MLF

Section Id :	64065328982
Section Number :	8
Section type :	Online
Mandatory or Optional :	Mandatory
Number of Questions :	14
Number of Questions to be attempted :	14
Section Marks :	50
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 :	64065363325
Question Shuffling Allowed :	No
Is Section Default? :	null

Question Number : 138 Question Id : 640653445580 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 "DIPLOMA LEVEL: MACHINE LEARNING FOUNDATIONS"

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 :

6406531484684. ✔ Yes

6406531484685. ✖ No

Sub-Section Number : 2

Sub-Section Id : 64065363326

Question Shuffling Allowed : Yes

Is Section Default? : null

Question Number : 139 Question Id : 640653445581 Question Type : MSQ Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 4 Selectable Option : 0

Question Label : Multiple Select Question

Choose the correct option(s) with respect to a square Hermitian matrix *A* of order *n*

Options :

6406531484686. ✔ If A is a Hermitian matrix, and k is any real scalar, then kA is also a Hermitian matrix.

6406531484687. ✔ For every $a_{ij} \in A, \overline{a_{ij}} = a_{ji}$ for all $(1 \leq i, j \leq n)$.

6406531484688. ✔ Every diagonal element of the matrix A is a real number.

6406531484689. ✖ The determinant of A can either be real or complex.

Question Number : 140 Question Id : 640653445582 Question Type : MSQ Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 4 Selectable Option : 0

Question Label : Multiple Select Question

Consider a hermitian matrix A given as

$$A = \begin{bmatrix} 2 & i \\ -i & 2 \end{bmatrix}$$

and choose the correct option(s):

Options :

6406531484690. ✔ The eigenvalues of *A* are 1 and 3.

6406531484691. ✖ The eigenvalues of *A* are 1 repeated twice.

6406531484692. ✔ The matrix *A* is unitarily diagonalizable.

6406531484693. ✖ The matrix *A* is not unitarily diagonalizable.

Question Number : 141 Question Id : 640653445586 Question Type : MSQ Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 4 Selectable Option : 0

Question Label : Multiple Select Question

Consider the matrix $A = \begin{bmatrix} 1 & -1 \\ -1 & 1 \end{bmatrix}$ and choose the correct option(s).

Options :

6406531484703. ✔ The eigenvalues of A are non-negative.

6406531484704. ✔ The matrix A is a positive semidefinite matrix.

6406531484705. ✖ The eigenvectors of A are $v_1 = (-1, 1), v_2 = (1, 2)$

6406531484706. ✖ The matrix A is positive definite.

Sub-Section Number :	3
Sub-Section Id :	64065363327
Question Shuffling Allowed :	Yes
Is Section Default? :	null

Question Number : 142 Question Id : 640653445583 Question Type : SA Calculator : None

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

Correct Marks : 4

Question Label : Short Answer Question

Let v_1 and v_2 be two non zero real vectors of size 3×1. Suppose that v_1 and v_2 satisfy $v_1^T v_2 = 0$, $v_1^T v_1 = 1$ and $v_2^T v_2 = 1$. Let A be 3×3 matrix given as $A = 2v_1 v_1^T + 3v_2 v_2^T$, then eigen values of A are λ_1, λ_2 and λ_3, then find the value of $\lambda_1 + \lambda_2 + \lambda_3$?

Note: Enter the answer to the nearest integer.

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

5

Question Number : 143 Question Id : 640653445591 Question Type : SA Calculator : None

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

Correct Marks : 4

Question Label : Short Answer Question

Find the height of a cylinder of maximum volume that can be inscribed in a sphere of radius $a = \sqrt{3}$

Note: Enter the answer to the nearest integer.

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

2

Question Number : 144 Question Id : 640653445592 Question Type : SA Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 4

Question Label : Short Answer Question

You are told to make an open box with a squared base from a wooden piece of 27 m^2 area such that the volume of the resulting box is maximum. If the dimensions (length, breadth, and height) of the resulting box are *l*, *b*, and *h* respectively, then the length of the required box is?

Note: Enter the answer to the nearest integer.

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

3

Sub-Section Number :	4
Sub-Section Id :	64065363328
Question Shuffling Allowed :	Yes
Is Section Default? :	null

Question Number : 145 Question Id : 640653445584 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

$$\text{The matrix } A = \frac{1}{2}\begin{bmatrix} 1+i & \sqrt{k} \\ 1-i & \sqrt{k}i \end{bmatrix} \text{ is unitary if k is}$$

Options :

6406531484695. ✖ $\frac{1}{2}$

6406531484696. ✖ 1

6406531484697. ✔ 2

6406531484698. ✖ $\frac{1}{4}$

Sub-Section Number : 5

Sub-Section Id : 64065363329

Question Shuffling Allowed : Yes

Is Section Default? : null

Question Number : 146 Question Id : 640653445587 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

Given $f(x, y) = 10x^2 + 10xy + 5y^2$, then point $(0, 0)$ is a _____.

Options :

6406531484707. ✖ maxima

6406531484708. ✔ minima

6406531484709. ✖ saddle point

6406531484710. ✖ None of these

Sub-Section Number : 6

Sub-Section Id : 64065363330

Question Shuffling Allowed : Yes

Is Section Default? : null

Question Number : 147 Question Id : 640653445585 Question Type : MCQ Is Question

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

Correct Marks : 4

Question Label : Multiple Choice Question

The SVD of matrix $A = \begin{bmatrix} -4 & -7 \\ 1 & 4 \end{bmatrix}$ is

Options :

6406531484699. ✔ $\begin{bmatrix} -0.894 & 0.447 \\ 0.447 & 0.894 \end{bmatrix} \begin{bmatrix} \sqrt{81} & 0 \\ 0 & \sqrt{1} \end{bmatrix} \begin{bmatrix} 0.447 & 0.894 \\ -0.894 & 0.447 \end{bmatrix}$

6406531484700. ✖ $\begin{bmatrix} -0.447 & 0.894 \\ -0.894 & -0.447 \end{bmatrix} \begin{bmatrix} \sqrt{40} & 0 \\ 0 & \sqrt{10} \end{bmatrix} \begin{bmatrix} -0.707 & 0.707 \\ 0.707 & 0.707 \end{bmatrix}$

6406531484701. ✖ $\begin{bmatrix} -0.707 & 0.707 \\ 0.707 & 0.707 \end{bmatrix} \begin{bmatrix} 4 & 0 \\ 0 & -5 \end{bmatrix} \begin{bmatrix} -0.447 & 0.894 \\ -0.894 & -0.447 \end{bmatrix}$

6406531484702. ✖ $\begin{bmatrix} -0.512 & 0.707 \\ 0.707 & -0.512 \end{bmatrix} \begin{bmatrix} \sqrt{40} & 0 \\ 0 & \sqrt{10} \end{bmatrix} \begin{bmatrix} 0.707 & -0.707 \\ 0.707 & 0.707 \end{bmatrix}$

Question Number : 148 Question Id : 640653445588 Question Type : MCQ Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 4

Question Label : Multiple Choice Question

Let $A = \begin{bmatrix} 2 & -2 & 0 \\ -2 & 1 & -2 \\ 0 & -2 & 1 \end{bmatrix}$ and $B = \begin{bmatrix} 2 & 2 & -2 \\ 2 & 5 & -4 \\ -2 & -4 & 5 \end{bmatrix}$ Then choose the right option.

Options :

6406531484711. ✖ Only *A* is positive definite

6406531484712. ✔ Only *B* is positive definite

6406531484713. ✖ Both *A* and *B* are positive definite

6406531484714. ✖ None of them is positive definite.

Question Number : 149 Question Id : 640653445589 Question Type : MCQ Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 4

Question Label : Multiple Choice Question

Consider the data points

$$x_1 = \begin{bmatrix} 0 \\ 2 \end{bmatrix}, x_2 = \begin{bmatrix} 1 \\ 1 \end{bmatrix}, x_3 = \begin{bmatrix} 2 \\ 0 \end{bmatrix}$$

If we are projecting this dataset onto the first principal component, then what is the projected variance?

Options :

6406531484715. ✖ 0.34

6406531484716. ✖ 1

6406531484717. ✔ 1.34

6406531484718. ✖ None of these

Question Number : 150 Question Id : 640653445590 Question Type : MCQ Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 4

Question Label : Multiple Choice Question

Consider these data points to answer the following question:

$$x_1 = \begin{bmatrix} -4 \\ 4 \end{bmatrix}, x_2 = \begin{bmatrix} -2 \\ 2 \end{bmatrix}, x_3 = \begin{bmatrix} 2 \\ -2 \end{bmatrix} \; x_4 = \begin{bmatrix} 4 \\ -4 \end{bmatrix}$$

The projected (new) data points x_1', x_2', x_3', x_4' corresponding to the original points x_1, x_2, x_3, x_4 in one dimensional PCA is

Options :

6406531484719. ✖ $x_1' = \begin{bmatrix} 0 \\ 2 \end{bmatrix}, x_2' = \begin{bmatrix} 2 \\ 4 \end{bmatrix}, x_3' = \begin{bmatrix} 4 \\ 2 \end{bmatrix} \; x_4' = \begin{bmatrix} 2 \\ 0 \end{bmatrix}$

6406531484720. ✖ $x_1' = \begin{bmatrix}2\\2\end{bmatrix}, x_2' = \begin{bmatrix}4\\4\end{bmatrix}, x_3' = \begin{bmatrix}4\\4\end{bmatrix}\ x_4' = \begin{bmatrix}2\\2\end{bmatrix}$

6406531484721. ✔ $x_1' = \begin{bmatrix}-4\\4\end{bmatrix}, x_2' = \begin{bmatrix}-2\\2\end{bmatrix}, x_3' = \begin{bmatrix}2\\-2\end{bmatrix}\ x_4' = \begin{bmatrix}4\\-4\end{bmatrix}$

6406531484722. ✖ $x_1' = \begin{bmatrix}-2\\2\end{bmatrix}, x_2' = \begin{bmatrix}-4\\4\end{bmatrix}, x_3' = \begin{bmatrix}2\\-2\end{bmatrix}\ x_4' = \begin{bmatrix}4\\-4\end{bmatrix}$

Sub-Section Number :	7
Sub-Section Id :	64065363331
Question Shuffling Allowed :	No
Is Section Default? :	null

Question Id : 640653445593 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 : (151 to 152)

Question Label : Comprehension

A furniture dealer deals in only two items, i.e tables and chairs. He has a maximum of $10000 to invest and a space to store at most 60 pieces. A table costs him $500 and chair $200. He can sell a table at a profit of $50 and a chair at a profit of $15. Assume that he can sell all the items that he buys. Formulate this problem so that he can maximize the profit

Based on the above data, answer the given subquestions.

Sub questions

Question Number : 151 Question Id : 640653445594 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

The objective function for the problem is

Options :

6406531484725. ✖ min 50*x* + 15*y*

6406531484726. ✔ max 50*x* + 15*y*

6406531484727. ✖ min 50*x* − 15*y*

6406531484728. ✖ max 50*x* − 15*y*

Question Number : 152 Question Id : 640653445595 Question Type : MSQ Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 3 Selectable Option : 0

Question Label : Multiple Select Question

The constraint function for the problem is

Options :

6406531484729. ✔ $x \geq 0, y \geq 0$

6406531484730. ✔ $5x + 2y \leq 100$

6406531484731. ✖ $5x + 2y \geq 100$

6406531484732. ✔ $x + y \leq 60$

Java

Section Id :	64065328983
Section Number :	9
Section type :	Online
Mandatory or Optional :	Mandatory
Number of Questions :	16