SRM VALLIAMMAI ENGINEERING COLLEGE

(An Autonomous Institution)

SRM Nagar, Kattankulathur – 603 203

DEPARTMENT OF ARTIFICIAL INTELLIGENCE AND DATA SCIENCE

QUESTION BANK

VIII SEMESTER

1922804 – BUSINESS ANALYTICS

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UNIT 1 - INTRODUCTION TO BUSINESS ANALYTICS

What is Analytics? - Overview of different Analytic Areas-Introduction to Descriptive analytics, Descriptive Statistics, Probability Distributions, Statistics through hypothesis tests, Permutation & Randomization Test

PART – A

Q.No	Question	Competence	Level
1	What is Business Analytics?	Remember	BTL 1
2	Difference between Data Analytics and Data Analysis.	Understand	BTL 2
3	How is data analytics used?	Understand	BTL 2
4	What is the difference between descriptive analytics and diagnostic analytics?	Remember	BTL 1
5	List out the types of analytics.	Remember	BTL 1
6	Define modality of a distribution.	Remember	BTL 1
7	Define Probability Mass Function.	Remember	BTL 1
8	Recall Central Limit Theorem.	Remember	BTL 1
9	Difference between univariate, bivariate and multivariate descriptive statistics.	Understand	BTL 2
10	Compare and contrast descriptive and inferential statistics.	Understand	BTL 2
11	List out the three ways of finding probabilities.	Remember	BTL 1
12	Define probability of Outcome and Round off rule.	Understand	BTL 2
13	Write down the general properties of Probability Distributions.	Remember	BTL 1
14	What are the two types of probability distributions?	Remember	BTL 1
15	Define normal distribution.	Remember	BTL 1
16	Define Probability tables.	Remember	BTL 1
17	Define Probability distribution.	Remember	BTL 1
18	What is a test statistic used for? When to perform a statistical test?	Remember	BTL 1
19	How to test a statistical hypothesis?	Understand	BTL 2
20	What is hypothesis testing?	Remember	BTL 1
21	What is a permutation test?	Remember	BTL 1
22	How do you find a randomization distribution?	Understand	BTL 2
23	Define Null hypothesis and Alternative hypothesis.	Remember	BTL 1
24	Define Parametric and Non-Parametric methods.	Remember	BTL 1

PART-B

Q.No.	Question		Competence	Level
1	Examine the five areas of analytics in detail.	(13)	Analyze	BTL 4
2	Explain about Variance ad Standard Deviation.	(13)	Evaluate	BTL 5
3	Inspect about Skewness and Kurtosis with relevant example.	(13)	Analyze	BTL 4

4	Describe in detail about descriptive statistics and its types. (13)	Analyze	BTL 4
5	Illustrate a Simple Probabilities with cards. Draw a single card from a well shuffled deck of 52 cards. Each card has the same chance of being drawn so we have equally likely outcomes. Find the following probabilities: P(card is red) P(card is a heart) P(card is a red 5) (13)	Apply	BTL 3
6	Illustrate the simple probabilities with a fair Die. Roll a fair die one time. The sample space is $S = \{1, 2, 3, 4, 5, 6\}$. Find the following probabilities. P(roll a four) P(roll an odd number) P(roll a number less than five) (13)	Apply	BTL 3
7	Illustrate the probabilities for the sum of two fair dice. (13)	Apply	BTL 3
8	Explain in detail about Continuous Probability Distributions and how to calculate probabilities for continuous data. (13)	Analyze	BTL 4
9	Explain in detail about Discrete Probability Distributions with an example. (13)	Analyze	BTL 4
10	How to test hypotheses using Null distributions. (13)	Apply	BTL 3
11	Identify how to find the expected value and standard deviation with examples. (13)	Apply	BTL 3
12	Illustrate the Concept of Continuous Probability distribution. (13)	Apply	BTL 3
13	Suppose a manufacturer of the XJ35 battery claims the mean life of the battery is 500 days with a standard deviation of 25 days. (13) Say Sample Mean : 490 1. State the random variable and the parameter in words. 2. State the null and alternative hypothesis and the level of significance. 3. State and check the assumptions for a hypothesis test. 4. A random sample of size *n* is taken. 5. The population standard derivation is known. 6. The sample size is at least 30 or the population of the random variable is normally distributed. 7. Find the sample statistic, test statistic, and p-value.	Apply	BTL 3
14	Summarize the concept of Non-parametric test and identify its purpose. (13)	Apply	BTL 3
15	Explain in detail about Regression tests and Comparison tests. (13)	Evaluate	BTL 5
16	Discuss the concept of Randomization tests with example of your own (13)	Create	BTL 6
17	Formulate how to use Permutation Tests? (13)	Create	BTL 6
	PART – C		
1.	Explain different types of data analytics with examples. (15)	Create	BTL 6

2.	Describe descriptive statistics and its types and each with an example. (15)	Evaluate	BTL 5
3.	Draw a flow chart explain and evaluate the statistical test and its variable types. (15)	Evaluate	BTL 5
4.	Estimate in detail about Hypothesis Testing. (15)	Create	BTL 6
5.	Discuss the assumptions of a Permutation test with an example. (15)	Create	BTL 6

UNIT II REGRESSION

Regression: Ordinary Least Squares, Ridge Regression, Lasso Regression, K Nearest Neighbours, Regression &Classification, Logistic Regression, Linear Discriminant Analysis, Quadratic Discriminant analysis, Regression and classification tree, support vector machine.

PART – A

Q.No	Question	Competence	Level
1	Define regression.	Remember	BTL 1
2	What is the purpose of Regression?	Remember	BTL 1
3	How do you interpret a Regression Model?	Understand	BTL 2
4	List out the assumptions of regression models.	Remember	BTL 1
5	List out the advantages of OLS Regression.	Remember	BTL 1
6	Define Overfitting and under fitting.	Remember	BTL 1
7	Define K-NN algorithm.	Remember	BTL 1
8	Why do we need a K-NN algorithm?	Understand	BTL 2
9	What is Classification in statistics?	Remember	BTL 1
10	Compare and contrast clustering and classification.	Understand	BTL 2
11	Difference between classification and regression algorithm.	Understand	BTL 2
12	Define RMSE.	Remember	BTL 1
13	Define accuracy.	Remember	BTL 1
14	What is Linear Discriminant Analysis?	Remember	BTL 1
15	Is linear discriminant analysis better than linear regression?	Understand	BTL 2
16	Define quadratic discriminant analysis.	Remember	BTL 1
17	Is linear discriminant analysis more flexible than quadratic discrimination analysis? Give inference	Understand	BTL 2
18	Give an outline joint probability distribution.	Understand	BTL 2
19	What is a regression tree in machine learning?	Remember	BTL 1
20	What is the difference between a regression and classification tree?	Understand	BTL 2
21	List out the advantages and disadvantages of CART.	Remember	BTL 1
22	Define Support Vector Machines and list out its advantages.	Remember	BTL 1
23	What role does the logistic function play in Logistic Regression?	Remember	BTL 1
24	How can a linear support vector machine be solved more efficiently?	Understand	BTL 2

PART-B

Q.No.	Question	Competence	Level
1	Explain in detail about Ordinary Least Squares Regression. (13)	Analyze	BTL 4
2	Discuss in detail about Lasso Regression for Regularization and Model Selection. (13)	Understand	BTL 2
3	Why Lasso can be used for Model Selection , but not Ridge Regression. Analyze. (13)	Analyze	BTL 4
4	Explain about the distance metrics used in K-NN Algorithms and few applications. (13)	Analyze	BTL 4
5	What is predictive analytics? What is the difference between Classification vs Regression. (13)	Analyze	BTL 4
6	Explain in detail the properties and assumptions of LDA. (13)	Analyze	BTL 4
7	Identify how the linear discriminant function works? (13)	Apply	BTL 3
8	Construct and explain in detail how to prepare data for LDA and QDA? List out few applications. (13)	Apply	BTL 3
9	Sketch in detail about the CART algorithm and list out few applications. (13)	Apply	BTL 3
10	Analyze how does CART algorithm works for regression and classification? (13)	Analyze	BTL 4
11	Examine in detail about the types of SVM. (13)	Analyze	BTL 4
12	Sketch the difference between linear and logistic regression. (13)	Apply	BTL 3
13	How Logistic regression works? Apply it to an example. (13)	Apply	BTL 3
14	Write down the steps how SVM works with suitable example. (13)	Create	BTL 6
15	Determine some applications of SVM in detail. (13)	Evaluate	BTL5
16	Explain about support vector machine terminologies. (13)	Analyze	BTL4
17	Explain in detail about the types and assumptions of logistic regression. (13)	Evaluate	BTL5

PART – C

1	Describe in detail about Lasso and Ridge Regression. (15)	Evaluate	BTL 5
2	Interpret how to choose the value of k for K-NN algorithm? List out the advantages and disadvantages. (8) (7)	Evaluate	BTL 5
3	Discuss about classification and its types (15)	Create	BTL 6
4	Formulate the steps involved in logistic regression modelling and write a note on logistic regression model. (15)	Create	BTL 6
5	Elaborate the different types of Support vector machine and kernel function in SVM. (15)	Create	BTL 6

UNIT III CHALLENGES FOR BIG DATA ANALYTICS

Supervised Learning with Regression and Classification techniques- Unsupervised Learning and Challenges for Big Data Analytics- Clustering, Associative RuleMining, Challenges for big data analytics.

PART – A

Q.No.	Question	Competence	Level
1	Define Data Analysis.	Remember	BTL 1
2	What is the difference between regression and supervised learning?	Remember	BTL 1
3	What are the techniques of supervised machine learning?	Remember	BTL 1

4	Define regression and its types.	Remember	BTL 1
5	What is Supervised Machine Learning	Remember	BTL 1
6	Is Random Forest A classification or regression?	Understand	BTL 2
7	List the types of clustering.	Remember	BTL 1
8	Interpret what is clustering in unsupervised learning?	Understand	BTL 2
9	How can unlabeled / unsupervised data be used for analytics?	Understand	BTL 2
10	What do you mean by cluster analysis in data analytics?	Remember	BTL 1
11	What are the key considerations in cluster analysis?	Understand	BTL 2
12	Why do business use cluster analysis for market segmentation?	Understand	BTL 2
13	What are the advantages of cluster analysis?	Remember	BTL 1
14	List out the types of clustering algorithms.	Remember	BTL 1
15	What is clustering and list out the features of cluster analysis.	Remember	BTL 1
16	When to use cluster analysis?	Understand	BTL 2
17	Illustrate association rule algorithm?	Understand	BTL 2
18	Relate an example of association rule.	Understand	BTL 2
19	Point out the importance of clustering in data analysis.	Remember	BTL 1
20	What does 5 V's of big data refer to?	Understand	BTL 2
21	Why is big data challenging?	Remember	BTL 1
22	List out some big data challenges and solutions.	Remember	BTL 1
23	What are the challenges and opportunities of big data analytics?	Remember	BTL 1
24	Does big data analytics have uncertainty. Illustrate	Understand	BTL 2

PART-B

Q.No.	Question	Competence	Level
1	Define regression? List out the types of regression and assess the characteristics of regression in Data Analysis. (13)	Apply	BTL 3
2	Elaborate in detail about regression evaluation metrics. List out the advantages and disadvantages. (13)	Evaluate	BTL 5
3	Define Classification. Explain Classification Algorithms. (13)	Analyze	BTL 4
4	Compare and contrast Regression and classification. (13)	Analyze	BTL 4
5	Analyze how gradient descent help in minimizing the cost function? (13)	Analyze	BTL 4
6	Explain in detail about evaluating a machine learning regression algorithm. (13)	Evaluate	BTL 5
7	Examine in detail about Clustering. (13)	Analyze	BTL 4
8	Describe how Apriori algorithms used in market basket analysis. (13)	Create	BTL 6
9	Formulate the challenges of unsupervised learning. (13)	Create	BTL 6
10	Discuss the applications of cluster analysis. How does cluster analysis work? (13)	Apply	BTL 3
11	Explain in detail about association rule mining. (13)	Analyze	BTL 4
12	How does Association Rule Learning work? Analyze with a example of your own. (13)	Analyze	BTL 4

13	Formulate how Associative Classification is used in Data Mining and discuss its types. (13)	Create	BTL 6
14	Identify the approaches used in Market Based Analysis. And explain them (13)	Apply	BTL 3
15	Illustrate some major challenges in big data analytics and integration. (13)	Analyze	BTL4
16	Explain the density based clustering with a neat diagram. (13)	Analyze	BTL4
17	Examine the benefits of big data for business. (13)	Analyze	BTL4
	PART – C		
1	Explain in detail about Linear Regression in Machine Learning. (15)	Evaluate	BTL5
2	Discuss about the following: (i)Association Rules (8) (ii)Dimensionality Reduction (7)	Create	BTL6
3	Explain in detail about the types of clustering methods. (15)	Evaluate	BTL5
4	Elaborate about K-means clustering with an example. (15)	Create	BTL6
5	Summarize challenges in applying big data technology. (15)	Evaluate	BTL5
	UNIT IV LEARNING TECHNIQUES		
	Prescriptive analytics Creating data for analytics through designed experiments, creating data for analytics through Active learning, creating data for analytics through Reinforcement learning, Graph Visualization, Data Summaries, Model Checking & Comparison		
	PART – A		
Q.No.	**Question**	**Competence**	**Level**
1	How does machine learning work in prescriptive analytics?	Understand	BTL 2
2	What is prescriptive analytics methodology?	Remember	BTL 1
3	List out four key types of data analytics.	Remember	BTL 1
4	Define Hypothesis Generation.	Remember	BTL 1
5	What is active learning and how does it works?	Understand	BTL 2
6	How is active learning based on sampling?	Understand	BTL 2
7	How can active learning be used to optimize data points?	Understand	BTL 2
8	Can reinforcement learning be used in data science?	Understand	BTL 2
9	What is a policy based reinforcement learning method?	Remember	BTL 1
10	List out key elements of Reinforcement Learning.	Remember	BTL 1
11	What is Reinforcement Learning?	Remember	BTL 1
12	List out the three branches of Machine Learning.	Remember	BTL 1
13	List out the terminologies related to reinforcement learning.	Remember	BTL 1
14	Give an outline on Data Visualizations?	Understand	BTL 2
15	Recall the general types of Visualizations?	Remember	BTL 1
16	When to use bar charts and column charts?	Remember	BTL 1
17	Tell two different types of funnel charts.	Remember	BTL 1
18	Illustrate about the use heat maps and types of heat maps.	Understand	BTL 2
19	Give an outline on real time data.	Understand	BTL 2
20	What is a model in data analytics?	Remember	BTL 1

21	Interpret the importance of data analytics in decision-making.	Understand	BTL 2
22	What is Data Modeling? Infer its role in decision-making.	Understand	BTL 2
23	Classify the types of Data.	Understand	BTL 2
24	Interpret your view on Conceptual Data Model?	Understand	BTL 2

PART-B

Q.No.	Question	Competence	Level
1	Examine prescriptive analytics and list out few applications. (13)	Analyze	BTL 4
2	Elaborate briefly about the types of analytics. (13)	Create	BTL 6
3	Inspect Model building approach in predictive analytics and give a brief note on it. (13)	Analyze	BTL 4
4	Analyze prediction of Customer Behavior in Predictive Analytics using sample code. (13)	Analyze	BTL 4
5	Discuss about the approaches of active learning algorithm. (13)	Create	BTL 6
6	Why do we need active learning and explain with use-case in computer vision? (13)	Analyze	BTL 4
7	Evaluate in detail three main scenarios in active learning for query the labels of instances. (13)	Analyze	BTL 4
8	Formulate a technique to implement reinforcement learning algorithms with suitable example. (13)	Create	BTL 6
9	Assess with a suitable example of your own Markov Decision Process. (13)	Evaluate	BTL 5
10	Differentiate Model-free vs Model-based Reinforcement Learning. (13)	Apply	BTL 3
11	Analyze how Reinforcement Learning Works. (13)	Analyze	BTL 4
12	Identify the advantages and disadvantages of data visualizations (13)	Apply	BTL 3
13	Why data visualization is important ?Identify the reason with proper justification. (13)	Apply	BTL 3
14	Explain the different types of visualizations. (13)	Evaluate	BTL 5
15	Identify the need for creating a conceptual data model and justify its purpose. (13)	Apply	BTL 3
16	Define Physical Data Model. Examine the Data Analysis Process. (13)	Analyze	BTL 4
17	Analyze about Data Modeling and Security and examine its need. (13)	Analyze	BTL 4

PART – C

1	Evaluate real-world implementation of prescriptive analytics and tools used. (15)	Evaluate	BTL 5
2	Discuss about Active learning using sampling techniques and strategies for subsampling. (15)	Create	BTL 6
3	Generalize Reinforcement Learning framework in detail. (15)	Create	BTL 6
4	Explain data visualization techniques with a neat diagram. (15)	Evaluate	BTL 5
5	Assess about the following: a. Conceptual Data Model (8) b. Logical Data Model (7)	Evaluate	BTL 5

UNIT V CASE STUDY

Web Analytics: Understanding the metrics - Basic & Advanced Web Metrics - Google Analytics: Demo & Hands on- Campaign Analytics - Text Mining.

PART – A

Q.No.	Question	Competence	Level
1	Define Web analytics.	Remember	BTL 1
2	What are user engagement metrics in web analytics?	Remember	BTL 1
3	List out the Web Analytics Process.	Remember	BTL 1
4	List out the types of Web Analytics.	Remember	BTL 1
5	Why are Web Analytics important?	Understand	BTL 2
6	What are Web Analytics used for?	Remember	BTL 1
7	List few Web Analytics Tools.	Remember	BTL 1
8	Illustrate some of the common issues with Web Analytics.	Understand	BTL 2
9	What is Google Analytics?	Remember	BTL 1
10	Illustrate how to use Analytics Reports.	Understand	BTL 2
11	How can Google Analytics improve ad performance?	Understand	BTL 2
12	Define Campaign analytics.	Remember	BTL 1
13	What tools can be used to perform a campaign analysis?	Remember	BTL 1
14	Illustrate the advantages of marketing campaign analysis.	Understand	BTL 2
15	How to measure campaign performance?	Understand	BTL 2
16	Interpret the different types of marketing campaigns.	Understand	BTL 2
17	List out the main advantages of marketing campaign analysis include.	Remember	BTL 1
18	What are the steps involved in text mining?	Remember	BTL 1
19	Compare and contrast text mining and text analytics.	Understand	BTL 2
20	How text mining helps with information overloaded?	Understand	BTL 2
21	Compare structured and un-structured data.	Understand	BTL 2
22	Define text mining.	Remember	BTL 1
23	Define Text extraction.	Remember	BTL 1
24	Why is Text Mining important?	Understand	BTL 2

PART-B

Q.No.	Question		Competence	Level
1	Define Web Analytics and analyze the different types of Web Analytics.	(13)	Analyze	BTL 4
2	Explain in detail the Web Analytics Tools.	(13)	Analyze	BTL 4
3	Identify the risk in Web Analytics and brief about them.	(13)	Apply	BTL 3
4	Examine the three types of Web Analytics metrics .	(13)	Analyze	BTL 4
5	List out and examine the benefits of Website Analytics.	(13)	Analyze	BTL 4
6	Examine in detail about tools offered by Google Analytics solutions.	(13)	Analyze	BTL 4
7	Discover the importance of Campaign Analytics.	(13)	Analyze	BTL 4
8	Discover how does campaign analytics helps with sales.	(13)	Analyze	BTL 4
9	Formulate the tools that can be used to perform a campaign analysis?	(13)	Create	BTL 6
10	How to write a Campaign Analysis and how often do we need to measure marketing campaigns? Give your inference.	(13)	Analyze	BTL 4

11	Why do we need to analyze and assess our Campaigns? (13)	Analyze	BTL 4
12	Identify in detail about the recommendations for better campaign analysis with relevant example (13)	Apply	BTL 3
13	Examine in detail about how to review our marketing campaign objectives and KPIs in detail with neat diagram. (13)	Analyze	BTL 4
14	Explain in detail about smart insights RACE Planning Framework. (13)	Evaluate	BTL 5
15	How to identify campaign measurement tools? Experiment with suitable scenario. (13)	Evaluate	BTL 5
16	Differentiate between text mining, text analysis and text analytics. (13)	Analyze	BTL 4
17	Illustrate in detail about methods and techniques used in text mining and identify its challenges and issues. (13)	Apply	BTL 3
	PART - C		
1	Formulate the process involved in t Web Analytics with suitable example. (15)	Create	BTL 6
2	Interpret about Google Analytics and explain how does it work? (15)	Evaluate	BTL5
3	Explain in detail about key steps to create useful Marketing Campaign Analytics. (15)	Evaluate	BTL5
4	Explain how to measure out campaign's performance. (15)	Create	BTL 6
5	Explain in detail about Text mining Techniques and key steps in text mining applications. (15)	Evaluate	BTL5