**OMG355-MULTIVARIATE ANALYSIS**

**PART-A**

**UNIT I – INTRODUCTION**

1. **Q: What is multivariate data analysis?  
   A:** It is the statistical analysis of data involving more than two variables simultaneously.
2. **Q:** **Define univariate analysis.**  
   **A:** Analysis of a single variable to describe patterns and characteristics like mean, median, and mode.
3. **Q: What is bivariate analysis?**  
   **A:** Analysis involving two variables to examine relationships, like correlation or regression.
4. **Q:** **Mention any two types of multivariate techniques.**  
   **A:** Factor Analysis and Multiple Regression.
5. **Q: What are metric variables?**  
   **A:** Variables measured on an interval or ratio scale.
6. **Q**: **Name any two non-metric scales.**  
   **A:** Nominal and Ordinal scales.
7. **Q:** **What is model building?**  
   **A:** The process of developing statistical models to represent data relationships.
8. **Q:** **State a guideline for performing multivariate analysis.**  
   **A:** Ensure the data meets assumptions like normality and linearity.
9. **Q:** **What is data interpretation?**  
   **A:** Drawing meaningful insights from the results of statistical analysis.
10. **Q: What is the role of multivariate techniques in research?**  
    **A:** They help analyze complex relationships among multiple variables.

**UNIT II – PREPARING FOR MULTIVARIATE ANALYSIS**

1. **Q:** **What is conceptualization in research?**  
   **A:** Defining and understanding the research problem.
2. **Q:** **Define measurement error.**  
   **A:** The difference between the observed value and the true value of a variable.
3. **Q:** **What is the role of dummy variables?**  
   **A:** To include categorical variables in regression analysis.
4. **Q:** **What is missing data?**  
   **A:** Data that is not observed or is absent in the dataset.
5. **Q:** **Mention a method to handle missing data.**  
   **A:** Mean substitution or multiple imputation.
6. **Q:** **What are assumptions in multivariate analysis?**  
   **A:** Conditions like normality, linearity, and homoscedasticity needed for valid results.
7. **Q:** **Define statistical significance.**  
   **A:** It indicates whether an observed effect is likely due to chance or a real relationship.
8. **Q:** **What is data screening?**  
   **A:** Checking data for errors, outliers, or missing values before analysis.
9. **Q:** **What is variable measurement?**  
   **A:** Assigning numbers or categories to represent attributes of a variable.
10. **Q: Give one example of a metric variable.**  
    **A:** Age measured in years.

**UNIT III – MULTIPLE LINEAR REGRESSION & FACTOR ANALYSIS**

1. **Q:** **What is multiple linear regression?**  
   **A:** A technique to predict the value of a dependent variable based on multiple independent variables.
2. **Q: Define least square estimation.  
   A:** A method to minimize the sum of squared differences between observed and predicted values.
3. **Q:** **What is a dependent variable?**  
   **A:** A variable that is being predicted or explained.
4. **Q:** **What is factor analysis?**  
   **A:** A technique used to identify underlying factors that explain correlations among variables.
5. **Q:** **What is factor rotation?**  
   **A:** A process to make output of factor analysis easier to interpret.
6. **Q: What are factor scores?**  
   **A:** Scores that represent a person's position on each factor.
7. **Q:** **What is variance explained in factor analysis?**  
   **A:** The proportion of total variance accounted for by the extracted factors.
8. **Q:** **State a use of regression analysis.**  
   **A:** Forecasting sales based on advertising and income.
9. **Q:** **What is the objective of factor analysis?**  
   **A:** To reduce data dimensionality while retaining important information.
10. **Q:** **What is model validation?**  
    **A:** Testing how well a statistical model performs on unseen data.

**UNIT IV – LATENT VARIABLE TECHNIQUES**

1. **Q:** **What is a latent variable?**  
   **A:** A variable that is not directly observed but inferred from other variables.
2. **Q: Define Confirmatory Factor Analysis (CFA).**  
   **A:** A technique used to test whether a set of observed variables represents a certain number of factors.
3. **Q:** **What is Structural Equation Modeling (SEM)?**  
   **A:** A statistical method that combines factor analysis and regression.
4. **Q:** **Define mediation model.**  
   **A:** A model where a mediator variable explains the relationship between independent and dependent variables.
5. **Q:** **What is a moderation model?**  
   **A:** A model where a moderator variable affects the strength of the relationship.
6. **Q:** **What is conditional process modeling?**  
   **A:** A combination of mediation and moderation in a single model.
7. **Q:** **What is a longitudinal study?**  
   **A:** A study that observes the same subjects over a period of time.
8. **Q:** **What is a latent growth model?**  
   **A:** A statistical model to analyze change over time in latent variables.
9. **Q:** **What is Bayesian inference?**  
   **A:** A method that updates the probability of a hypothesis based on prior knowledge and new evidence.
10. **Q:** **Name a software used for SEM.**  
    **A:** AMOS or LISREL.

**UNIT V – ADVANCED MULTIVARIATE TECHNIQUES**

1. **Q:** **What is Discriminant Analysis?**  
   **A:** A technique to classify cases into groups based on predictor variables.
2. **Q:** **Define Logistic Regression.**  
   **A:** A technique to predict a binary outcome using one or more predictor variables.
3. **Q:** **What is Cluster Analysis?**  
   **A:** A method to group similar objects into clusters.
4. **Q:** **What is Conjoint Analysis?**  
   **A:** A technique to measure consumer preferences and trade-offs.
5. **Q:** **What is Multidimensional Scaling (MDS)?**  
   **A:** A technique that visualizes the level of similarity between items.
6. **Q:** **Mention one application of logistic regression.**  
   **A:** Predicting whether a customer will buy a product (yes/no).
7. **Q:** **What is the goal of cluster analysis?**  
   **A:** To identify natural groupings in data.
8. **Q:** **What is a part-worth utility in conjoint analysis?**  
   **A:** The value consumers place on specific features.
9. **Q:** **Name a distance measure used in cluster analysis.**  
   **A:** Euclidean distance.
10. **Q:** **What is the purpose of MDS maps?**  
    **A:** To help visualize perceptual differences between products or brands.