If the application is run locally on http://127.0.0.1:5000 using the command `python app.py stable`, what will be rendered by the browser for URL http://127.0.0.1:5000/home?

Options :

6406531929679. ✖ **static url path: /static**
static folder: C:\home\mad_1\static

6406531929680. ✖ **static url path: /stable**
static folder: C:\home\mad_1\stable

6406531929681. ✖ **static url path: C:\home\mad_1\stable**
static folder: /stable

6406531929682. ✔ **static url path: /stable**
static folder: C:\home\mad_1\static

MLF

Section Id :	64065339073
Section Number :	8
Section type :	Online
Mandatory or Optional :	Mandatory
Number of Questions :	15
Number of Questions to be attempted :	15
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 :	64065382594
Question Shuffling Allowed :	No
Is Section Default? :	null

Question Number : 119 Question Id : 640653577871 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 (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 :

6406531929719. ✔ YES

6406531929720. ✖ NO

Sub-Section Number :	2
Sub-Section Id :	64065382595
Question Shuffling Allowed :	Yes
Is Section Default? :	null

Question Number : 120 Question Id : 640653577872 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

Which of the following statements are correct?

Options :

6406531929721. ✔ $\mathbf{I}(444\%3 = 0 \text{ and } \pi \in \mathbb{R}) = 1.$

6406531929722. ✖ Mean Squared Error (MSE) is a suitable loss function for classification problems.

6406531929723. ✖ The loss obtained after applying encoder and decoder functions to a given data can be negative.

6406531929724. ✔ Gaussian mixture model is a family of distributions for modeling multimodal data.

Question Number : 121 Question Id : 640653577884 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

Which of the following statements is/are true?

Options :

6406531929745. ✔ Row space of a matrix is orthogonal to the null space of the matrix.

6406531929746. ✖ Row space of a matrix is orthogonal to the null space of transpose of the matrix.

6406531929747. ✔ Dimension of row space of a matrix is always equal to the dimension of column space of the matrix.

6406531929748. ✖ Dimension of row space of a matrix need not be equal to the dimension of column space of the matrix.

Question Number : 122 Question Id : 640653577886 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

Which of the following matrices have eigenvectors as $\begin{bmatrix}2\\1\\2\end{bmatrix}$, $\begin{bmatrix}1\\-2\\0\end{bmatrix}$ and $\begin{bmatrix}1\\0\\-1\end{bmatrix}$?

Options :

6406531929753. ✔ $\begin{bmatrix}3&2&4\\2&0&2\\4&2&3\end{bmatrix}$

6406531929754. ✔ $\begin{bmatrix}6&4&8\\4&0&4\\8&4&6\end{bmatrix}$

6406531929755. ✖ $\begin{bmatrix}2&1&4\\4&0&4\\8&4&6\end{bmatrix}$

6406531929756. ✖ $\begin{bmatrix}3&1&0\\2&0&2\\4&2&3\end{bmatrix}$

Question Number : 123 Question Id : 640653577887 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 the matrix $A \in \mathbb{R}^{d\times d}$ be diagonalizable, then which of the following statements is/are true for A?

Options :

6406531929757. ✖ A must be symmetric.

6406531929758. ✔ We can find a basis of eigenvectors for $\mathbb{R}^d$.

6406531929759. ✖ We can find an orthonormal basis of eigenvectors for $\mathbb{R}^d$.

6406531929760. ✔ A can have some repeated eigenvalues but must have distinct independent eigenvectors.

Sub-Section Number :	3
Sub-Section Id :	64065382596
Question Shuffling Allowed :	Yes
Is Section Default? :	null

Question Number : 124 Question Id : 640653577879 Question Type : MSQ Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 4 Max. Selectable Options : 0

Question Label : Multiple Select Question

Let $A, B \in \mathbb{R}^{n \times n}$ be two matrices, then which among the following statements are correct?

Options :

6406531929737. ✔ $x \in \text{Nullspace}(A) \implies x \in \text{Nullspace}(BA)$.

6406531929738. ✔ $x \in \text{Columnspace}(A) \implies x \in \text{Columnspace}(B)$, where $A = BC, C \in \mathbb{R}^{n \times n}$.

6406531929739. ✔ $x \in \text{Nullspace}(AB) \implies Bx \in \text{Nullspace}(A)$.

6406531929740. ✖ $x \in \text{Nullspace}(AB) \implies x \in \text{Nullspace}(B)$.

Question Number : 125 Question Id : 640653577885 Question Type : MSQ Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 4 Max. Selectable Options : 0

Question Label : Multiple Select Question

Consider the solution of the linear regression problem $(Ax = b)$ using least squares method, where $A = \begin{bmatrix} 1 & 5 & 5 \\ 2 & 3 & 5 \\ 0 & 7 & 1 \end{bmatrix}$ and $b = \begin{bmatrix} 7 \\ 8 \\ 4 \end{bmatrix}$.
Based on this data, which of the following statements is/are true?

Options :

6406531929749. ✔ The error value is zero as we can get an x such that Ax is exactly equal to b.

6406531929750. ✖ The error value is non-zero as we cannot get an x such that Ax is exactly equal to b.

6406531929751. ✔ Least squares solution for x is $\begin{bmatrix} 2 \\ 0.5 \\ 0.5 \end{bmatrix}$.

6406531929752. ✖ Least squares solution for x is $\begin{bmatrix} 1 \\ 0.6 \\ 0.4 \end{bmatrix}$.

Sub-Section Number :	4
Sub-Section Id :	64065382597
Question Shuffling Allowed :	Yes
Is Section Default? :	null

Question Number : 126 Question Id : 640653577877 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

Find the linear approximation of the function $f(x,y) = ye^{xy}$ in the neighbourhood of (0,1).

Options :

6406531929729. ✔ $x + y$

6406531929730. ✖ $x + 2y$

6406531929731. ✖ $2x + y$

6406531929732. ✖ $2x + 3y$

Question Number : 127 Question Id : 640653577878 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 $f : \mathbb{R}^2 \to \mathbb{R}$, given by $f(x,y) = x^2 + y^2$. Consider the following algorithm:

$$X_{n+1} = X_n - h\nabla f(X_n), \quad X_i \in \mathbb{R}^2, i : 1, 2, \ldots \text{ and } h > 0,$$

where h is the step size and $\nabla f(X_n)$ is the gradient of f evaluated at X_n. Fix $h = 0.25$ and $X_0 = (1,3)$, which among the following points does the algorithm converge to?

Options :

6406531929733. ✖ (1, 3)

6406531929734. ✖ (1/2, 1/6)

6406531929735. ✔ (0, 0)

6406531929736. ✖ The algorithm does not converge

Sub-Section Number : 5

Sub-Section Id : 64065382598

Question Shuffling Allowed : Yes

Is Section Default? : null

Question Number : 128 Question Id : 640653577873 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

Consider the following dataset with 5 data points:

X	y
$(2,3)$	5
$(-1,1)$	2
$(4,2)$	7
$(0,-2)$	1
$(-3,5)$	4

We want to fit a linear regression model of the form $f(X) = w^T x$ to this dataset, where $w = \begin{bmatrix} 1 \\ 2 \end{bmatrix}$. Compute the value of the loss function L for this dataset which is defined as $L = \max_i |f(x^i) - y^i|$.

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

5

Question Number : 129 Question Id : 640653577874 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 $f(x_1, x_2, x_3) = \frac{x_1 + x_2 + x_3}{2}$ be used as an encoder function and $g(u) = [u, u, u]$ be used as a decoder function for dimensionality reduction of the dataset $X_1 = [1, 2, 3]$, $X_2 = [2, 4, 6], X_3 = [3, 6, 9], X_4 = [4, 8, 12]$. Calculate the reconstruction error $\left(R(f, g) = \frac{1}{n}\sum_{i=1}^{n} \|x_i - g(f(x_i))\|^2\right)$ for this encoder decoder pair. Enter the answer correct to one decimal place.

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Range

Text Areas : PlainText

Possible Answers :

37 to 38

Question Number : 130 Question Id : 640653577883 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 P_1 be the projection matrix onto the line spanned by the vector $a = [1, 2, 3]^T$. Let P_2 be the projection matrix that projects vectors onto the plane perpendicular to span of a. Find the determinant of $P_1 + P_2$.

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

1

Sub-Section Number :	6
Sub-Section Id :	64065382599
Question Shuffling Allowed :	Yes
Is Section Default? :	null

Question Number : 131 Question Id : 640653577875 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

Find the directional derivative of $f(x, y, z) = x(x^2 - y^2) - z$ at a point D(1, -1, 0) in the direction of vector $\hat{h} = \frac{2}{7}i - \frac{3}{7}j + \frac{6}{7}k$. Enter the answer correct to two decimal places.

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Range

Text Areas : PlainText

Possible Answers :

-1.16 to -1.12

Sub-Section Number :	7
Sub-Section Id :	64065382600
Question Shuffling Allowed :	Yes
Is Section Default? :	null

Question Number : 132 Question Id : 640653577876 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 the function $f(x) = \begin{cases} ax - 3, & x < 2 \\ 4, & x = 2 \\ 2x, & x > 2 \end{cases}$ be continuous for all $x \in \mathbb{R}$. Then, find the value of a.

Enter the answer correct to one decimal place.

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

3.5

Sub-Section Number :	8
Sub-Section Id :	64065382601
Question Shuffling Allowed :	No
Is Section Default? :	null

Question Id : 640653577880 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

$$\text{Let } A = \begin{pmatrix} 1 & -1 \\ 1 & 1 \\ 1 & 2 \end{pmatrix} \text{ and } b = \begin{pmatrix} 1 \\ 1 \\ 3 \end{pmatrix}.$$

Based on the above data, answer the given subquestions.

Sub questions

Question Number : 133 Question Id : 640653577881 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

Is the system $Ax = b$ consistent?

Options :

6406531929741. ✖ Yes

6406531929742. ✔ No

Question Number : 134 Question Id : 640653577882 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

Using the least square approximation, find the length of the projection vector *p* of *b* onto the column space of *A*. Enter the answer correct to two decimal places.

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Range

Text Areas : PlainText

Possible Answers :

3.12 to 3.16

Java

Section Id :	64065339074
Section Number :	9
Section type :	Online
Mandatory or Optional :	Mandatory
Number of Questions :	16
Number of Questions to be attempted :	16
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