



Exam : Quiz 2  
Subject : Maths2  
Total Marks : 50.00  
QP : 2025 Mar16: IIT M AN EXAM QIM4

Exam Mode

Learning Mode

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CONTROLS

SUBMIT EXAM

Your Score

**0.00 / 50.00**

(0%)

Question 1 : 6406531175673

Total Mark : 0.00 | Type : MCQ

THIS IS QUESTION PAPER FOR THE SUBJECT "FOUNDATION LEVEL : SEMESTER II: MATHEMATICS FOR DATA SCIENCE II (COMPUTER BASED EXAM)" ARE YOU SURE YOU HAVE TO WRITE EXAM FOR THIS SUBJECT? CROSS CHECK YOUR HALL TICKET TO CONFIRM THE SUBJECTS TO BE WRITTEN. (IF IT IS NOT THE

**CORRECT SUBJECT, PLS CHECK THE SECTION AT THE TOP FOR THE SUBJECTS REGISTERED BY YOU)**

OPTIONS :

- YES
- NO

Your score : 0

 Discussions (0)



**Question 2 : 6406531175674**

 View Solutions (0)

Total Mark : 2.00 | Type : MCQ

Let  $A = \begin{bmatrix} \frac{2}{7} & \frac{6}{7} & \frac{3}{7} \\ \frac{3}{7} & \frac{2}{7} & -\frac{6}{7} \\ \frac{6}{7} & -\frac{3}{7} & \frac{2}{7} \end{bmatrix}$ . Choose the correct option for  $A^{-1}$ .



OPTIONS :

- $A^{-1} = \begin{bmatrix} \frac{2}{7} & \frac{6}{7} & \frac{3}{7} \\ \frac{3}{7} & \frac{2}{7} & -\frac{6}{7} \\ \frac{6}{7} & -\frac{3}{7} & \frac{2}{7} \end{bmatrix}$  

- $A^{-1} = \begin{bmatrix} \frac{4}{7} & \frac{3}{7} & \frac{2}{7} \\ \frac{2}{7} & \frac{4}{7} & -\frac{3}{7} \\ \frac{3}{7} & -\frac{2}{7} & \frac{4}{7} \end{bmatrix}$  

- $A^{-1} = \begin{bmatrix} \frac{2}{7} & \frac{3}{7} & \frac{6}{7} \\ \frac{6}{7} & \frac{2}{7} & -\frac{3}{7} \\ \frac{3}{7} & -\frac{6}{7} & \frac{2}{7} \end{bmatrix}$  

$A^{-1} = \begin{bmatrix} 2 & 3 & 6 \\ 6 & 2 & -3 \\ 3 & -6 & 2 \end{bmatrix}$  

Your score : 0

 Discussions (0)



### Question 3 : 6406531175675

 View Solutions (0)

Total Mark : 4.00 | Type : MSQ



Suppose  $T: \mathbb{R}^3 \rightarrow \mathbb{R}^3$  is a linear transformation. Let  $M_1$  and  $M_2$  denote the matrix representations of  $T$  with respect to distinct bases (for both domain and codomain)  $\beta_1$  and  $\beta_2$ , respectively. Choose the correct statements from the following.

OPTIONS :

rank( $M_1$ ) = rank( $M_2$ ) 

Columnspace( $M_1$ ) = Columnspace( $M_2$ ) 

Nullspace( $M_1$ ) = Nullspace( $M_2$ ) 

trace( $M_1$ ) = trace( $M_2$ ) 

det( $M_1$ ) = det( $M_2$ ) 

Your score : 0

 Discussions (1)



### Question 4 : 6406531175676

 View Solutions (0)

Total Mark : 4.00 | Type : MSQ



Let  $A = \begin{bmatrix} -2 & 0 & 3 \\ 4 & -1 & 2 \end{bmatrix}$ . Which of the matrices below are equivalent to  $A$ ?

OPTIONS :

$\begin{bmatrix} 1 & 2 & 3 \\ 3 & 2 & 1 \end{bmatrix}$  
  $\begin{bmatrix} -2 & 0 & 3 \\ -4 & 0 & 6 \end{bmatrix}$  
  $\begin{bmatrix} 1 & 4 & 3 \\ -1 & 4 & 3 \end{bmatrix}$  
  $\begin{bmatrix} -4 & 1 & -2 \\ 2 & 0 & -3 \end{bmatrix}$  

Your score : 0

[Discussions \(0\)](#)


### Question 5 : 6406531175677

[View Solutions \(0\)](#)

Total Mark : 4.00 | Type : MSQ

Let  $A = \begin{bmatrix} 2 & -3 \\ 4 & 1 \end{bmatrix}$ . Choose all the correct option(s).



OPTIONS :

- If  $A$  is equivalent to a matrix  $B$ , then they have the same rank, trace, and determinant. 
- $B \in M_{2 \times 2}(\mathbb{R})$  is a matrix with the same rank, trace, and determinant as  $A$ . Then  $A$  and  $B$  are similar. 
- $B \in M_{2 \times 2}(\mathbb{R})$  is a matrix such that  $A = \begin{bmatrix} 0 & -1 \\ 5 & 0 \end{bmatrix} B$ . Then  $A$  and  $B$  are equivalent. 
- $A$  is equivalent to any  $2 \times 2$  orthogonal matrix. 

Your score : 0

[Discussions \(0\)](#)


**Question 6 : 6406531175678**

View Solutions (0)

Total Mark : 2.00 | Type : SA

Find the maximum possible nullity of a  $3 \times 4$  matrix.

**Answer (Numeric):**

Answer

Accepted Answer : 4

Your score : 0

Discussions (0)

**Question 7 : 6406531175679**

View Solutions (0)

Total Mark : 2.00 | Type : SA

Let  $A = \begin{bmatrix} -1 & 1 \\ 1 & 5 \end{bmatrix}$  and  $B = (b_{ij})$  is a matrix similar to  $A$ . If  $b_{11} = 7$ , find  $b_{22}$ .



**Answer (Numeric):**

Answer

Accepted Answer : -3

Your score : 0

Discussions (0)

**Question 8 : 6406531175680**

Total Mark : 0.00 | Type : COMPREHENSION

Based on the above data, answer the given subquestions.

Consider the matrix



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

Your score : 0

**Question 9 :****6406531175681**

View Parent QN



View Solutions (0)

Total Mark : 2.00 | Type : SA

If  $(\alpha, \beta, 2, -1)$  is a vector in the nullspace of  $A$ , then find the value of  $\alpha - \beta$ .

**Answer (Numeric):**

Answer

**Accepted Answer : -4**

Your score : 0

Discussions (0)

**Question 10 :****6406531175682**

View Parent QN



View Solutions (0)

Total Mark : 2.00 | Type : SA

Find the nullity of the matrix A.

**Answer (Numeric):**

Answer

**Accepted Answer : 2**

Your score : 0

Discussions (0)

**Question 11 : 6406531175683**

Total Mark : 0.00 | Type : COMPREHENSION

Based on the above data, answer the given subquestions.

Let  $T: \mathbb{R}^3 \rightarrow \mathbb{R}^3$  be the linear transformation determined by  $T(1, 0, 0) = (1, 0, 4)$ ,   
 $T(1, 1, 0) = (-2, 3, 1)$ , and  $T(0, 0, 1) = (1, -1, 1)$ .

Your score : 0



### Question 12 :

**6406531175684**

View Parent QN

View Solutions (0)

Total Mark : 2.00 | Type : MCQ

Choose the correct definition for the linear transformation T.

OPTIONS :

- $T(x, y, z) = (x - 2y + z, 3y + z, 4x - 3y - z)$
- $T(x, y, z) = (x - 3y + z, 3y + z, 4x - 3y + z)$
- $T(x, y, z) = (x - 2y + z, 3y - z, 4x + y + z)$
- $T(x, y, z) = (x - 3y + z, 3y - z, 4x - 3y + z)$

Your score : 0

Discussions (0)



### Question 13 :

**6406531175685**

View Parent QN

View Solutions (0)

Total Mark : 4.00 | Type : MCQ

Which of the following statements is true?

OPTIONS :

- T is neither one-to-one nor onto.
- T is one-to-one, but not onto.

- T is onto, but not one-to-one.
- T is a linear isomorphism.

Your score : 0

 Discussions (0)



### Question 14 : 6406531175686

Total Mark : 0.00 | Type : COMPREHENSION

Based on the above data, answer the given subquestions.

Consider the linear transformation  $T : \mathbb{R}^3 \rightarrow \mathbb{R}^2$  defined by 

$T(x, y, z) = (x - 3y - (k + 1)z, 2x + ky + 10z)$  for all  $(x, y, z) \in \mathbb{R}^3$ , where  $k \in \mathbb{R}$ .

Your score : 0



### Question 15 :

6406531175687

 View Parent QN

 View Solutions (0)

Total Mark : 2.00 | Type : SA

Find the value of  $k$  for which the  nullity of the transformation  $T$  equals 2.

Answer (Numeric):

Answer

Accepted Answer : -6

Your score : 0

[Discussions \(0\)](#)**Question 16 :****6406531175688**[View Parent QN](#)[View Solutions \(0\)](#)

Total Mark : 4.00 | Type : MSQ

For the value of  $k$  obtained in previous question which of the following vectors belong to the range of  $T$ ?

OPTIONS :

- (1, 2)
- (-1, -2)
- (1, -2)
- (-1, 2)

Your score : 0

[Discussions \(0\)](#)**Question 17 : 6406531175689**

Total Mark : 0.00 | Type : COMPREHENSION

Based on the above data, answer the given subquestions.

Let  $T$  be an orthogonal transformation defined on  $\mathbb{R}^3$  with the usual inner product. 

Your score : 0

**Question 18 :****6406531175690**[View Parent QN](#)[View Solutions \(0\)](#)

Total Mark : 2.00 | Type : SA

Find  $\|T(4, 0, -3)\|$ .

Answer (Numeric):

Answer

Accepted Answer : 5

Your score : 0

Discussions (0)



Question 19 :

6406531175691

View Parent QN

View Solutions (0)

Total Mark : 2.00 | Type : SA

Suppose  $Q$  is the matrix representation of  $T$  with respect to some ordered basis, then find  $\det(Q^2)$ .

Answer (Numeric):

Answer

Accepted Answer : 1

Your score : 0

Discussions (0)



Question 20 :

6406531175692

View Parent QN

View Solutions (0)

Total Mark : 2.00 | Type : MCQ

Find the angle between  $T(1, 1, 1)$  and  $T(1, -2, 1)$ .

OPTIONS :

- $\frac{\pi}{3}$

- $\frac{3\pi}{2}$  
- $\pi$  
- $\frac{\pi}{2}$  

Your score : 0

 Discussions (0)



### Question 21 : 6406531175693

Total Mark : 0.00 | Type : COMPREHENSION

Let  $u_1 = (1, 0, 1)$ ,  $u_2 = (1, 1, 1)$  and  $W = \text{span}\{u_1, u_2\}$ . 

Answer the given subquestions.

Your score : 0



### Question 22 :

6406531175694

 View Parent QN

 View Solutions (0)

Total Mark : 2.00 | Type : SA

If  $(a, b, c)$  is the projection of  $u_2$  on   $u_1$ , find  $a + b + c$ .

Answer (Numeric):

Answer

Accepted Answer : 2

Your score : 0

[Discussions \(0\)](#)**Question 23 :****6406531175695**[View Parent QN](#)[View Solutions \(0\)](#)

Total Mark : 2.00 | Type : MCQ

Let  $\{v_1, v_2\}$  be the orthonormal set of vectors obtained from  $\{u_1, u_2\}$  by applying Gram-Schmidt process.  
Choose the correct option.

OPTIONS :

- $v_1 = \frac{1}{\sqrt{2}}(1, 0, 1), v_2 = \frac{1}{\sqrt{3}}(-1, 1, 1)$
- $v_1 = \frac{1}{\sqrt{2}}(1, 0, 1), v_2 = (0, 1, 0)$
- $v_1 = \frac{1}{\sqrt{2}}(1, 0, 1), v_2 = \frac{1}{\sqrt{2}}(-1, 0, 1)$
- $v_1 = \frac{1}{\sqrt{2}}(1, 0, 1), v_2 = \frac{1}{\sqrt{2}}(1, 0, -1)$

Your score : 0

[Discussions \(0\)](#)**Question 24 :****6406531175696**[View Parent QN](#)[View Solutions \(0\)](#)

Total Mark : 2.00 | Type : MCQ

Choose the correct option for W.

OPTIONS :

- $W = \{(x, y, z) \mid x + y = z\}$
- $W = \{(x, y, z) \mid x - y = z\}$

- $W = \{(x, y, z) \mid x = y = z\}$

- $W = \{(x, y, z) \mid x = z\}$

Your score : 0

Discussions (0)



### Question 25 :

6406531175697

View Parent QN

View Solutions (0)

Total Mark : 2.00 | Type : SA

Let  $(a, b, c)$  be the vector obtained by projecting the vector  $(1, 2, 3)$  on  $W$ . Find  $a + b + c$ .

Answer (Numeric):

Answer

Accepted Answer : 6

Your score : 0

Discussions (0)



### Question 26 :

6406531175698

View Parent QN

View Solutions (0)

Total Mark : 2.00 | Type : MCQ

Which of the affine spaces below correspond to the subspace  $W$  ?

OPTIONS :

- $L = \{(x, x + 1, x + 2) \mid x \in \mathbb{R}\}$

- $L = \{(x, y, z) \mid x + z = 1, y \in \mathbb{R}\}$

- $L = \{(x, y, x + 2) \mid x, y \in \mathbb{R}\}$

**L = {(x, y, z) | x + y + z = 3}**

Your score : 0

Discussions (0)



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