Reg No.:_____ Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

B.Tech Degree S3 (R) (FT/WP) Examination November 2025 (2024 Scheme)

Course Code: GNEST305
Course Name: INTRODUCTION TO ARTIFICIAL INTELLIGENCE AND DATA SCIENCE

Max. Marks: 60 Duration: 2 hours 30 minutes

PART A

(Answer all questions. Each question carries 3 marks)

			CO	Marks
1		Explain different types of machine learning systems with one example each.	CO1	(3)
2		What is the difference between classification and regression?	CO1	(3)
3		What is the role of linear algebra in data representation and analysis?	CO2	(3)
4		Explain the concept of rank of a matrix	CO2	(3)
5		What is probability? Discuss the different uses of probability in details	CO3	(3)
6		State Baye's Theorem	CO3	(3)
7		Explain the importance of Data science	CO4	(3)
8		Describe the role of 5 V's in helping organising of Big Data	CO4	(3)

PART B

(Answer any one full question from each module, each question carries 9 marks)

Module -1

9	a)	What is machine learning? What are the different elements of machine learning?	CO1	(5)
	b)	Explain the different types of Activation function in ANN	CO1	(4)
10	a)	Illustrate how the perceptron learning algorithm can be used to solve the two-input AND gate problem. Use the following settings: i)Learning rate=1 ii)All initial weights bias are zero iii)show calculations for at least two epochs or until the perceptron converges	CO1	(6)

	b)	Explain the Universal Approximation Theorem in detail.	CO1	(3)

Module -2

11	a)	Explain the steps of Singular Value Decomposition (SVD) with an example.	CO2	(5)
	b)	What is matrix decomposition? List the matrix decomposition methods used to solve the system of linear equations.	CO2	(4)
12	a)	What is Principal Component Analysis (PCA) and Spectral Decomposition?	CO2	(5)
	b)	Given a symmetric 2x2 matrix, $A=\begin{bmatrix}4 & 1\\ 1 & 4\end{bmatrix}$. Perform its spectral decomposition.	CO2	(4)

Module -3

13	a)	Given the following data. Calculate the Pearson correlation coefficient? X=[1,2,3];Y=[2,3,6]	CO3	(5)
	b)	Explain the Least square method in detail.	CO3	(4)
14	a)	Distinguish between covariance and Karl Pearson's correlation coefficient.	CO3	(3)
	b)	A bag contains 60% red balls and 40% blue balls.10% of the red balls are defective, and 5% of the blue balls are defective, a ball is chosen at random and found to be defective. What is the probability that it is red?	CO3	(6)

Module -4

15	a)	What are the applications of machine learning in data science?	CO4	(3)
	b)	A hospital collects patient records, lab reports and medical images. How would you design a system to manage this diverse data effectively?	CO4	(6)
16	a)	What are the important steps of data processing? Explain in detail.	CO4	(5)
	b)	Differentiate between Traditional data analysis and Big data analysis.	CO4	(4)

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