

**NATIONAL FORENSIC SCIENCES UNIVERSITY**

Semester End Examination (December – 2024)

**M. Tech Artificial Intelligence & Data Science**

Semester - I

**Subject Code: CTMTAIDS SI P4****Date: 09/12/2024****Subject Name: Fundamentals of Data Science and Machine Learning.****Time: 2:30 AM – 05:30 PM****Total Marks: 100****Instructions:**

1. Write down each question on a separate page.
2. Attempt all questions.
3. Make suitable assumptions wherever necessary.
4. Figures to the right indicate full marks.

		Marks
<b>Q.1</b>	<b>Attempt any three.</b>	
(a)	Compare Supervised and Unsupervised Machine Learning Techniques with examples	08 ✓
(b)	Difference between Regression and Classification with example.	08 ✓
(c)	What is the significance of the Region of Convergence (ROC) in the z-transform?	08
(d)	Explain the Data Cleaning Techniques with examples.	08
<b>Q.2</b>	<b>Attempt any three.</b>	
(a)	Explain different Data Processing techniques.	08
(b)	Explain the working of the K-Means clustering algorithm with an example	08 ✓
(c)	How Data Visualization tools, techniques help in Data Analysis.	08 ✓
(d)	As a data scientist what would be your role in the mid of active COVID Pandemic.	08
<b>Q.3</b>	<b>Attempt any three.</b>	
(a)	What is the Confusion Matrix, recall rate? A model outputs 3 TP, 4 TN, 2 FP, and 1 FN. Calculate the Accuracy, precision, FPR and Recall in Percentage.	08
(b)	Explain the Data Science Process.	08 ✓
(c)	Explain DBSCAN Working and list down strength and Weakness of DBSCAN	08 ✓
(d)	List down Types and Technology used in Data Visualization.	08 ✓
<b>Q.4</b>	<b>Attempt any two.</b>	
(a)	Write a note on different types of Data in Data Science	07
(b)	Explain any 2 classification techniques in detail.	07



- (c) Based on the table below, calculate the support for the item sets:  
 {Bread}, {Bread, Milk}, {Diapers, Coke}.
- Calculate the confidence for the following rules:  
 {Bread}  $\rightarrow$  {Milk}, {Diapers}  $\rightarrow$  {Coke}.

Transaction ID	Items Purchased
1	{Bread, Milk, Eggs}
2	{Bread, Diapers, Coke, Eggs}
3	{Milk, Diapers, Coke, Cola}
4	{Bread, Milk, Diapers, Coke}
5	{Bread, Milk, Cola}

07

Q.5

Attempt any two.

- (a) Provide 3 ways to handle null value with supportive python code. 07
- (b) Describe how the data aggregation and normalization work and why it is used in data transformation. 07
- (c) Explain the concept of Data Reduction in the context of a specific application of your choice of data science. 07

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