Question Label : Multiple Choice Question

They want to go on a long journey, _____

**Options :**

6406532305264. ✖ Doesn't they?

6406532305265. ✔ Don't they?

6406532305266. ✖ Didn't they?

6406532305267. ✖ Won't they?

# Sem2 Maths2

| | |
|---|---|
| **Section Id :** | 64065348483 |
| **Section Number :** | 6 |
| **Section type :** | Online |
| **Mandatory or Optional :** | Mandatory |
| **Number of Questions :** | 9 |
| **Number of Questions to be attempted :** | 9 |
| **Section Marks :** | 25 |
| **Display Number Panel :** | Yes |
| **Group All Questions :** | No |
| **Enable Mark as Answered Mark for Review and Clear Response :** | Yes |
| **Maximum Instruction Time :** | 0 |
| **Sub-Section Number :** | 1 |
| **Sub-Section Id :** | 640653100685 |
| **Question Shuffling Allowed :** | No |
| **Is Section Default? :** | null |

**Question Number : 122 Question Id : 640653689001 Question Type : MCQ Is Question**

Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

**Correct Marks : 0**

Question Label : Multiple Choice Question

**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 :**

6406532305268. ✔ YES

6406532305269. ✖ NO

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|---|---|
| **Sub-Section Number :** | 2 |
| **Sub-Section Id :** | 640653100686 |
| **Question Shuffling Allowed :** | Yes |
| **Is Section Default? :** | null |

**Question Number : 123 Question Id : 640653689010 Question Type : MSQ Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

**Correct Marks : 2 Max. Selectable Options : 0**

Question Label : Multiple Select Question

Which of the following functions are linear transformations?

**Options :**

6406532305288. ✖ $T : \mathbb{R} \to \mathbb{R}, T(x) = 2x + 1$

6406532305289. ✔ $T : \mathbb{R}^4 \to \mathbb{R}^2, T(x, y, z, w) = (x + y, z + w)$

6406532305290. ✔ $T : \mathbb{R}^3 \to \mathbb{R}^3$, $T(x, y, z) = (-y, -x, 0)$

6406532305291. ✖ $T : \mathbb{R} \to \mathbb{R}^2$, $T(x) = (x + 1, x - 1)$

**Question Number : 124 Question Id : 640653689011 Question Type : MSQ Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

**Correct Marks : 2 Max. Selectable Options : 0**

Question Label : Multiple Select Question

Let $T$ be a linear transformation from $\mathbb{R}^2$ to $\mathbb{R}^3$. $S \subset \mathbb{R}^2$ is a line passing through the origin. Which of the following are possible?

**Options :**

6406532305292. ✔ $T(S)$ could be the origin in $\mathbb{R}^3$.

6406532305293. ✔ $T(S)$ could be a line passing through the origin in $\mathbb{R}^3$.

6406532305294. ✖ $T(S)$ could be a plane passing through the origin in $\mathbb{R}^3$.

6406532305295. ✖ $T(S)$ could be $\mathbb{R}^3$

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|---|---|
| **Sub-Section Number :** | 3 |
| **Sub-Section Id :** | 640653100687 |
| **Question Shuffling Allowed :** | Yes |
| **Is Section Default? :** | null |

**Question Number : 125 Question Id : 640653689002 Question Type : MSQ Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction**

**Correct Marks : 3 Max. Selectable Options : 0**

Question Label : Multiple Select Question

Let $A$ and $B$ be $n \times n$ matrices. Which of the following statement(s) is/are true?

**Options :**

6406532305270. ✔ If $A$ and $B$ are similar, then nullity of $A$ and nullity of $B$ are equal.

6406532305271. ✔ Let $A$ and $B$ be similar matrices. Then the homogeneous system of linear equations $Ax = 0$ has a unique solution if and only if the homogeneous system of linear equations $Bx = 0$ has a unique solution.

6406532305272. ✖ If $A^k$ and $B^k$ are similar for some positive integer $k$, then $A$ and $B$ are similar.

6406532305273. ✔ If $A$ and $B$ are similar matrices where $A$ is a scalar matrix, then $A = B$.

**Question Number : 126 Question Id : 640653689009 Question Type : MSQ Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

**Correct Marks : 3 Max. Selectable Options : 0**

Question Label : Multiple Select Question

Let $A$ be a $n \times n$ orthogonal matrix. Then which of the following statement(s) is/are true?

**Options :**

6406532305284. ✔ The rows of $A$ form an orthonormal basis for $\mathbb{R}^n$.

6406532305285. ✔ Suppose $T$ is the linear transformation corresponding to $A$, then $\|Tv\| = \|v\|$ for any $v \in \mathbb{R}^n$.

6406532305286.

The system of linear equations $Ax = b$ has a unique solution for
✔ every $b \in \mathbb{R}^n$.

The rows of $A$ form an orthogonal basis but not an orthonormal
6406532305287. ✖ basis for $\mathbb{R}^n$.

| | |
|---|---|
| **Sub-Section Number :** | 4 |
| **Sub-Section Id :** | 640653100688 |
| **Question Shuffling Allowed :** | No |
| **Is Section Default? :** | null |

**Question Id : 640653689003 Question Type : COMPREHENSION Sub Question Shuffling Allowed : No Group Comprehension Questions : No Question Pattern Type : NonMatrix Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

**Question Numbers : (127 to 128)**

Question Label : Comprehension

Let $L = \{(x, y): y = x + 1\}$ and $L' = \{(x, x + z - 2, z): x, z \in \mathbb{R}\}$.

Based on the above data, answer the given subquestions.

**Sub questions**

**Question Number : 127 Question Id : 640653689004 Question Type : MSQ Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

**Correct Marks : 2 Max. Selectable Options : 0**

Question Label : Multiple Select Question

Choose the correct option from the following.

**Options :**

The subspace associated with the affine space $L$ is the line
6406532305274. ✖ $y = x + 1$.

6406532305275. ✔ The subspace associated with the affine space $L$ is given by $\{(x, x) : x \in \mathbb{R}\}$.

6406532305276. ✔ The subspace associated with the affine space $L'$ is given by $\{(x, y, z) : x - y + z = 0\}$

6406532305277. ✖ The subspace associated with the affine space $L'$ is the $xz$- plane.

**Question Number : 128 Question Id : 640653689005 Question Type : SA Calculator : None**

**Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

**Correct Marks : 1**

Question Label : Short Answer Question

If the dimension of $L$ is $m$ and the dimension of $L'$ is $n$, then $m + n$ is

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Equal

**Text Areas :** PlainText

**Possible Answers :**

3

| **Sub-Section Number :** | 5 |
| --- | --- |
| **Sub-Section Id :** | 640653100689 |
| **Question Shuffling Allowed :** | No |
| **Is Section Default? :** | null |

**Question Id : 640653689006 Question Type : COMPREHENSION Sub Question Shuffling Allowed : No Group Comprehension Questions : No Question Pattern Type : NonMatrix**

**Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

**Question Numbers : (129 to 130)**

Question Label : Comprehension

Let $W = \{(x, y, z) \colon x + 2y - z = 0\}$.


Based on the above data, answer the given subquestions.

**Sub questions**


**Question Number : 129 Question Id : 640653689007 Question Type : MCQ Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

**Correct Marks : 1**

Question Label : Multiple Choice Question

Which of the following is a basis

$\beta$ for $W$?

**Options :**

6406532305279. ✳ {(1, 0, −1),(0, 1, 2)}

6406532305280. ✔ {(1, 0, 1),(0, 1, 2)}

6406532305281. ✳ {(1, 0, 1),(0, 1, 1)}

6406532305282. ✳ {(−1, 0, −1),(0, 2, 1)}


**Question Number : 130 Question Id : 640653689008 Question Type : SA Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

**Correct Marks : 3**

Question Label : Short Answer Question

If $\gamma$ is the orthonormal basis of $W$ obtained from the basis $\beta$ by using the Gram Schmidt process with respect to the usual inner product and $(a, b, c)$ is the projection of $(1,3,1)$ onto $W$, then what is $a + b + c$?

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Equal

**Text Areas :** PlainText

**Possible Answers :**

3

**Question Id : 640653689012 Question Type : COMPREHENSION Sub Question Shuffling Allowed : No Group Comprehension Questions : No Question Pattern Type : NonMatrix Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

**Question Numbers : (131 to 132)**

Question Label : Comprehension

Consider the following system of linear equations:

$$x + 3y - 2z = 0$$
$$y - z = 0$$
$$x + y = 0$$

Let $A$ be the coefficient matrix corresponding to this system.

Based on the above data, answer the given subquestions.

**Sub questions**

**Question Number : 131 Question Id : 640653689013 Question Type : MCQ Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

**Correct Marks : 2**

Question Label : Multiple Choice Question

Which of the following is the nullspace of *A*?

**Options :**

6406532305296. ✔ span{(−1, 1, 1)}

6406532305297. ✖ span{(1, 1, 0)}

6406532305298. ✖ span{(1, 0, 1),(0, 1, −1)}

6406532305299. ✖ span{(1, 1, 0),(0, 1, −1)}

**Question Number : 132 Question Id : 640653689014 Question Type : SA Calculator : None**

**Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

**Correct Marks : 2**

Question Label : Short Answer Question

Let *B* be a square matrix of order 3. What is the smallest value that the nullity of *BA* could take?

**Response Type :** Numeric

**Evaluation Required For SA :** Yes

**Show Word Count :** Yes

**Answers Type :** Equal

**Text Areas :** PlainText

**Possible Answers :**

1

**Question Id : 640653689015 Question Type : COMPREHENSION Sub Question Shuffling**

**Allowed : No Group Comprehension Questions : No Question Pattern Type : NonMatrix**

**Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

**Question Numbers : (133 to 134)**

Question Label : Comprehension

Consider a vector space $V$ with bases $\beta = \{v_1, v_2\}$ and $\gamma = \{v_1 + v_2, v_1 - v_2\}$.

$T$ is a linear transformation from $V$ to itself such that $T(v_1) = v_1 + 2v_2$

and $T(v_2) = 2v_1 - v_2$.

Based on the above data, answer the given subquestions.

**Sub questions**

**Question Number : 133 Question Id : 640653689016 Question Type : MCQ Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0**

**Correct Marks : 3**

Question Label : Multiple Choice Question

Find the matrix corresponding to $T$

if $\gamma$ is used as the basis for both

the domain and co-domain.

**Options :**

6406532305301. ✔ $\begin{bmatrix} 2 & 1 \\ 1 & -2 \end{bmatrix}$

6406532305302. ✖ $\begin{bmatrix} 1 & 2 \\ 2 & -1 \end{bmatrix}$

6406532305303. ✖ $\begin{bmatrix} 3 & -1 \\ 1 & 3 \end{bmatrix}$

6406532305304. ✖ $\begin{bmatrix} 1.5 & 0.5 \\ -0.5 & 1.5 \end{bmatrix}$

**Question Number : 134 Question Id : 640653689017 Question Type : MCQ Is Question**

**Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction**

**Time : 0**

**Correct Marks : 1**

Question Label : Multiple Choice Question

Is *T* an isomorphism?

**Options :**

6406532305305. ✔ Yes

6406532305306. ✖ No

# Sem2 Statistics2

| | |
|---|---|
| **Section Id :** | 64065348484 |
| **Section Number :** | 7 |
| **Section type :** | Online |
| **Mandatory or Optional :** | Mandatory |
| **Number of Questions :** | 12 |
| **Number of Questions to be attempted :** | 12 |
| **Section Marks :** | 40 |
| **Display Number Panel :** | Yes |
| **Group All Questions :** | No |
| **Enable Mark as Answered Mark for Review and Clear Response :** | Yes |
| **Maximum Instruction Time :** | 0 |
| **Sub-Section Number :** | 1 |
| **Sub-Section Id :** | 640653100690 |
| **Question Shuffling Allowed :** | No |
| **Is Section Default? :** | null |

**Question Number : 135 Question Id : 640653689018 Question Type : MCQ Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction**