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2503N1099

Candidate's Seat No :_____

M.B.A. in BI (Rep.) Sem.-3 Examination

BI-303

MDA

Time : 2-30 Hours] **March-2025** **[Max. Marks : 70**

Instructions :(1) This paper contains **FIVE** questions.
(2) All questions are compulsory.
(3) Question No.**2, 3, 4** have internal options.
(4) Figures in the right side in parenthesis indicate marks.

Q:1 A researcher wants to conduct a multivariate analysis to understand the factors influencing a consumer's decision to purchase a car. Purchase Decision, is influenced by several factors, such as Price, Style, Safety, Engine Power, and Luxury. Each factor contributes proportionally to the purchase decision, but they are not equally impactful. **(14)**

- Discuss the role of independent variables (IVs) and dependent variables (DVs) in multivariate data analysis and provide an example using the decision-making process of purchasing a car.
- Describe the role of each of the building blocks of multivariate data analysis in this research context.
- Design a hypothetical mathematical formula that represents the relationships between variables in the study.

Q:2 Imagine you are conducting a study to determine if a new car model with advanced features influences customer purchase decisions more than the previous model. You want to use hypothesis testing to analyze the effectiveness of the new model's features in attracting customers. **(14)**

- Explain what hypothesis testing is and how it could be used in this scenario to test the effectiveness of the new model.
- Identify and describe the core set of terms used in hypothesis testing that would apply in this study

OR

(P.T.O)

Q:2 Data examination is a time-consuming, but necessary, initial step in any analysis. **(14)**

- List and explain the key issues researchers need to consider when determining the accuracy of data before analysis.

Define what an outlier is in the context of data analysis and explain how outliers can affect the accuracy of analysis results.

Q:3 Given the following data, calculate the multiple regression equation of Y based on X_1 and X_2. Calculate beta values, intercept and residual. **(14)**

Y	X1	X2
50	5	2
60	6	3
70	7	4
80	8	5
90	9	6

OR

Q:3 Multidimensional scaling (MDS) is often used in marketing, psychology, and other fields to visually represent relationships between objects or concepts based on similarity or preference data. Answer the following questions: **(14)**

- Define Multidimensional Scaling (MDS) and explain its primary purpose in data analysis.
- List and briefly describe the main types of Multidimensional Scaling.

Outline the three main steps involved in conducting a Multidimensional Scaling analysis.

Q:4 Car dealership wants to predict whether a potential customer will buy a new car based on several factors. They have collected data on customer characteristics, including: **(14)**

- Income level (high, medium, low)
- Age
- Whether they previously bought a car from dealership (yes/no)
- Preferred car type (SUV, sedan, truck)

The dealership wants to use logistic regression to determine the likelihood that a new customer with specific characteristics will make a purchase.

1. Explain what logistic regression is and why it would be appropriate for this scenario.
2. Describe how the dealership could set up a logistic regression model to

predict the probability of a customer buying a car. In your response, include:

- The dependent and independent variables for this model.
- How the model would interpret coefficients for each independent variable.

3. Interpret a hypothetical output: Suppose the logistic regression model gives a coefficient of 1.5 for "Income level (high)," -0.75 for "Age," and 2.0 for "Previously bought a car (yes)." Explain what each of these coefficients means in terms of the likelihood of a purchase.

Discuss potential limitations of using logistic regression in this case. What factors could affect the accuracy of predictions, and how might the dealership address them?

OR

Q:4 Conjoint analysis is widely used in market research to understand customer preferences for products and services with multiple attributes. **(14)**

- Define conjoint analysis and explain its purpose in analyzing consumer choices.
- Describe the main types of conjoint analysis and discuss the scenarios in which each type would be most appropriate.

Outline the steps involved in conducting a conjoint analysis study.

Q:5 Structural Equation Modeling (SEM) is a powerful statistical technique used to analyze complex relationships between observed and latent variables. **(14)**

1. Define Structural Equation Modeling (SEM) and explain its importance in research for examining complex relationships between variables.
2. Explain the key components of an SEM model (e.g., measurement model, structural model, path analysis), and describe the role of each component in analyzing data.
3. Model Fit: Describe at least three model fit indices (e.g., CFI, RMSEA, Chi-Square) and explain how they are used to assess the quality of an SEM model.