```
The book title is Python Basics and
it costs {{price}}.
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6406533774203. ✔ Invalid input

MLF

Section Id :	64065379123
Section Number :	6
Section type :	Online
Mandatory or Optional :	Mandatory
Number of Questions :	13
Number of Questions to be attempted :	13
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 :	No
Section Maximum Duration :	0
Section Minimum Duration :	0
Section Time In :	Minutes
Maximum Instruction Time :	0
Sub-Section Number :	1
Sub-Section Id :	640653168514
Question Shuffling Allowed :	No

Question Number : 83 Question Id : 6406531113776 Question Type : MCQ

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 :

6406533774204. ✖ YES

6406533774205. ✔ NO

Sub-Section Number : 2

Sub-Section Id : 640653168515

Question Shuffling Allowed : Yes

Question Number : 84 Question Id : 6406531113777 Question Type : MCQ

Correct Marks : 3

Question Label : Multiple Choice Question

Consider the function $f(x, y) = \sin(xy)$. Let $L(x, y)$ be the linear approximation of $f(x, y)$ around the point $\left(\frac{\pi}{2}, 0\right)$. What is the value of $L\left(\frac{\pi}{2} + 0.1, 0.1\right)$?

hint: Use the approximation of $\pi = 3.14$

Options :

6406533774206. ✖ 0.162

6406533774207. ✖ 0.257

6406533774208. ✔ 0.157

6406533774209. ✖ 1.57

Question Number : 85 Question Id : 6406531113778 Question Type : MCQ

Correct Marks : 3

Question Label : Multiple Choice Question

Consider the matrix M given by:

$$M = \begin{bmatrix} 1 & 2 \\ 3 & 6 \end{bmatrix}$$

Which of the following options is true?

Options :

6406533774210. ✖ Eigenvectors corresponding to the two different eigenvalues of *M* are orthogonal.

6406533774211. ✖ The matrix *M* is not diagonalizable.

6406533774212. ✖ The eigenvalues of *M* are 4 and 1

6406533774213. ✔ The rank of *M* is 1.

Question Number : 86 Question Id : 6406531113779 Question Type : MCQ

Correct Marks : 3

Question Label : Multiple Choice Question

The directional derivative of a scalar function $f(x, y)$ at a point (x_0, y_0) in the direction of a unit vector u represents:

Options :

6406533774214. ✔

The rate of change of f in the direction of u at (x_0, y_0).

6406533774215. ✖ The magnitude of the gradient vector ∇f at (x_0, y_0).

6406533774216. ✖ The maximum value of the gradient at (x_0, y_0).

6406533774217. ✖ The angle between the vector u and ∇f.

Question Number : 87 Question Id : 6406531113780 Question Type : MCQ
Correct Marks : 3
Question Label : Multiple Choice Question
Which of the following is the best second-order polynomial that fits the dataset by the least sum of squares method?

$$\min_{\theta_0,\theta_1,\theta_2} \sum_{i=1}^{3} (y_i - (\theta_0 + \theta_1 x_i + \theta_2 x_i^2))^2$$

x	1	0	-1
y	-1	1	1

Options :

6406533774218. ✖ $2 - \frac{1}{2}x + \frac{5}{2}x^2$

6406533774219. ✔ $2 - \frac{1}{2}x - \frac{5}{2}x^2$

6406533774220. ✖ $2 + \frac{1}{2}x - \frac{5}{2}x^2$

6406533774221. ✖ $2 + \frac{1}{2}x + \frac{5}{2}x^2$

Sub-Section Number : 3
Sub-Section Id : 640653168516
Question Shuffling Allowed : Yes

Question Number : 88 Question Id : 6406531113781 Question Type : MSQ
Correct Marks : 3 Max. Selectable Options : 0

Question Label : Multiple Select Question

Which of the following options is/are true?

Options :

6406533774222. ✔ $\begin{bmatrix}0\\0\\1\end{bmatrix}$ is orthogonal to the vectors $\begin{bmatrix}1\\0\\0\end{bmatrix}$ and $\begin{bmatrix}1\\1\\0\end{bmatrix}$.

6406533774223. ✖ For a matrix A, vectors of column space of A are perpendicular to the vectors of null space of A.

6406533774224. ✖ Length of the vector, $a = \begin{bmatrix}1\\1\\-1\end{bmatrix}$ is 3.

6406533774225. ✔ $\begin{bmatrix}1\\2\\3\end{bmatrix}$ and $\begin{bmatrix}1\\1\\-1\end{bmatrix}$ are orthogonal vectors.

Question Number : 89 Question Id : 6406531113782 Question Type : MSQ

Correct Marks : 3 Max. Selectable Options : 0

Question Label : Multiple Select Question

Which of the following options is/are true when the vector $\begin{bmatrix}1\\2\\1\end{bmatrix}$ projected onto the vector $\begin{bmatrix}1\\-1\\0\end{bmatrix}$?

Options :

6406533774226. ✖ The projection matrix is $\frac{1}{2}\begin{bmatrix}-1&-1&0\\1&1&0\\0&0&0\end{bmatrix}$

6406533774227. ✔ The projection matrix is $\frac{1}{2}\begin{bmatrix}1&-1&0\\-1&1&0\\0&0&0\end{bmatrix}$

6406533774228. ✔ Projected vector is $\frac{1}{2}\begin{bmatrix}-1\\1\\0\end{bmatrix}$

6406533774229. ✖ Projected vector is $\frac{1}{2}\begin{bmatrix}1\\-1\\0\end{bmatrix}$

Question Number : 90 Question Id : 6406531113784 Question Type : MSQ
Correct Marks : 3 Max. Selectable Options : 0
Question Label : Multiple Select Question
Which of the following statements is/are correct?
Options :

6406533774234. ✖ $f(x) = \ln(x)$ is continuous and differentiable in the domain $[0, \infty)$.

6406533774235. ✔ $f(x) = e^x$ is continuous and differentiable for all $x \in \mathbb{R}$.

6406533774236. ✔ $f(x) = \sqrt{x}$ is continuous but not differentiable at $x = 0$.

6406533774237. ✔ $f(x) = \frac{1}{x}$ is continuous and differentiable for all $x \neq 0$.

Sub-Section Number : 4
Sub-Section Id : 640653168517
Question Shuffling Allowed : Yes

Question Number : 91 Question Id : 6406531113783 Question Type : MSQ
Correct Marks : 2 Max. Selectable Options : 0
Question Label : Multiple Select Question
Consider a matrix

$$A = \begin{bmatrix}2 & 5\\6 & 15\end{bmatrix}.$$

Which of the following options is/are true?
Options :

6406533774230. ✔ Null space of A is span $\left\{\begin{bmatrix}-5\\2\end{bmatrix}\right\}$

6406533774231. ✔ Column space of A is span $\left\{\begin{bmatrix}1\\3\end{bmatrix}\right\}$

6406533774232. ✔ Left null space of A is span $\left\{\begin{bmatrix}-3\\1\end{bmatrix}\right\}$

6406533774233. ✖ Row space of A is span $\left\{\begin{bmatrix} 2 \\ -5 \end{bmatrix}\right\}$

Sub-Section Number : 5
Sub-Section Id : 640653168518
Question Shuffling Allowed : Yes

Question Number : 92 Question Id : 6406531113785 Question Type : SA
Correct Marks : 2
Question Label : Short Answer Question
Consider a matrix $A_{20\times25}$. If the nullity of the matrix is 10, then find the rank of the matrix.

Response Type : Numeric
Evaluation Required For SA : Yes
Show Word Count : Yes
Answers Type : Equal
Text Areas : PlainText
Possible Answers :
15

Sub-Section Number : 6
Sub-Section Id : 640653168519
Question Shuffling Allowed : Yes

Question Number : 93 Question Id : 6406531113786 Question Type : SA
Correct Marks : 3
Question Label : Short Answer Question
If $f(x, y, z) = \sin(xy) + e^{yz} + xz^2$, what is the length of the gradient at the point, $(1, 0, 2)$? 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 :
6.37 to 6.43

Sub-Section Number : 7
Sub-Section Id : 640653168520
Question Shuffling Allowed : No

Question Id : 6406531113787 Question Type : COMPREHENSION Sub Question Shuffling Allowed : No Group Comprehension Questions : No Question Pattern Type : NonMatrix Question Numbers : (94 to 95)

Question Label : Comprehension

A bank wants to predict whether a customer will default on a loan using a classification model. The bank collects data from past customers, which includes the following features:

- x_1: Credit score (scaled between 0 and 1)
- x_2: Monthly income (in \$1000s)
- x_3: Number of late payments in the past year

The target variable y represents whether the customer defaulted (1 for default, 0 for no default). The data is provided in the table below:

x	y
[0.9, 5, 1]	0
[0.4, 3, 5]	1
[0.8, 4, 2]	0
[0.2, 2, 7]	1
[0.7, 6, 0]	0

The bank uses the following linear combination to compute z:

$$z = 0.5x_1 + 0.3x_2 - 0.2x_3$$

The step function $u(z)$ is used to classify the outcome:

$$u(z) = \begin{cases} 1 & \text{if } z \geq 1.5 \\ 0 & \text{otherwise} \end{cases}$$

Based on the above data, answer the given subquestions.

Sub questions

Question Number : 94 Question Id : 6406531113788 Question Type : MCQ Correct Marks : 3

Question Label : Multiple Choice Question

For the input *x* = [0.9, 5, 1], what will be the predicted output *u(z)*?

Options :

6406533774240. ✖ 0

6406533774241. ✔ 1

6406533774242. ✖ 1.75

6406533774243. ✖ Cannot be determined

Question Number : 95 Question Id : 6406531113789 Question Type : MCQ

Correct Marks : 3

Question Label : Multiple Choice Question

If the threshold in the step function is changed to $z \geq 1.0$, what will happen to the misclassification rate?

Options :

6406533774244. ✔ Increase

6406533774245. ✖ Decrease

6406533774246. ✖ Remain same

6406533774247. ✖ Cannot be determined

Question Id : 6406531113790 Question Type : COMPREHENSION Sub Question Shuffling Allowed : No Group Comprehension Questions : No Question Pattern Type : NonMatrix

Question Numbers : (96 to 97)

Question Label : Comprehension

Consider a 3×3 matrix B given by

$$B = (-1)\begin{bmatrix} -4 & 3 & 0 \\ -2 & 1 & 0 \\ -1 & 1 & -1 \end{bmatrix}.$$

Based on the above data, answer the given subquestions.

Sub questions

Question Number : 96 Question Id : 6406531113791 Question Type : MCQ

Correct Marks : 3

Question Label : Multiple Choice Question

If B is diagonalizable, what is the invertible matrix P such that $B = PDP^{-1}$?

Options :

6406533774248. ✖ $\begin{bmatrix} 4 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{bmatrix}$

6406533774249. ✖ $\begin{bmatrix} 3 & 2 & 1 \\ 2 & 1 & 1 \\ 1 & 0 & 1 \end{bmatrix}$

6406533774250. ✖ $\begin{bmatrix} 1 & 1 & 1 \\ 2 & 1 & 0 \\ 0 & 0 & 1 \end{bmatrix}$

6406533774251. ✔ $\begin{bmatrix} 3 & 1 & 0 \\ 2 & 1 & 0 \\ 1 & 0 & 1 \end{bmatrix}$

6406533774252. ✖ B is not diagonalizable.

Question Number : 97 Question Id : 6406531113792 Question Type : MCQ
Correct Marks : 3
Question Label : Multiple Choice Question
If B is diagonalizable, which of the following is a diagonal matrix D such that $B = PDP^{-1}$? Use the matrix P obtained in the previous question.
Options :

6406533774253. ✔ $\begin{bmatrix} 2 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{bmatrix}$

6406533774254. ✖ $\begin{bmatrix} 4 & 0 & 0 \\ 0 & -1 & 0 \\ 0 & 0 & 1 \end{bmatrix}$

6406533774255. ✖ $\begin{bmatrix} 3 & 0 & 0 \\ 0 & 2 & 0 \\ 0 & 0 & 1 \end{bmatrix}$

6406533774256. ✖ $\begin{bmatrix} 2 & 0 & 0 \\ 0 & 0 & 0 \\ 0 & 0 & 1 \end{bmatrix}$

6406533774257. ✖ B is not diagonalizable.

Java

Section Id :	64065379124
Section Number :	7
Section type :	Online
Mandatory or Optional :	Mandatory
Number of Questions :	16
Number of Questions to be attempted :	16