►

$$\begin{bmatrix} 10 \\ 4 \\ 1 \end{bmatrix}$$

►

$$\begin{bmatrix} 1 \\ 2 \\ 3 \\ 2 \end{bmatrix}$$

►

Question No: 13 (Marks: 1) - Please choose one

If $\begin{vmatrix} a & b & c \\ d & e & f \\ g & h & i \end{vmatrix} = 5$ then $\begin{vmatrix} a & b & c \\ 3d & 3e & 3f \\ g & h & i \end{vmatrix}$ will be

► 15

► **45**

► 135

► 60

Question No: 14 (Marks: 1) - Please choose one

For an n×n matrix $(A^t)^t =$

► A^t

► **A**

► A^{-1}

► $(A^{-1})^{-1}$

Question No: 15 (Marks: 1) - Please choose one

Each Linear Transformation T from R^n to R^m is equivalent to multiplication by a matrix A of order

► m´n

► **n´m**

► n´n

► m´m

Question No: 16 (Marks: 1) - Please choose one

Reduced echelon form of the matrix $\begin{bmatrix} 1 & 2 & 3 \\ 2 & 3 & 4 \end{bmatrix}$ is

► $\begin{bmatrix} 1 & 2 & 3 \\ 0 & 0 & 1 \end{bmatrix}$

► $\begin{bmatrix} 1 & 0 & 3 \\ 0 & 0 & 1 \end{bmatrix}$

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

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

Question No: 17 (Marks: 2)

Find vector and parametric equations of the plane that passes through the origin of $\boldsymbol{R}^3$ and is parallel to the vectors $\boldsymbol{v}_1 = (1, 2, 5)$ and $\boldsymbol{v}_2 = (5, 0, 4)$.

Question No: 18 (Marks: 2)

Which of the following is true? If V is a vector space over the field F.(justify your answer)

(a) $\{x + y / x \in V, y \in V\} = V$

(b) $\{x + y / x \in V, y \in V\} = V \times V$

(c) $\{\lambda v / v \in V, \lambda \in F\} = F \times V$

Question No: 19 (Marks: 3)

Let

$$v_1 = \begin{bmatrix} 1 \\ 0 \\ -2 \end{bmatrix}, v_2 = \begin{bmatrix} -2 \\ 1 \\ 7 \end{bmatrix}, and\ y = \begin{bmatrix} h \\ -3 \\ -5 \end{bmatrix}.$$

For what value(s) of h is $\boldsymbol{y}$ in the plane generated by $\boldsymbol{v_1}$ and $\boldsymbol{v_2}$?

Question No: 20 (Marks: 5)

With T defined by T(x)= Ax , find a vector x whose image under T is b, and determine whether x is unique.

$$\begin{bmatrix} 1 & -5 & -7 \\ -3 & 7 & 5 \end{bmatrix}, b = \begin{bmatrix} -2 \\ -2 \end{bmatrix}$$

Question No: 21 (Marks: 10)

Given A and b , write the augmented matrix for the linear system that corresponds to the matrix equation $Ax = b$ .Then solve the system and write the solution as a vector.

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

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

If for a linear transformation the equation T(x)=0 has only the trivial solution then T is

► one-to-one

► onto

Question No: 2 (Marks: 1) - Please choose one

Which one of the following is an elementary matrix?

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

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

► $\begin{bmatrix} 1 & 0 \\ 2 & -3 \end{bmatrix}$

► $\begin{bmatrix} 1 & 2 \\ 0 & 3 \end{bmatrix}$

Question No: 3 (Marks: 1) - Please choose one

Let

$$A = \begin{bmatrix} a & b \\ c & d \end{bmatrix}$$

and let k be a scalar .A formula that relates det kA to k and det A is

► det kA= k det A

▶det kA = det (k+A)

▶det k A = k^2 det A

▶det kA = det A

Question No: 4 (Marks: 1) - Please choose one

The equation x = p + t v describes a line

▶through v parallel to p

▶through p parallel to v

▶through origin parallel to p

Question No: 5 (Marks: 1) - Please choose one

Determine which of the following sets of vectors are linearly dependent.

$$v_1 = \begin{bmatrix} 1 \\ 2 \end{bmatrix}, \quad v_2 = \begin{bmatrix} 6 \\ 2 \end{bmatrix}$$

▶

$$v_1 = \begin{bmatrix} 3 \\ 2 \\ 1 \end{bmatrix}, \quad v_2 = \begin{bmatrix} 6 \\ 2 \\ 1 \end{bmatrix}$$

▶

$$v_1 = \begin{bmatrix} 5 \\ 2 \\ 3 \end{bmatrix}, \quad v_2 = \begin{bmatrix} 10 \\ 4 \\ 6 \end{bmatrix}$$

▶

Question No: 6 (Marks: 1) - Please choose one

Every linear transformation is a matrix transformation

▶True

▶False

Question No: 7 (Marks: 1) - Please choose one

A null space is a vector space.

▶True

▶False

Question No: 8 (Marks: 1) - Please choose one

If two row interchanges are made in succession, then the new determinant

▶equals to the old determinant

▶equals to -1 times the old determinant

Question No: 9 (Marks: 1) - Please choose one

The determinant of A is the product of the pivots in any echelon form U of A , multiplied by $(-1)^r$, Where r is

▶the number of rows of A

▶the number of row interchanges made during row reduction from A to U

▶the number of rows of U

▶the number of row interchanges made during row reduction U to A

Question No: 10 (Marks: 1) - Please choose one

If A is invertible, then $\det(A)\det(A^{-1})=1$.

▶True

▶False

Question No: 11 (Marks: 1) - Please choose one

A square matrix $A=\left[a_{ij}\right]$ is lower triangular if and only if $a_{ij}=0$ for

▶ $i>j$

▶ $i<j$

▶ $i\leq j$

▶ $i=j$

Question No: 12 (Marks: 1) - Please choose one

The product of upper triangular matrices is

▶lower triangular matrix

▶upper triangular matrix

▶diagonal matrix

Question No: 13 (Marks: 1) - Please choose one

The matrix multiplication is associative

▶True

▶False

Question No: 14 (Marks: 1) - Please choose one

We can add the matrices of ______________.

▶ **same order**

▶ same number of columns.

▶ same number of rows

▶ different order

Question No: 15 (Marks: 1) - Please choose one

By solving system of equations with iterative method, we stop the process when the entries in two successive iterations are _________.

▶repeat

▶large difference

▶different

Question No: 16 (Marks: 1) - Please choose one

Jacobi's Method is ____________ converges to solution than Gauss Siedal Method.

▶slow

▶fast

▶better

Question No: 17 (Marks: 1) - Please choose one

A system of linear equations is said to be homogeneous if it can be written in the form ______________.

▶$AX = B$

▶$AX = 0$

▶$AB = X$

▶$X = A^{-1}$

Question No: 18 (Marks: 1) - Please choose one

The row reduction algorithm applies only to augmented matrices for a linear system.

▶True

▶False

Question No: 19 (Marks: 1) - Please choose one

Whenever a system has no free variable, the solution set contains many solutions.

▶True

▶False

Question No: 20 (Marks: 1) - Please choose one

Which of the following is not a linear equation?

- ► $x_1 + 4x_2 + 1 = x_3$
- ► $x_1 = 1$
- ► $x_1 + 4x_2 - \sqrt{2}x_3 = \sqrt{4}$
- ► $x_1 + 4x_1x_2 - \sqrt{2}x_3 = \sqrt{4}$

Question No: 21 (Marks: 2)

If a square idempotent matrix A is non singular then show that A is equal to the identity matrix I.

Question No: 22 (Marks: 2)

Let

$$v_1 = \begin{bmatrix} 7 \\ 4 \\ -9 \\ -5 \end{bmatrix}, v_2 = \begin{bmatrix} 4 \\ -7 \\ 2 \\ 5 \end{bmatrix}, v_3 = \begin{bmatrix} 1 \\ -5 \\ 3 \\ 4 \end{bmatrix}$$

, and $H = span\{v_1, v_2, v_3\}$ .It can be verified that $v_1 - 3v_2 + 5v_3 = 0.$ Use this information to find a basis for H.

Question No: 23 (Marks: 3)

Find

$$\begin{vmatrix} 1 & 2 & 3 \\ -4 & 5 & 6 \\ 7 & -8 & 9 \end{vmatrix}$$

Question No: 24 (Marks: 3)

Determine bases for the plane 3x – 2y + 5z = 0 as a subspace of $\boldsymbol{R^3}$

Question No: 25 (Marks: 5)

Show that $\begin{bmatrix} I & 0 \\ A & I \end{bmatrix}$ is invertible and find its inverse.

Question No: 26 (Marks: 5)

Find the condition for r and s such that the vectors (r,2,s) , (r+1,2,1) and (3,s,1) are linear dependent.

Matrix $[1 \; 3]^T$ is an example of

► Non-Singular matrix

► Square matrix

► Column vector

► Row vector

Standard matrix for transformation T(x1, x2) = (−x1 + x2 , x1 − x2)is

- $\begin{bmatrix} -1 & 1 \\ 1 & -1 \end{bmatrix}$
- $\begin{bmatrix} 1 & -1 \\ -1 & 1 \end{bmatrix}$
- $\begin{bmatrix} -1 & 1 \\ -1 & 1 \end{bmatrix}$
- None of these

Matrix $\begin{matrix} a & b \\ c & d \end{matrix}$ is singular if

► Ad=bc

► ad ≠ bc

► ad − bc = 1

► None of these

\$\$ QUIZ....

All the lines those passes through origin are not the subspace of a plane.

Select correct option:

FALSE

CORRECT

TRUE

Click here to Save Answer & Move to Next Question

/wEPDwUKMTY2N

/wEWCgKI/vurDv

Time Left 17 sec(s)

Quiz Start Time: 09:54 PM

Question # 2 of 10 (**Start time: 09:55:53 PM**) **Total Marks:** 1

If a system of equations is solved using the Gauss-Seidel method, then which of the following is the most appropriate answer about the matrix M that is derived from the coefficient matrix ?

Select correct option:

- All of its entries on the diagonal must be zero.
- All of its entries below the diagonal must be zero.
- All of its entries above the diagonal must be zero.

CORRECT

- All of its entries below and above the diagonal must b

Click here to Save Answer & Move to Next Question

Why inverse of the matrix A= [1 2] is NOT possible?

Select correct option:

Because it is a square matrix.

Because it is a zero matrix.

Because it is an identity matrix.

Because it is a rectangular matrix.

CORRECT

Let W = {(1, y) such that y in R}. Is W a vector subspace of plane.

Select correct option:

YES

NO

CORRECT

Click here to Save Answer & Move to Next Question

/wEPDwUKMTY2N

/wEWCgLMmce5C

Time Left 7 sec(s)

Quiz Start Time: 09:54 PM

Question # 5 of 10 (**Start time: 10:00:20 PM**) **Total Marks:** 1

If M is a square matrix having two rows equal then which of the following about the determinant of the matrix is true?

Select correct option:

- det (M) is not equal to '1'
- det (M)=1
- det (M) is not equal to '0'
- det (M)=0

CORRECT

Click here to Save Answer & Move to Next Question

/wEPDwUKMTY2N

/wEWCgL919jqBv

Time Left 12 sec(s)

Quiz Start Time: 09:54 PM

Question # 6 of 10 (**Start time: 10:01:48 PM**) **Total Marks:** 1

If a system of equations is solved using the Jacobi's method , then which of the following is the most appropriate answer about the matrix M that is derived from the coefficient matrix ?

Select correct option:

- All of its entries on the diagonal must be zero.
- All of its entries below the diagonal must be zero.
- All of its entries above the diagonal must be zero.
- All of its entries below and above the diagonal must b

CORRECT

Click here to Save Answer & Move to Next Question

Which of the following is the volume of the parallelepiped determined by the columns of A where A is a 3 x 3 matrix?

Select correct option:

- |det A|

CORRECT

- [A]
- det A

A^(-1) ,that is inverse of A

Click here to Save Answer & Move to Next Question

If all the entries of a row or a column of a square matrix are zero, then det (A) will be _____________.

Select correct option:

zero

CORRECT

infinity

one

non zero

If both the Jacobi and Gauss-Seidel sequences converge for the solution of Ax=b, for any initial x(0), then which of the following is true about both the solutions?

Select correct option:

No solution

Unique solution

CORRECT

Different solutions

Infinitely many solutions

Click here to Save Answer & Move to Next Question

How many different permutations are there in the set of integers {1,2,3}?

Select correct option:

2

4

6

8

CORRECT

Click here to Save Answer & Move to Next Question

LATEST 9th Dec 2011 Paper:

Q=26 **Let w be the set of all vectors of the form** $\begin{bmatrix} 5b+2c \\ b \\ c \end{bmatrix}$ **,where ' b' and 'c' are arbitrary scalars.show that w is a subspace of R^3.**

SOLUTION:

W is a subspace of R^3 as

$$W = \left\{ \begin{bmatrix} a \\ b \\ c \end{bmatrix} : a = 5b + 2c, where\, b\, and\, c\, are\, the\, arbitrary \right\}$$

Reference to the scalars b and c "arbitrary" means that the scalars can be any real numbers.

Q=25 **compute AB using block multiplication ,where** $A = \begin{pmatrix} 1 & 2 & 1 \\ 3 & 4 & 0 \\ 0 & 0 & 2 \end{pmatrix}$ **and**

$$B = \begin{pmatrix} 1 & 2 & 3 & 1 \\ 4 & 5 & 6 & 1 \\ 0 & 0 & 0 & 1 \end{pmatrix}$$

$$\begin{pmatrix} A_{11} & A_{12} \\ A_{21} & A_{22} \end{pmatrix} \times \begin{pmatrix} B_{11} & B_{12} \\ B_{21} & B_{22} \end{pmatrix}$$

$$A_{11} = \begin{pmatrix} 1 & 2 \\ 3 & 4 \end{pmatrix}, A_{12} = \begin{pmatrix} 1 \\ 0 \end{pmatrix}, A_{21}\begin{bmatrix} 0 & 0 \end{bmatrix}, A_{22}\begin{bmatrix} 2 \end{bmatrix}$$

$$B_{11} = \begin{pmatrix} 1 & 2 \\ 4 & 5 \end{pmatrix}, B_{12} = \begin{pmatrix} 3 & 1 \\ 6 & 1 \end{pmatrix}, B_{21}\begin{bmatrix} 0 & 0 \end{bmatrix}, B_{22} = \begin{bmatrix} 0 & 1 \end{bmatrix}$$

$$AB = \begin{pmatrix} A_{11}B_{11} + A_{12}B_{21} & A_{11}B_{12} + A_{12}B_{22} \\ A_{21}B_{11} + A_{22}B_{21} & A_{21}B_{12} + A_{22}B_{22} \end{pmatrix}$$

$$A_{11}B_{11} + A_{12}B_{21} = \begin{pmatrix} 1 & 2 \\ 3 & 4 \end{pmatrix}\begin{pmatrix} 1 & 2 \\ 4 & 5 \end{pmatrix} + \begin{pmatrix} 1 \\ 0 \end{pmatrix}\begin{bmatrix} 0 & 0 \end{bmatrix}$$

$$= \begin{pmatrix} 9 & 12 \\ 19 & 26 \end{pmatrix}$$

$$A_{11}B_{12} + A_{12}B_{22} = \begin{pmatrix} 1 & 2 \\ 3 & 4 \end{pmatrix}\begin{pmatrix} 3 & 1 \\ 6 & 1 \end{pmatrix} + \begin{pmatrix} 1 \\ 0 \end{pmatrix}\begin{bmatrix} 0 & 1 \end{bmatrix}$$

$$= \begin{pmatrix} 15 & 3 \\ 33 & 7 \end{pmatrix} + \begin{bmatrix} 0 & 0 \end{bmatrix}$$

$$A_{21}B_{11} + A_{22}B_{21} = \begin{bmatrix} 0 & 0 \end{bmatrix}\begin{pmatrix} 1 & 2 \\ 4 & 5 \end{pmatrix} + \begin{bmatrix} 2 \end{bmatrix}\begin{bmatrix} 0 & 0 \end{bmatrix}$$

$$= \begin{pmatrix} 0 & 0 \\ 0 & 0 \end{pmatrix} + \begin{bmatrix} 0 & 0 \end{bmatrix}$$

$$A_{21}B_{12} + A_{22}B_{22} = \begin{bmatrix} 0 & 0 \end{bmatrix}\begin{bmatrix} 0 & 0 \end{bmatrix} + \begin{bmatrix} 2 \end{bmatrix}\begin{bmatrix} 0 & 1 \end{bmatrix}$$

$$= \begin{bmatrix} 0 & 0 \end{bmatrix} + \begin{bmatrix} 0 & 2 \end{bmatrix}$$

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

$$AB = \begin{pmatrix} A_{11}B_{11} + A_{12}B_{21} & A_{11}B_{12} + A_{12}B_{22} \\ A_{21}B_{11} + A_{22}B_{21} & A_{21}B_{12} + A_{22}B_{22} \end{pmatrix} = \begin{pmatrix} 9 & 12 & 15 & 3 \\ 19 & 26 & 33 & 7 \\ 0 & 0 & 0 & 2 \\ 0 & 0 & 0 & 0 \end{pmatrix} ..Answer$$

Q =24 let W be the set of all vectors of the form $\begin{pmatrix} 3a + 4b \\ 2a + 6b \\ 7a + 9b \end{pmatrix}$ **, where 'a' and 'b' are arbitrary scalars.find the vectors** $\vec{U} and \ \vec{V}$ **such that w= span (**$\vec{U}, \vec{V}$ **) ……3 marks**

Answer.

$$= a\begin{pmatrix} 3 \\ 2 \\ 7 \end{pmatrix} + b\begin{pmatrix} 4 \\ 6 \\ 9 \end{pmatrix}$$

therefore, $\{u, v\} = \left\{ \begin{pmatrix} 3 \\ 2 \\ 7 \end{pmatrix}, \begin{pmatrix} 4 \\ 6 \\ 9 \end{pmatrix} \right\}$ are the vectors in w such that w=span$\{u, v\}$

Q=23 find the increase of the matrix. $A = \begin{pmatrix} 1 & 0 & 0 \\ 3 & 1 & 0 \\ 0 & 0 & 1 \end{pmatrix}$ **using the inversion**

algorithm…..3marks

answer 23

$$A = \begin{pmatrix} 1 & 0 & 0 \\ 3 & 1 & 0 \\ 0 & 0 & 1 \end{pmatrix}$$

$$AI = \left(\begin{array}{ccc|ccc} 1 & 0 & 0 & 1 & 0 & 0 \\ 3 & 1 & 0 & 0 & 1 & 0 \\ 0 & 0 & 1 & 0 & 0 & 1 \end{array}\right)$$

$$R_2 \leftarrow R_2 - 3R_1 \qquad \left(\begin{array}{ccc|ccc} 1 & 0 & 0 & 1 & 0 & 0 \\ 0 & 1 & 0 & -3 & 1 & 0 \\ 0 & 0 & 1 & 0 & 0 & 1 \end{array}\right)$$

therefore $A^{-1} = \begin{pmatrix} 1 & 0 & 0 \\ -3 & 1 & 0 \\ 0 & 0 & 1 \end{pmatrix}$

Q=22 = determine whether the set v = {(x,y,z)| x,y,z $\in$ R and x,y =11} is a subspace of R^3 or not….2

augmented matrix is $\begin{pmatrix} 4 & 3 & | & 4 \\ 5 & 8 & | & 6 \end{pmatrix}$

$R_2 \leftarrow 4R_2 - 5R_1$ $\begin{pmatrix} 4 & 3 & | & 4 \\ 0 & 17 & | & 4 \end{pmatrix}$

$R_1 \leftarrow 17R_1 - 3R_1$ $\begin{pmatrix} 68 & 0 & | & 56 \\ 0 & 17 & | & 4 \end{pmatrix}$

From above matrix it is clear that in 2x2 system, no free variable exists, neither there is any inconsistency such as sum of zero coefficients equal to non-zero real number. therefore, given system has unique solution

Q=21 show that the following system of linear equations has unique solutions.

$4x_1 + 3x_2 = 4$

$5x_1 + 8x_2 = 6$

/wEPDwUKMTY2N

/wEWCgLdgfGlDC

Time Left 9 sec(s)

Quiz Start Time: 11:11 PM

Question # 1 of 10 (Start time: 11:11:37 PM) **Total Marks:** 1

Let t be any m x n matrix with orthonormal columns and v be any vector then ||t . v || = _____.

Select correct option:

|| v ||

| v |

Correct

v

t . || v ||

Click here to Save Answer & Move to Next Question

/wEPDwUKMTY2N

/wEWBgLD3NfSD

Time Left 69 sec(s)

Quiz Start Time: 11:11 PM

Question # 3 of 10 (Start time: 11:14:36 PM) **Total Marks:** 1

If the augmented matrices of two linear systems are row equivalent, then the two systems have the same solution set.

Select correct option:

TRUE

Correct

FALSE

Click here to Save Answer & Move to Next Question

/wEPDwUKMTY2N

/wEWCgKm4fWP/

Time Left 19 sec(s)

Quiz Start Time: 11:11 PM

Question # 4 of 10 (**Start time: 11:15:21 PM**) **Total Marks:** 1

If A^2 (A square) is the _____, then the only eigen value of A is zero.

Select correct option:

zero matrix

Correct

scalar matrix

symmetric matrix

identity matrix

Click here to Save Answer & Move to Next Question

/wEPDwUKMTY2N
/wEWBgLg4Oa4C

Time Left 9 sec(s)

Quiz Start Time: 11:11 PM

Question # 5 of 10 (Start time: 11:16:45 PM) **Total Marks: 1**

Let t be any m x n matrix with orthonormal columns and v be any vector then ||t . v || = t . || v ||.

Select correct option:

TRUE

FALSE

Correct

Click here to Save Answer & Move to Next Question

If a square matrix has orthonormal columns, then it also has ______ rows.

Select correct option:

orthonormal

Correct

orthogonal

Click here to Save Answer & Move to Next Question

If x is _______ to both u and v, then x must be orthogonal to u – v.

Select correct option:

orthogonal

Correct

orthonormal

If a _____ matrix has orthonormal columns, then it also has orthonormal rows.

Select correct option:

square

Correct

singular

diagonal

rectangular

For any vectors u and v, the length of vector u – v will be || u – v ||.

Select correct option:

TRUE

FALSE

Correct

n x n matrix A is invertible if and only if ___________ is not an eigen value of A.

Select correct option:

0

Correct

- 1
- -1
- 2

Click here to Save Answer & Move to Next Question

```
1. If w is the orthogonal projection of a vector v in R^n onto a subspace W
of

R^n then w is orthogonal to v

        False

========

2. Let W be a subspace of R^n and v be a vector in R^n. Among all vectors in
W,

                                                                    +
the vector closet to v is the orthogonal projection of v onto W

        False

=========

3. The set of all vectors in R^n orthogonal to one fixed vector is a subspace
```

of R^n

True

================

4. If W is a subspace of R^n, then W and W^{+} have no vectors in common

False

=========

5. If a square matrix has orthonormal columns, then it also has orthonormal rows

True

(VISIT VURANK FOR MORE)