

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
Q.1	Attempt any three.	
(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
Q.2	Attempt any three.	
(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
Q.3	Attempt any three.	
(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 ✓
Q.4	Attempt any two.	
(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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