long will the client have to wait before receiving the response? [**Note:** the speed of light on cable is 2×10^8 m/sec and that in air is 3×10^8 m/sec.]

Options :

6406531153248. ✖ 50 milliseconds

6406531153249. ✖ 135 milliseconds

6406531153250. ✔ 125 milliseconds

6406531153251. ✖ 115 milliseconds

MLF

Section Id :	64065321951
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 :	64065349214
Question Shuffling Allowed :	No

Question Number : 122 Question Id : 640653346919 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 "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 :

6406531153252. ✔ YES

6406531153253. ✖ NO

Sub-Section Number : 2

Sub-Section Id : 64065349215

Question Shuffling Allowed : Yes

Question Number : 123 Question Id : 640653346920 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

For the data sets $(x^i, y^i) = [(1,1),(2,3),(3,4),(4,4),(5,7)], i = 1$ to 5, Consider the regression model $f(x) = x + 2$. What is the mean squared loss of $f(x)$

NOTE: Enter your 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 : 124 Question Id : 640653346921 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

$f(x_1, x_2, x_3) = \frac{x_1+x_2+x_3}{3}$ is used as encoder function and $g(u) = [u, 2u, 3u]$ is used as decoder function for dimensionality reduction of following data set.

X
[1,2,3]
[2,3,4]

Give the reconstruction error for this encoder decoder pair. The reconstruction error is the mean of the squared distance between the reconstructed input and input.

NOTE: Enter your answer to the nearest integer.

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Range

Text Areas : PlainText

Possible Answers :

24 to 25

Question Number : 125 Question Id : 640653346924 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

What will be the directional derivative of $f(x, y, z) = x^2y^3 - 4xz$ at point $(1, 1, 1)$ in the direction of [-1, 2, 0]?

NOTE: Enter your answer in one decimal place.

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Range

Text Areas : PlainText

Possible Answers :

3.3 to 3.7

Question Number : 126 Question Id : 640653346925 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

For what value of k, will the following function be continuous?

$$f(x) = \begin{cases} 3x^2 - kx + 5, & \text{if } 0 \leq x < 2 \\ 1 - 3x, & \text{if } 2 \leq x \leq 3 \end{cases}$$

NOTE: Enter your 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 :

11

Question Number : 127 Question Id : 640653346926 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 linear approximation (L) of $f(x_1, x_2) = 2x_1^2 + 4x_2^4$ around (1, 1), and

use it to compute L(1.1, 1.1). What will be the value of $f(1.1, 1.1) - L(1.1, 1.1)$?

NOTE: Enter your answer in two decimal places.

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Range

Text Areas : PlainText

Possible Answers :

0.20 to 0.35

Question Number : 128 Question Id : 640653346931 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

The eigenvalues of the matrix $\begin{bmatrix} 1 & 0 & -1 \\ 1 & 0 & 0 \\ -2 & 2 & 1 \end{bmatrix}$ are a, b, c in increasing order, then the value of $a + b$ is

NOTE: Enter your 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 :

0

Question Number : 129 Question Id : 640653346932 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

If $A = PDP^{-1}$ where $P = \begin{bmatrix} 1 & 2 \\ 1 & -5 \end{bmatrix}$ and $D = \begin{bmatrix} -1 & 0 \\ 0 & 6 \end{bmatrix}$. Calculate A^4 and enter the summation of all the elements of A^4

NOTE: Enter your 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 :

1297

Question Number : 130 Question Id : 640653346933 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 values of α and β for which the matrix $A = \begin{bmatrix} 2 & \alpha \\ 2 & \beta \end{bmatrix}$ has eigenvalues equal to -1 and -3. Enter your answer as $2 \times \alpha + \beta$

NOTE: Enter your 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 :

-21

Sub-Section Number : 3

Sub-Section Id : 64065349216

Question Shuffling Allowed : Yes

Question Number : 131 Question Id : 640653346922 Question Type : MSQ Is Question Mandatory : No Calculator : None Response Time : N.A Think Time : N.A Minimum Instruction Time : 0

Correct Marks : 2

Question Label : Multiple Select Question

Identify which of the following requires use of classification technique.

Options :

6406531153256. ✖ Predicting the amount of rainfall in May 2022 in North India based on precipitation data of the year 2021.

6406531153257. ✖ Predicting the price of a land based on its area and distance from the market.

6406531153258. ✔ Predicting whether an email is spam or not.

6406531153259. ✔ Predicting whether the patient is having cancer or not.

Sub-Section Number : 4

Sub-Section Id : 64065349217

Question Shuffling Allowed : Yes

Question Number : 132 Question Id : 640653346923 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

Consider a function

$$f(x) = \begin{cases} \frac{x-|x|}{x}, & \text{if } x \neq 0 \\ 2, & \text{if } x = 0 \end{cases}$$

Is f continuous?

(Provide 1 as answer for 'Yes' and 0 for 'No'.)

Response Type : Numeric

Evaluation Required For SA : Yes

Show Word Count : Yes

Answers Type : Equal

Text Areas : PlainText

Possible Answers :

0

Sub-Section Number : 5

Sub-Section Id : 64065349218

Question Shuffling Allowed : Yes

Question Number : 133 Question Id : 640653346927 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

For the matrix $S = \begin{bmatrix} 2 & -1 & 3 \\ 1 & 0 & 1 \\ 0 & 2 & -1 \\ 1 & 1 & 4 \end{bmatrix}$ what is the dimension of its row space?

NOTE: Enter your 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 : 6

Sub-Section Id : 64065349219

Question Shuffling Allowed : Yes

Question Number : 134 Question Id : 640653346928 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

Consider the system $\begin{bmatrix} 1 & 2 & 3 \\ 2 & 5 & 7 \\ 2 & 4 & 6 \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \\ x_3 \end{bmatrix} = \begin{bmatrix} b_1 \\ b_2 \\ b_3 \end{bmatrix}$.

Under what condition on b_1, b_2, b_3 is this system solvable?

Options :

6406531153265. ✖ $b_2 = 2b_1$

6406531153266. ✖ $b_2 = 3b_1$

6406531153267. ✔ $b_3 = 2b_1$

6406531153268. ✖ $b_3 = 3b_1$

Sub-Section Number :	7
Sub-Section Id :	64065349220
Question Shuffling Allowed :	Yes

Question Number : 135 Question Id : 640653346929 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

Calculate the projection of vector $(2, -1, 3)^T$ onto another vector $(-1, 3, 1)^T$.

Which of the following is the squared length of the projection vector?

Options :

6406531153269. ✖ 0.8686

6406531153270. ✔ 0.3636

6406531153271. ✖ 1.0363

6406531153272. ✖ 1.3636

Question Number : 136 Question Id : 640653346930 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 set with input x and output y as follows.

x	y
1	2
2	1
1	3
3	4

For the above given data set Raj wants to compute a least square approximation that best fits the dataset with minimum error. Which of the following is the correct equation for the best fit line computed by Raj?

Options :

6406531153273. ✖ $\hat{y} = 0.412x + 0.215$

6406531153274. ✖ $\hat{y} = 1.335x + 2.245$

6406531153275. ✔ $\hat{y} = 0.545x + 1.545$

6406531153276. ✖ $\hat{y} = 1.713x + 1.175$

6406531153277. ✖ $\hat{y} = 2.225x + 3.665$