For URL http://127.0.0.1:5000/choice/if browser will display `/if` as output.

MLF

Section Id :	64065344902
Section Number :	8
Section type :	Online
Mandatory or Optional :	Mandatory
Number of Questions :	15
Number of Questions to be attempted :	15
Section Marks :	40
Display Number Panel :	Yes
Section Negative Marks :	0
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 :	64065395170
Question Shuffling Allowed :	No
Is Section Default? :	null

Question Number : 118 Question Id : 640653668558 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 :

6406532239871. ✔ YES

6406532239872. ✖ NO

Sub-Section Number :	2
Sub-Section Id :	64065395171
Question Shuffling Allowed :	Yes
Is Section Default? :	null

Question Number : 119 Question Id : 640653668559 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 is/are supervised learning task(s)?

Options :

6406532239873. ✔ Predicting future weather conditions based on the past weather observations.

6406532239874. ✖ Reducing the dimensionality of images while retaining essential features, enabling efficient storage and transmission.

6406532239875. ✔ Identifying objects in images with multiple categories, such as cats, dogs, cars, and trees.

6406532239876. ✔ Categorizing news articles into topics like politics, sports, entertainment, and technology.

Sub-Section Number :	3

Sub-Section Id : 64065395172

Question Shuffling Allowed : Yes

Is Section Default? : null

Question Number : 120 Question Id : 640653668560 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

Consider the following input data points:

X	Y
[0, 1]	+1
[0, 2]	+1
[1, 3]	+1
[3, 4]	-1
[4, 5]	-1
[7, 6]	-1

Which among the following models has the least misclassification error?

Options :

6406532239877. ✖ $Sign(x_1 - 2)$

6406532239878. ✖ $Sign(x_2 + 2)$

6406532239879. ✖ $Sign(x_1 + x_2)$

6406532239880. ✔ $Sign(x_2 - x_1)$

Question Number : 121 Question Id : 640653668566 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

Consider a vector $v = \begin{bmatrix} 2 \\ 1 \\ -2 \end{bmatrix}$. Does v belong to the columnspace of $A = \begin{bmatrix} -8 & -2 & -9 \\ 6 & 4 & 8 \\ 4 & 0 & 4 \end{bmatrix}$?

Options :

6406532239892. ✔ Yes

6406532239893. ✖ No

Question Number : 122 Question Id : 640653668572 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

Let $A = \begin{bmatrix} 8 & 3 \\ 2 & 7 \end{bmatrix}$. Find a matrix P such that $P^{-1}AP$ is diagonal.

Options :

6406532239907. ✖ $\begin{bmatrix} 1 & 1 \\ 2 & -3 \end{bmatrix}$

6406532239908. ✖ $\begin{bmatrix} 10 & 0 \\ 0 & 5 \end{bmatrix}$

6406532239909. ✖ $\begin{bmatrix} 1 & 1 \\ 2 & 3 \end{bmatrix}$

6406532239910. ✔ $\begin{bmatrix} 3 & 1 \\ 2 & -1 \end{bmatrix}$

Sub-Section Number :	4
Sub-Section Id :	64065395173
Question Shuffling Allowed :	Yes

Is Section Default? : null

Question Number : 123 Question Id : 640653668561 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

Consider a regression model $h(x_1, x_2) = \frac{x_1 + x_2}{2}$. For the below input data points, find the mean squared loss of h. Enter the answer correct to two decimal places.

X	Y
$[1, 2]$	2
$[2, 3]$	3
$[3, 4]$	4
$[4, 5]$	5

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

0.25

Question Number : 124 Question Id : 640653668563 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

The curve $y = ax^2 + bx + c$ passes through the points $(2, -1)$ and $(0, 0)$, and is tangent to the line $y = -x$ at the origin. Find the absolute value of the product ab. Enter the answer correct to two decimal places.

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

0.25

Question Number : 125 Question Id : 640653668564 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

At the point $P_0 = (1, 2)$, the function $f(x, y)$ has a derivative of $2\sqrt{2}$ in the direction $\left(\frac{1}{\sqrt{2}}, \frac{1}{\sqrt{2}}\right)$ and a derivative of 5 in the direction $(0, 1)$. Find the derivative of $f(x, y)$ at point P_0 in the direction $\left(\frac{-1}{\sqrt{5}}, \frac{2}{\sqrt{5}}\right)$. 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 :

4.88 to 4.95

Question Number : 126 Question Id : 640653668573 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

Consider a 2×2 matrix A whose eigenvectors are $v_1 = [1, 1]^T$ and $v_2 = [1, 2]^T$ with eigenvalues 2 and 3, respectively. Find the sum of square of all the entries of A.

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

22

Sub-Section Number : 5

Sub-Section Id : 64065395174

Question Shuffling Allowed : Yes

Is Section Default? : null

Question Number : 127 Question Id : 640653668562 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 $f(x) = \begin{cases} e^{-1/x^2}, & x > 0 \\ 0, & x \leq 0 \end{cases}$. Select which among the following are true?

Options :

6406532239882. ✖ f is discontinuous at $x = 0$.

6406532239883. ✔ f is differentiable.

6406532239884. ✖ f is not differentiable at $x = 0$.

6406532239885. ✔ $f'(0) = 0$

Sub-Section Number : 6

Sub-Section Id : 64065395175

Question Shuffling Allowed : Yes

Is Section Default? : null

Question Number : 128 Question Id : 640653668565 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 second order approximation for $f(x,y) = e^{2y-x}$ in the neighbourhood of $(0,0)$.

Options :

6406532239888. ✖ $1 - x + 2y - 2xy + y^2 + \frac{x^2}{2}$

6406532239889. ✖ $1 - 2xy + 2y^2 + \frac{x^2}{2}$

6406532239890. ✖ $2y^2 + \frac{x^2}{2}$

6406532239891. ✔ $1 - x + 2y - 2xy + 2y^2 + \frac{x^2}{2}$

Question Number : 129 Question Id : 640653668571 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 best fit line for the dataset given below using least squares method.

x	1	3	4	5	7
y	-3	7	1	0	4

Options :

6406532239903. ✔ $\hat{y} = 0.7x - 1$

6406532239904. ✖ $\hat{y} = x + 0.5$

6406532239905. ✖ $\hat{y} = x + 0.2$

6406532239906. ✖ $\hat{y} = 0.2x + 1$

Question Number : 130 Question Id : 640653668574 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

Let A be a $n \times n$ real matrix. Then, which among the following statements are true?

Options :

6406532239912. ✖ If the eigenvalues of A are $\lambda_1, \ldots, \lambda_n$, then A is similar to a diagonal matrix with $\lambda_1, \ldots, \lambda_n$ along the diagonal.

6406532239913. ✖ If $\text{rank}(A) = r$, then A has r non-zero eigenvalues.

6406532239914. ✔ A may have complex eigenvalues.

6406532239915. ✖ If A has a repeated eigenvalue, then A is not diagonalizable.

Sub-Section Number :	7
Sub-Section Id :	64065395176
Question Shuffling Allowed :	Yes
Is Section Default? :	null

Question Number : 131 Question Id : 640653668567 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

Select the correct options from the following.

Options :

6406532239894. ✖ There exists a matrix whose row space contains $\begin{bmatrix}1\\0\\-1\end{bmatrix}$ and whose null space contains $\begin{bmatrix}0\\1\\1\end{bmatrix}$.

6406532239895. ✖ There exists a matrix with row space $= \mathbb{R}^3$ and column space $= \mathbb{R}^4$.

6406532239896. ✔ There exists a matrix whose column space contains $\begin{bmatrix}1\\0\\0\end{bmatrix}, \begin{bmatrix}0\\0\\1\end{bmatrix}$ and row space contains $\begin{bmatrix}1\\1\end{bmatrix}, \begin{bmatrix}1\\2\end{bmatrix}$

6406532239897. ✔ There exists a matrix whose nullspace consists of all vectors in $\mathbb{R}^3$ such that $x_1 + 2x_2 + 4x_3 = 0$.

Sub-Section Number :	8
Sub-Section Id :	64065395177
Question Shuffling Allowed :	No
Is Section Default? :	null

Question Id : 640653668568 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 : (132 to 133)

Question Label : Comprehension

Consider a subspace $U \subseteq \mathbb{R}^3$ and a vector $b \subseteq \mathbb{R}^3$, where

$$U = \text{span}\left\{\begin{bmatrix}1\\1\\2\end{bmatrix}, \begin{bmatrix}1\\-1\\1\end{bmatrix}\right\}, \quad b = \begin{bmatrix}2\\0\\-4\end{bmatrix}$$

Based on the above data, answer the given subquestions.

Sub questions

Question Number : 132 Question Id : 640653668569 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 projection of *b* onto U.

Options :

6406532239898. ✖ $\begin{bmatrix} -1 \\ -1 \\ 2 \end{bmatrix}$

6406532239899. ✔ $\begin{bmatrix} -1 \\ -1 \\ -2 \end{bmatrix}$

6406532239900. ✖ $\begin{bmatrix} 1 \\ 1 \\ -2 \end{bmatrix}$

6406532239901. ✖ $\begin{bmatrix} 1 \\ -1 \\ -2 \end{bmatrix}$

Question Number : 133 Question Id : 640653668570 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

Find the length of the error vector $e = b - p$, where p is the projection of *b* onto *U*. 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 :

3.70 to 3.78

Java

Section Id :	64065344903
Section Number :	9
Section type :	Online
Mandatory or Optional :	Mandatory
Number of Questions :	16
Number of Questions to be attempted :	16
Section Marks :	100
Display Number Panel :	Yes
Section Negative Marks :	0
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 :	64065395178
Question Shuffling Allowed :	No
Is Section Default? :	null

Question Number : 134 Question Id : 640653668575 Question Type : MCQ Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction