



VIVEKANANDHA COLLEGE OF ENGINEERING FOR WOMEN
 [AUTONOMOUS INSTITUTION AFFILIATED TO ANNA UNIVERSITY, CHENNAI]
 Elayampalayam – 637 205, Tiruchengode, Namakkal Dt., Tamil Nadu.

Question Paper Code: 50018

M.E. / M.Tech. DEGREE END-SEMESTER EXAMINATIONS – NOV. / DEC. 2025

Third Semester

Information Technology

P23CSOE1 - BUSINESS ANALYTICS

(Regulation 2023)

Time: Three Hours

Maximum: 100 Marks

Answer ALL the questions

Knowledge Levels	K1 – Remembering	K3 – Applying	K5 - Evaluating
(KL)	K2 – Understanding	K4 – Analyzing	K6 - Creating

PART – A

(10 x 2 = 20 Marks)

Q.No.	Questions	Marks	KL	CO
1.	Choose the correct phase of the analytics life cycle where missing values are handled and justify briefly.	2	K2	CO1
2.	In interpreting results, why might a model with slightly lower accuracy be preferred over a complex one?	2	K1	CO1
3.	State two common OLAP operations and, why these operations are so important.	2	K1	CO2
4.	A retail chain builds a central repository of historical sales data. Identify whether this is a warehouse or a mart and justify briefly.	2	K2	CO2
5.	A bank uses historical credit scores and income data to predict loan default. Identify the predictive technique used.	2	K1	CO3
6.	When a dataset is imbalanced (e.g., far fewer fraud cases than non-fraud), indicate one machine learning challenge.	2	K1	CO3
7.	State two main objectives of human resource planning and give suitable justification.	2	K1	CO4
8.	A manufacturer sources raw materials from multiple regions. Indicate the role of the supply chain network here.	2	K2	CO4
9.	Mention two benefits of collaborative business intelligence.	2	K1	CO5
10.	A retailer applies predictive analytics to personalize promotions. Identify the impact on customer behaviour.	2	K2	CO5

PART – B

(5 x 13 = 65 Marks)

Q.No.	Questions	Marks	KL	CO
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| 11. a) | <p>In business analytics, consider the example of “Enjoy Sports” dataset with the following parameters;</p> <ul style="list-style-type: none"> • Sky (values: Sunny, Cloudy, Rainy) • AirTemp (values: Warm, Cold) • Humidity (values: Normal, High) • Wind (values: Strong, Weak) • Water (values: Warm, Cool) • Forecast (values: Same, Change) | 13 | K2 | CO1 |
|--------|---|----|----|-----|

The concept learn would be “Good Days for Water Sports (values: Yes or No)”.

Example of training instance:

<Sunny, Warm, High, Strong, Warm, Same, Yes>

Generate the possible Hypothesis from the dataset given. Apply the suitable modelling for correct class identification. Perform the Validation and Evaluation of model with suitable example.

Enjoy_Sports Dataset:

Day	Sky	AirTemp	Humidity	Wind	Water	Forecast	WaterSport
1	Sunny	Warm	Normal	Strong	Warm	Same	Yes
2	Sunny	Warm	High	Strong	Warm	Same	Yes
3	Rainy	Cold	High	Strong	Warm	Change	No
4	Sunny	Warm	High	Strong	Cool	Change	Yes

(OR)

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|----|--|----|----|-----|
| b) | <p>A retail company wants to improve its sales performance using analytics. The management has collected historical sales data, customer feedback, and market trends over the past three years.</p> <ul style="list-style-type: none"> • Identify the appropriate type(s) of analytics the company should apply for: <ol style="list-style-type: none"> 1. Understanding the reasons for past sales decline. 2. Forecasting next quarter’s sales. 3. Optimizing product placement in stores. • Outline the steps of the analytics life cycle that should be followed to implement these analytics effectively, starting from business problem consideration to deployment. • Suggest one potential challenge at each stage of the life cycle and a way to address it. | 13 | K2 | CO1 |
|----|--|----|----|-----|

12. a) An international winter clothing boutique franchise company is interested in data warehouse implementation by executing a data mart in their holding company. The CEO of 'Snow Boutique' said that he want to have analysis of the sales for his entire store to support their strategic marketing plan. He wants to know how many products they have sell in their stores for specific period of time such as by day, month, quarter and year. He also wants to have the figure of sales qty, amount and the cost for particular store, product and period. The product of their stores such as sweater, shoes and gloves are varies by color and size and the store is located per city which is under responsibility of a manager contactable by telephone number. You are required to draw a star schema for 'Snow Boutique Holdings' considering all information given, indicating dimension table, fact table, primary key and foreign key.
- (OR)
- b) Develop a comprehensive framework for enterprise-wide decision support system (DSS). Include two examples of decision made in each functional area of business.
13. a) A healthcare provider aims to improve patient care using machine learning-based predictive analytics. Electronic health records, treatment histories, and demographic data are available.
- Choose logic-driven and data-driven approaches for:
 1. Identifying reasons for patient readmissions.
 2. Predicting patients at high risk of complications.
 3. Recommending personalized treatment schedules.
 - Provide end-to-end process of predictive analytics implementation by highlighting one challenge at each stage and a solution to mitigate it.
- (OR)
- b) A retail company wants to use data mining and machine learning to improve customer retention and sales. Historical purchase data, demographic information, and customer feedback over the last three years are available.
- Select suitable data mining techniques for:
 1. Identifying patterns in customer purchase behavior.
 2. Segmenting customers for targeted marketing campaigns.
 - Identify machine learning models appropriate for:
 1. Predicting customers likely to churn.
 2. Recommending products to individual customers.
 - Outline the steps involved in predictive analysis modeling, starting from data collection to deployment.

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| 14. | a) Cite two examples from Indian organization and discuss the HRD practices done in these Organizations. | 13 | K2 | CO4 |
| (OR) | | | | |
| | b) Identify the key applications of business analytic in supply chain management. Analyze with suitable examples. | 13 | K2 | CO4 |
| 15. | a) Marketing research is vital for the evaluation of a sound marketing strategy.” Explain this statement. Also, discuss its objectives and various stages involved in the marketing research process. | 13 | K4 | CO5 |
| (OR) | | | | |
| | b) A multinational company wants to enhance decision-making and reporting using modern analytics trends. Operational data, sales records, and market insights are available. | 13 | K4 | CO5 |
| | <ul style="list-style-type: none"> • Identify applications of embedded and collaborative business intelligence for: <ul style="list-style-type: none"> i. Improving cross-department decision-making. ii. Integrating analytics into everyday business operations. • Suggest visual data recovery techniques for: <ul style="list-style-type: none"> i. Identifying missing or corrupted data in large datasets. ii. Presenting recovered data effectively to stakeholders. | | | |

PART – C

(1 x 15 = 15Marks)

- | Q.No. | Questions | Marks | KL | CO |
|-------|---|-------|----|-----|
| 16. | a) A large hospital wants to improve patient care, optimize resource allocation, and reduce operational costs using analytics. Historical patient records, treatment outcomes, staffing data, and equipment usage logs are available. <ul style="list-style-type: none"> • Suggest business analytics applications to: <ol style="list-style-type: none"> 1. Identify patterns in patient admissions and treatment outcomes. 2. Forecast high-demand periods for different hospital departments. • Apply business intelligence tools to: <ol style="list-style-type: none"> 1. Monitor real-time hospital performance metrics. 2. Support decision-making for resource allocation and staff scheduling. • Use business forecasting techniques to: <ol style="list-style-type: none"> 1. Predict future patient inflow and resource needs. 2. Plan procurement and inventory for medical supplies. | 15 | K3 | CO3 |

(OR)

b) A commercial bank wants to improve loan approvals, reduce defaults, and enhance customer experience using analytics. Historical customer transactions, credit scores, loan repayment histories, and market data are available.

15 K3 CO3

- Suggest business analytics applications to:
 1. Identify patterns in customer borrowing and repayment behavior.
 2. Detect potential loan defaults before they occur.
 - Apply business intelligence tools to:
 1. Monitor real-time loan portfolio performance.
 2. Support decision-making for branch resource allocation and staffing.
 - Use business forecasting techniques to:
 1. Predict future loan demand across different customer segments.
 2. Plan financial product offerings and risk management strategies.
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