Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE- SEMESTER–V EXAMINATION – WINTER 2025

Subject Code:3151608 Date:27-11-2025

Subject Name:Data Science

Time:10:30 AM TO 01:00 PM Total Marks:70

Instructions:

1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**
4. **Simple and non-programmable scientific calculators are allowed.**

			MARKS
Q.1	**(a)**	Define business analytics and explain the use of it.	**03**
	(b)	Explain the three main types of business analytics: descriptive, predictive, and prescriptive, and provide an example of each.	**04**
	(c)	Discuss the potential future trends and challenges in data-driven decision making as technology continues to evolve. Provide examples to support your points.	**07**
Q.2	**(a)**	Explain Percentile, Decile and Quartile.	**03**
	(b)	Discuss the four major types of data measurement scales: nominal, ordinal, interval, and ratio. Provide examples for each.	**04**
	(c)	Compare and contrast the merits and limitations of using mean, median, and mode as measures of central tendency. Provide examples to illustrate your points.	**07**
		OR	
	(c)	Consider the marks of 20 students in data science subject as below:	**07**

88	36	88	96	88	74	88	46	88	73
40	30	45	62	85	95	45	78	76	82

I. Calculate mean, median and mode.
II. Calculate 95th and 50th percentile of the marks.
III. Calculate the inter quartile range (IQR).

Q.3	**(a)**	Differentiate between qualitative and quantitative data types, providing an example of each.	**03**
	(b)	Discuss need of Skewness and Kurtosis. Explain its types with example.	**04**
	(c)	What is Probability Distribution function? Explain Uniform Distribution, Normal Distribution, and Exponential Distribution in brief.	**07**
		OR	
Q.3	**(a)**	Differentiate between a population and a sample	**03**
	(b)	Define descriptive analytics and explain its primary purpose in data analysis.	**04**
	(c)	Explain the Chi-Square distribution, Student's t-distribution and F-Distribution in brief.	**07**
Q.4	**(a)**	Explain Bayes' Theorem and provide an example of how it is used to update probabilities in real-life situations.	**03**
	(b)	Differentiate Probabilistic Sampling and Non-Probability Sampling.	**04**
	(c)	Provide a detailed history of regression modeling, highlighting key milestones and developments from Francis Galton's work to modern regression techniques.	**07**
		OR	

Q.4	**(a)**	Discuss Poisson distribution with example	**03**
	(b)	Explain why Central Limit Theorem is called as a heart of the Data Science.	**04**
	(c)	Explain in detail: Maximum Likelihood Estimation (MLE).	**07**
Q.5	**(a)**	List out steps involved in building a Simple Linear Regression model, from data collection to model interpretation.	**03**
	(b)	Compare linear regression vs. Logistic regression.	**04**
	(c)	Discuss decision tree algorithm for classification of data with example.	**07**

OR

Q.5	**(a)**	Define sensitivity and specificity in the context of Logistic Regression and their relevance in classification problems.	**03**
	(b)	Explain Outlier analysis in brief.	**04**
	(c)	Explain Random Forest method with suitable example	**07**