

# **SRM VALLIAMMAI ENGINEERING COLLEGE**

**(An Autonomous Institution)**

**SRM Nagar, Kattankulathur – 603 203**

**DEPARTMENT OF COMPUTER APPLICATIONS**

**QUESTION BANK**

**Academic Year 2026-2027**



**III SEMESTER**

**PMC103 - DATA ANALYTICS AND COMPUTING**

**(Regulation – 2024)**

**Prepared by**

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## DEPARTMENT OF COMPUTER APPLICATIONS



**Subject Code & Name : PMC103 Data Analytics and Computing**

**Class / Semester : II -MCA - III Sem**

### UNIT I INTRODUCTION

Introduction to Data, Data types, Introduction to Stages of Data Processing: Data Pre Processing; Data Imputation; Data Cleaning; Data Transformation; Data Visualization; Data Analysis; Data Engineering, Data Management.

#### Part A

| Q.No | Questions                                                   | Marks | Competence    | BT Level | CO  |
|------|-------------------------------------------------------------|-------|---------------|----------|-----|
| 1    | Define Data.                                                | 2     | Remembering   | BTL1     | CO1 |
| 2    | List the different types of data.                           | 2     | Remembering   | BTL1     | CO1 |
| 3    | Differentiate between structured and unstructured data.     | 2     | Remembering   | BTL2     | CO1 |
| 4    | What is semi-structured data? Give an example.              | 2     | Understanding | BTL2     | CO1 |
| 5    | Define Data Processing.                                     | 2     | Remembering   | BTL1     | CO1 |
| 6    | List the stages involved in Data Processing.                | 2     | Remembering   | BTL1     | CO1 |
| 7    | Define Data Preprocessing.                                  | 2     | Remembering   | BTL1     | CO1 |
| 8    | State the need for Data Preprocessing.                      | 2     | Understanding | BTL2     | CO1 |
| 9    | What is Data Imputation?                                    | 2     | Remembering   | BTL1     | CO1 |
| 10   | List any two methods of handling missing values.            | 2     | Remembering   | BTL1     | CO1 |
| 11   | Define Data Cleaning.                                       | 2     | Remembering   | BTL1     | CO1 |
| 12   | Mention any two Data Cleaning techniques.                   | 2     | Understanding | BTL2     | CO1 |
| 13   | Define Data Transformation.                                 | 2     | Remembering   | BTL1     | CO1 |
| 14   | What is normalization in Data Transformation?               | 2     | Understanding | BTL2     | CO1 |
| 15   | Define Data Visualization.                                  | 2     | Remembering   | BTL1     | CO1 |
| 16   | List any four visualization techniques.                     | 2     | Remembering   | BTL1     | CO1 |
| 17   | What is Data Analysis?                                      | 2     | Remembering   | BTL1     | CO1 |
| 18   | Define Data Engineering.                                    | 2     | Remembering   | BTL1     | CO1 |
| 19   | Define Data Management.                                     | 2     | Remembering   | BTL1     | CO1 |
| 20   | Differentiate between Data Engineering and Data Management. | 2     | Understanding | BTL2     | CO1 |
| 21   | What is missing data?                                       | 2     | Remembering   | BTL1     | CO1 |
| 22   | Define noisy data.                                          | 2     | Remembering   | BTL1     | CO1 |

| 23            | State the importance of data quality.                                                                                   | 2            | Understanding     | BTL2            | CO1       |
|---------------|-------------------------------------------------------------------------------------------------------------------------|--------------|-------------------|-----------------|-----------|
| 24            | List the benefits of Data Visualization.                                                                                | 2            | Remembering       | BTL1            | CO1       |
| <b>Part B</b> |                                                                                                                         |              |                   |                 |           |
| <b>Q.No</b>   | <b>Questions</b>                                                                                                        | <b>Marks</b> | <b>Competence</b> | <b>BT Level</b> | <b>CO</b> |
| 1             | Apply the concept of Data and discuss the different types of data with suitable examples.                               | 16           | Applying          | BTL3            | CO1       |
| 2             | (i) Develop the stages of Data Processing with a neat diagram.                                                          | 8            | Applying          | BTL3            | CO1       |
|               | (ii) Identify the significance of each stage in Data Analytics.                                                         | 8            |                   |                 |           |
| 3             | Examine the Data Preprocessing process and discuss its importance in improving data quality.                            | 16           | Applying          | BTL3            | CO1       |
| 4             | (i) Apply various Data Imputation techniques.                                                                           | 8            | Applying          | BTL3            | CO1       |
|               | (ii) Implement the methods used to handle missing values with examples.                                                 | 8            |                   |                 |           |
| 5             | Examine the Data Cleaning process and techniques used to remove duplicate, noisy and inconsistent data.                 | 16           | Applying          | BTL3            | CO1       |
| 6             | (i) Illustrate about Data Transformation and its objectives.                                                            | 8            | Applying          | BTL3            | CO1       |
|               | (ii) Examine normalization, aggregation, and encoding techniques with examples.                                         | 8            |                   |                 |           |
| 7             | Analyze the importance of Data Visualization and discuss various visualization techniques with suitable examples.       | 16           | Analyzing         | BTL4            | CO1       |
| 8             | Inspect the Data Analysis process and explain its role in business decision-making.                                     | 16           | Analyzing         | BTL3            | CO1       |
| 9             | Analyze the concept of Data Engineering and discuss its role in building data pipelines.                                | 16           | Analyzing         | BTL4            | CO1       |
| 10            | Examine about Data Management and explain about data governance, storage, security, and maintenance.                    | 16           | Analyzing         | BTL4            | CO1       |
| 11            | (i) Examine Data Cleaning and Data Transformation.                                                                      | 8            | Applying          | BTL3            | CO1       |
|               | (ii) Examine Data Engineering and Data Management.                                                                      | 8            |                   |                 |           |
| 12            | Analyze the impact of poor-quality data on analytical results and discuss suitable preprocessing techniques.            | 16           | Analyzing         | BTL4            | CO1       |
| 13            | Examine the importance of Data Visualization in business intelligence and decision-making with suitable examples.       | 16           | Applying          | BTL3            | CO1       |
| 14            | Demonstrate the complete workflow showing the stages from raw data collection to meaningful insights in Data Analytics. | 16           | Applying          | BTL3            | CO1       |

|    |                                                                                                                                                                            |    |           |      |     |
|----|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|-----------|------|-----|
| 15 | Examine the relationship among Data Preprocessing, Data Cleaning, Data Transformation, Data Analysis, Data Engineering, and Data Management using a neat workflow diagram. | 16 | Analyzing | BTL4 | CO1 |
| 16 | (i) Examine the role of Data Engineering in modern analytics systems.                                                                                                      | 8  | Applying  | BTL3 | CO1 |
|    | (ii) Examine the responsibilities of Data Management in ensuring data quality and security.                                                                                | 8  |           |      |     |
| 17 | Analyze the complete data processing life cycle from data collection to visualization and analysis.                                                                        | 16 | Analyzing | BTL4 | CO1 |

## UNIT II EXPLORATORY DATA ANALYSIS AND VISUALIZATION

Introduction to the Chicago Train Ridership data, Visualizations for Numeric Data: Exploring Train Ridership Data, Visualizations for Categorical Data: Exploring the OkCupid Data, Visualizing Relationships between Outcomes and Predictors, Exploring Relationships between Categorical Predictors, Post Modelling Exploratory Visualizations.

| Part A |                                                                   |       |               |          |     |
|--------|-------------------------------------------------------------------|-------|---------------|----------|-----|
| Q.No   | Questions                                                         | Marks | Competence    | BT Level | CO  |
| 1      | Define Exploratory Data Analysis (EDA).                           | 2     | Remembering   | BTL-1    | CO2 |
| 2      | State the objectives of Exploratory Data Analysis.                | 2     | Remembering   | BTL-1    | CO2 |
| 3      | What is the Chicago Train Ridership dataset?                      | 2     | Remembering   | BTL-1    | CO2 |
| 4      | List any two characteristics of the Chicago Train Ridership data. | 2     | Remembering   | BTL-1    | CO2 |
| 5      | What is meant by numeric data visualization?                      | 2     | Remembering   | BTL-1    | CO2 |
| 6      | Define Histogram.                                                 | 2     | Remembering   | BTL-1    | CO2 |
| 7      | What is a Box Plot?                                               | 2     | Remembering   | BTL-1    | CO2 |
| 8      | Differentiate between Histogram and Box Plot.                     | 2     | Understanding | BTL-2    | CO2 |
| 9      | Define Scatter Plot.                                              | 2     | Remembering   | BTL-1    | CO2 |
| 10     | What is a Line Chart?                                             | 2     | Remembering   | BTL-1    | CO2 |
| 11     | What is categorical data?                                         | 2     | Remembering   | BTL-1    | CO2 |
| 12     | What is the OkCupid dataset?                                      | 2     | Remembering   | BTL-1    | CO2 |
| 13     | Mention any two visualizations used for categorical data.         | 2     | Remembering   | BTL-1    | CO2 |
| 14     | Define Bar Chart.                                                 | 2     | Remembering   | BTL-1    | CO2 |
| 15     | What is a Stacked Bar Chart?                                      | 2     | Remembering   | BTL-1    | CO2 |

|               |                                                                                                                             |              |                   |                 |           |
|---------------|-----------------------------------------------------------------------------------------------------------------------------|--------------|-------------------|-----------------|-----------|
| 16            | Define predictor and outcome variables.                                                                                     | 2            | Remembering       | BTL-1           | CO2       |
| 17            | How can relationships between predictors and outcomes be visualized?                                                        | 2            | Understanding     | BTL-2           | CO2       |
| 18            | What is correlation?                                                                                                        | 2            | Understanding     | BTL-2           | CO2       |
| 19            | What are categorical predictors?                                                                                            | 2            | Remembering       | BTL-1           | CO2       |
| 20            | Why should relationships between categorical predictors be explored?                                                        | 2            | Understanding     | BTL-2           | CO2       |
| 21            | What are post-modeling exploratory visualizations?                                                                          | 2            | Remembering       | BTL-1           | CO2       |
| 22            | Mention two advantages of post-modeling visualization.                                                                      | 2            | Understanding     | BTL-2           | CO2       |
| 23            | What is residual analysis?                                                                                                  | 2            | Understanding     | BTL-2           | CO2       |
| 24            | Why is visualization important in predictive analytics?                                                                     | 2            | Understanding     | BTL-2           | CO2       |
| <b>Part B</b> |                                                                                                                             |              |                   |                 |           |
| <b>Q.No</b>   | <b>Questions</b>                                                                                                            | <b>Marks</b> | <b>Competence</b> | <b>BT Level</b> | <b>CO</b> |
| 1             | Analyze the concept of Exploratory Data Analysis (EDA) and discuss its importance in data analytics with suitable examples. | 16           | Analyzing         | BTL-4           | CO2       |
| 2             | Classify the Chicago Train Ridership dataset and examine how visualization techniques help in exploring the data.           | 16           | Analyzing         | BTL-4           | CO2       |
| 3             | Apply various visualization techniques for numeric data with suitable examples.                                             | 16           | Applying          | BTL-3           | CO2       |
| 4             | Examine different visualization methods for categorical data using the OkCupid dataset.                                     | 16           | Applying          | BTL-3           | CO2       |
| 5             | Compare the relationships between predictor variables and outcome variables that can be visualized.                         | 16           | Analyzing         | BTL-4           | CO2       |
| 6             | Examine the techniques used to explore relationships between categorical predictors with examples.                          | 16           | Analyzing         | BTL-4           | CO2       |
| 7             | Apply post-modeling exploratory visualizations and residual analysis techniques.                                            | 16           | Applying          | BTL-3           | CO2       |
| 8             | Analyze the role of data visualization in exploratory data analysis and decision making.                                    | 16           | Analyzing         | BTL-4           | CO2       |
| 9             | Analyze the Chicago Train Ridership dataset using different visualization techniques.                                       | 16           | Analyzing         | BTL-4           | CO2       |
| 10            | Compare numeric and categorical data visualization techniques with suitable examples.                                       | 16           | Analyzing         | BTL-4           | CO2       |
| 11            | Analyze the use of scatter plots, heat maps, and correlation plots in identifying relationships among variables.            | 16           | Analyzing         | BTL-4           | CO2       |
| 12            | Analyze graphical techniques used to identify outliers, trends, distributions, and anomalies.                               | 16           | Analyzing         | BTL-4           | CO2       |

|    |                                                                                             |    |           |       |     |
|----|---------------------------------------------------------------------------------------------|----|-----------|-------|-----|
| 13 | Examine the visualization techniques used before and after predictive model building.       | 16 | Applying  | BTL-3 | CO2 |
| 14 | Analyze the significance of exploratory visualization in business analytics.                | 16 | Analyzing | BTL-4 | CO2 |
| 15 | Apply the effectiveness of different visualization techniques in exploratory data analysis. | 16 | Applying  | BTL-3 | CO2 |
| 16 | Examine the visualization techniques used for the OkCupid dataset.                          | 16 | Applying  | BTL-3 | CO2 |
| 17 | Illustrate the visualization methods for relationships between outcomes and predictors      | 16 | Applying  | BTL-3 | CO2 |

### UNIT III FEATURE SELECTION AND ENGINEERING

Feature Selection, Classes of Feature Selection Methodologies: intrinsic (or implicit) methods, filter methods, and wrapper methods, Feature Engineering. Feature Engineering techniques: Binning, Feature Hashing, Log Transforms, n-grams, Banalization, Bag-of words

| Part A |                                                |       |               |          |     |
|--------|------------------------------------------------|-------|---------------|----------|-----|
| Q.No   | Questions                                      | Marks | Competence    | BT Level | CO  |
| 1      | Define Feature Selection.                      | 2     | Remembering   | BTL-1    | CO3 |
| 2      | What is Feature Engineering?                   | 2     | Remembering   | BTL-1    | CO3 |
| 3      | State the need for Feature Selection.          | 2     | Remembering   | BTL-1    | CO3 |
| 4      | List the classes of Feature Selection methods. | 2     | Remembering   | BTL-1    | CO3 |
| 5      | What are intrinsic (implicit) methods?         | 2     | Remembering   | BTL-1    | CO3 |
| 6      | What are filter methods?                       | 2     | Remembering   | BTL-1    | CO3 |
| 7      | What are wrapper methods?                      | 2     | Remembering   | BTL-1    | CO3 |
| 8      | Differentiate filter and wrapper methods.      | 2     | Understanding | BTL-2    | CO3 |
| 9      | What is Binning?                               | 2     | Remembering   | BTL-1    | CO3 |
| 10     | State the purpose of Binning.                  | 2     | Understanding | BTL-2    | CO3 |
| 11     | Define Feature Hashing.                        | 2     | Remembering   | BTL-1    | CO3 |
| 12     | What is a Log Transform?                       | 2     | Remembering   | BTL-1    | CO3 |
| 13     | What are n-grams?                              | 2     | Remembering   | BTL-1    | CO3 |
| 14     | Define Binarization.                           | 2     | Remembering   | BTL-1    | CO3 |
| 15     | What is Bag-of-Words?                          | 2     | Remembering   | BTL-1    | CO3 |
| 16     | List two feature engineering techniques.       | 2     | Remembering   | BTL-1    | CO3 |
| 17     | Mention two advantages of Feature Engineering. | 2     | Understanding | BTL-2    | CO3 |
| 18     | What is dimensionality reduction?              | 2     | Remembering   | BTL-1    | CO3 |
| 19     | What is feature importance?                    | 2     | Remembering   | BTL-1    | CO3 |
| 20     | Why is feature selection required?             | 2     | Understanding | BTL-2    | CO3 |
| 21     | State two applications of Feature Hashing.     | 2     | Remembering   | BTL-1    | CO3 |
| 22     | What is overfitting in feature selection?      | 2     | Understanding | BTL-2    | CO3 |

| 23            | How does Binarization improve learning?                                           | 2            | Understanding     | BTL-2           | CO3       |
|---------------|-----------------------------------------------------------------------------------|--------------|-------------------|-----------------|-----------|
| 24            | Mention two applications of Bag-of-Words.                                         | 2            | Understanding     | BTL-2           | CO3       |
| <b>Part B</b> |                                                                                   |              |                   |                 |           |
| <b>Q.No</b>   | <b>Questions</b>                                                                  | <b>Marks</b> | <b>Competence</b> | <b>BT Level</b> | <b>CO</b> |
| 1             | Examine Feature Selection and its significance in machine learning.               | 16           | Applying          | BTL-3           | CO3       |
| 2             | Analyze the different classes of Feature Selection methodologies.                 | 16           | Analyzing         | BTL-4           | CO3       |
| 3             | Analyze intrinsic, filter, and wrapper methods with suitable examples.            | 16           | Analyzing         | BTL-4           | CO3       |
| 4             | Examine the process of Feature Engineering with suitable examples.                | 16           | Applying          | BTL-3           | CO3       |
| 5             | Examine Binning and Feature Hashing techniques.                                   | 16           | Applying          | BTL-3           | CO3       |
| 6             | Analyze Log Transform and its applications in machine learning.                   | 16           | Analyzing         | BTL-4           | CO3       |
| 7             | Compare and contrast n-grams and Bag-of-Words with examples.                      | 16           | Analyzing         | BTL-4           | CO3       |
| 8             | Analyze the advantages and limitations of Feature Selection methods.              | 16           | Analyzing         | BTL-4           | CO3       |
| 9             | Analyze intrinsic, filter, and wrapper methods.                                   | 16           | Analyzing         | BTL-4           | CO3       |
| 10            | Analyze different Feature Engineering techniques used in data preprocessing.      | 16           | Analyzing         | BTL-4           | CO3       |
| 11            | Examine Feature Hashing with a suitable example.                                  | 16           | Applying          | BTL-3           | CO3       |
| 12            | Analyze the role of Binarization in Feature Engineering.                          | 16           | Analyzing         | BTL-4           | CO3       |
| 13            | Examine the importance of Feature Engineering in predictive analytics.            | 16           | Applying          | BTL-3           | CO3       |
| 14            | Analyze the impact of Feature Selection on model performance.                     | 16           | Analyzing         | BTL-4           | CO3       |
| 15            | Organize different Feature Selection techniques based on efficiency and accuracy. | 16           | Applying          | BTL-3           | CO3       |
| 16            | Examine Feature Engineering techniques.                                           | 16           | Applying          | BTL-3           | CO3       |
| 17            | Examine Log Transform and Feature Hashing.                                        | 16           | Applying          | BTL-3           | CO3       |

#### **UNIT IV MODEL SELECTION**

Model Selection, Introduction to machine learning, Supervised and unsupervised learning, machine learning algorithms.

| <b>Part A</b> |                           |              |                   |                 |           |
|---------------|---------------------------|--------------|-------------------|-----------------|-----------|
| <b>Q.No</b>   | <b>Questions</b>          | <b>Marks</b> | <b>Competence</b> | <b>BT Level</b> | <b>CO</b> |
| 1             | Define Model Selection.   | 2            | Remembering       | BTL-1           | CO4       |
| 2             | What is Machine Learning? | 2            | Remembering       | BTL-1           | CO4       |

|    |                                         |   |               |       |     |
|----|-----------------------------------------|---|---------------|-------|-----|
| 3  | Define supervised learning.             | 2 | Remembering   | BTL-1 | CO4 |
| 4  | Define unsupervised learning.           | 2 | Remembering   | BTL-1 | CO4 |
| 5  | What is a training dataset?             | 2 | Remembering   | BTL-1 | CO4 |
| 6  | What is a test dataset?                 | 2 | Remembering   | BTL-1 | CO4 |
| 7  | Define classification.                  | 2 | Remembering   | BTL-1 | CO4 |
| 8  | Define regression.                      | 2 | Understanding | BTL-2 | CO4 |
| 9  | What is clustering?                     | 2 | Remembering   | BTL-1 | CO4 |
| 10 | What is overfitting?                    | 2 | Understanding | BTL-2 | CO4 |
| 11 | What is underfitting?                   | 2 | Understanding | BTL-2 | CO4 |
| 12 | State the need for model selection.     | 2 | Understanding | BTL-2 | CO4 |
| 13 | What is cross-validation?               | 2 | Understanding | BTL-2 | CO4 |
| 14 | Define hyperparameter.                  | 2 | Remembering   | BTL-1 | CO4 |
| 15 | What is a machine learning algorithm?   | 2 | Remembering   | BTL-1 | CO4 |
| 16 | List two supervised algorithms.         | 2 | Remembering   | BTL-1 | CO4 |
| 17 | List two unsupervised algorithms.       | 2 | Remembering   | BTL-1 | CO4 |
| 18 | What is decision tree?                  | 2 | Remembering   | BTL-1 | CO4 |
| 19 | What is KNN?                            | 2 | Remembering   | BTL-1 | CO4 |
| 20 | What is Naive Bayes?                    | 2 | Remembering   | BTL-1 | CO4 |
| 21 | What is SVM?                            | 2 | Remembering   | BTL-1 | CO4 |
| 22 | Define k-means clustering.              | 2 | Remembering   | BTL-1 | CO4 |
| 23 | What is model complexity?               | 2 | Understanding | BTL-2 | CO4 |
| 24 | State the objective of model selection. | 2 | Understanding | BTL-2 | CO4 |

### Part B

| Q.No | Questions                                                        | Marks | Competence | BT Level | CO  |
|------|------------------------------------------------------------------|-------|------------|----------|-----|
| 1    | Examine model selection and its importance.                      | 16    | Applying   | BTL-3    | CO4 |
| 2    | Compare and contrast supervised and unsupervised learning.       | 16    | Analyzing  | BTL-4    | CO4 |
| 3    | Examine various machine learning algorithms with examples.       | 16    | Applying   | BTL-3    | CO4 |
| 4    | Illustrate about the model selection process.                    | 16    | Applying   | BTL-3    | CO4 |
| 5    | Inspect the concept of classification and regression algorithms. | 16    | Analyzing  | BTL-4    | CO4 |
| 6    | Analyze the clustering techniques.                               | 16    | Analyzing  | BTL-4    | CO4 |
| 7    | Examine training, testing and validation datasets.               | 16    | Applying   | BTL-3    | CO4 |
| 8    | Distinguish between overfitting and underfitting.                | 16    | Analyzing  | BTL-4    | CO4 |

|    |                                                                                 |    |           |       |     |
|----|---------------------------------------------------------------------------------|----|-----------|-------|-----|
| 9  | Compare and contrast supervised and unsupervised learning.                      | 16 | Analyzing | BTL-4 | CO4 |
| 10 | Analyze model complexity and performance.                                       | 16 | Analyzing | BTL-4 | CO4 |
| 11 | Illustrate about decision tree and KNN algorithms.                              | 16 | Applying  | BTL-3 | CO4 |
| 12 | Analyze SVM and Naive Bayes.                                                    | 16 | Analyzing | BTL-4 | CO4 |
| 13 | Examine hyperparameter tuning.                                                  | 16 | Applying  | BTL-3 | CO4 |
| 14 | Analyze model evaluation during selection.                                      | 16 | Analyzing | BTL-4 | CO4 |
| 15 | Examine about machine learning algorithms.                                      | 16 | Applying  | BTL-3 | CO4 |
| 16 | Identify the differences between supervised learning and unsupervised learning. | 16 | Applying  | BTL-3 | CO4 |
| 17 | Illustrate about model selection, classification and regression.                | 16 | Applying  | BTL-3 | CO4 |

### UNIT V MODEL EVALUATION

Model Evaluation Approaches: Cross Validation, Confusion Matrix, Gain and Lift chart, Kolmogorov-Smirnov Chart, Chi Square, ROC curve, Gini Coefficient, L<sup>1</sup> version of RSME

#### Part A

| Q.No | Questions                            | Marks | Competence    | BT Level | CO  |
|------|--------------------------------------|-------|---------------|----------|-----|
| 1    | Define model evaluation.             | 2     | Remembering   | BTL-1    | CO5 |
| 2    | What is cross validation?            | 2     | Remembering   | BTL-1    | CO5 |
| 3    | Define confusion matrix.             | 2     | Remembering   | BTL-1    | CO5 |
| 4    | What is accuracy?                    | 2     | Understanding | BTL-2    | CO5 |
| 5    | Define precision.                    | 2     | Understanding | BTL-2    | CO5 |
| 6    | Define recall.                       | 2     | Understanding | BTL-2    | CO5 |
| 7    | What is F1-score?                    | 2     | Understanding | BTL-2    | CO5 |
| 8    | What is ROC curve?                   | 2     | Understanding | BTL-2    | CO5 |
| 9    | What is AUC?                         | 2     | Understanding | BTL-2    | CO5 |
| 10   | Define Gain chart.                   | 2     | Understanding | BTL-2    | CO5 |
| 11   | What is Lift chart?                  | 2     | Remembering   | BTL-1    | CO5 |
| 12   | Define Kolmogorov-Smirnov chart.     | 2     | Remembering   | BTL-1    | CO5 |
| 13   | What is Chi-square test?             | 2     | Remembering   | BTL-1    | CO5 |
| 14   | Define Gini coefficient.             | 2     | Remembering   | BTL-1    | CO5 |
| 15   | What is RMSE?                        | 2     | Remembering   | BTL-1    | CO5 |
| 16   | What is L1 version of RMSE?          | 2     | Remembering   | BTL-1    | CO5 |
| 17   | State the need for model evaluation. | 2     | Understanding | BTL-2    | CO5 |
| 18   | What is true positive?               | 2     | Remembering   | BTL-1    | CO5 |

| 19            | What is false positive?                                      | 2            | Remembering       | BTL-1           | CO5       |
|---------------|--------------------------------------------------------------|--------------|-------------------|-----------------|-----------|
| 20            | What is true negative?                                       | 2            | Remembering       | BTL-1           | CO5       |
| 21            | What is false negative?                                      | 2            | Remembering       | BTL-1           | CO5       |
| 22            | What is sensitivity?                                         | 2            | Understanding     | BTL-2           | CO5       |
| 23            | What is specificity?                                         | 2            | Understanding     | BTL-2           | CO5       |
| 24            | List two model evaluation metrics.                           | 2            | Understanding     | BTL-2           | CO5       |
| <b>Part B</b> |                                                              |              |                   |                 |           |
| <b>Q.No</b>   | <b>Questions</b>                                             | <b>Marks</b> | <b>Competence</b> | <b>BT Level</b> | <b>CO</b> |
| 1             | Examine cross-validation techniques.                         | 16           | Applying          | BTL-3           | CO5       |
| 2             | Compare confusion matrix and evaluation metrics.             | 16           | Analyzing         | BTL-4           | CO5       |
| 3             | Distinguish between ROC curve and AUC.                       | 16           | Analyzing         | BTL-4           | CO5       |
| 4             | (ii) Examine about Gain and Lift charts.                     | 16           | Applying          | BTL-3           | CO5       |
|               | (ii) Examine about Cross-validation                          |              |                   |                 |           |
| 5             | Criticize about Kolmogorov-Smirnov chart.                    | 16           | Analyzing         | BTL-4           | CO5       |
| 6             | Apply Chi-square test in model evaluation.                   | 16           | Applying          | BTL-3           | CO5       |
| 7             | Examine Gini coefficient and L1 RMSE.                        | 16           | Applying          | BTL-3           | CO5       |
| 8             | Analyze different model evaluation approaches.               | 16           | Analyzing         | BTL-4           | CO5       |
| 9             | Demonstrate about evaluation metrics.                        | 16           | Applying          | BTL-3           | CO5       |
| 10            | Examine ROC and KS charts.                                   | 16           | Applying          | BTL-3           | CO5       |
| 11            | Analyze confusion matrix with example.                       | 16           | Analyzing         | BTL-4           | CO5       |
| 12            | Analyze Gain and Lift charts.                                | 16           | Analyzing         | BTL-4           | CO5       |
| 13            | Explain the model validation strategies.                     | 16           | Applying          | BTL-3           | CO5       |
| 14            | Analyze performance metrics.                                 | 16           | Analyzing         | BTL-4           | CO5       |
| 15            | Illustrate the model performance using evaluation metrics.   | 16           | Applying          | BTL-3           | CO5       |
| 16            | Demonstrate about ROC and Gini coefficient.                  | 16           | Applying          | BTL-3           | CO5       |
| 17            | Differentiate between Cross-validation and Confusion matrix. | 16           | Analyzing         | BTL-4           | CO5       |

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