Reg. No. : | | | | | | | | | | | | |

Question Paper Code: U5316

M.E. DEGREE EXAMINATION, NOV 2025

Professional Elective

COMPUTER SCIENCE AND ENGINEERING

21PCS516 – ANALYTICAL DATA SCIENCE

(Regulations 2021)

Duration: Three hours | Maximum: 100 Marks

Answer ALL Questions

PART - A (5 x 20 = 100 Marks)

1.	(a)	Explain with the help of matrix multiplication the process of computing the dot product in linear regression. How does this calculation contribute to model fitting and prediction?	CO1- U	(20)
		Or		
	(b)	Explain the significance of problem formulation in data science. How do defining clear objectives and success criteria contribute to structured problem-solving?	CO1- U	(20)
2.	(a)	Apply descriptive statistics techniques to analyze a dataset containing monthly sales figures for a retail company. Calculate and interpret measures of central tendency and variability to assess sales performance.	CO1-App	(20)
		Or		
	(b)	Develop a plan to use a histogram to analyze the distribution of exam scores in a classroom. Include steps for data preprocessing, binning, and interpretation of results.	CO1-App	(20)
3.	(a)	A transition matrix of a Markov process with discrete states {Sunny, Rainy) $\begin{bmatrix} 0.8 & 0.2 \\ 0.5 & 0.5 \end{bmatrix}$ Find the steady state values and check whether it is really a steady state.	CO1-App	(20)
		Or		
	(b)	Find all the distance measures for the points (1,2,3,4,5) and (5,6,7,8,9).	CO1-App	(20)

4.	(a)	355/113 is an approximation of pi. Write a python program to find nth digit after decimal point.	CO1-App	(20)
		Or		
	(b)	Describe the different tools for exploratory data analysis.	CO1-App	(20)
5.	(a)	Discuss various methods to detect and handle outliers in a multivariate dataset. Include a practical example of each method with python code.	CO1-U	(20)
		Or		
	(b)	Explain how you would use a combination of feature selection and dimensionality reduction techniques to prepare a dataset for a machine learning model. Provide a step-by-step python example.	CO1-U	(20)