

Enrollment No./Seat No.:

GUJARAT TECHNOLOGICAL UNIVERSITY
MBA - SEMESTER - II EXAMINATION - SUMMER 2025

Subject Code: MB02096011

Date: 30-05-2025

Subject Name: Business Analytics

Time: 10:30 AM TO 01:30 PM

Total Marks: 70

Instructions

- 1. Attempt all questions.**
- 2. Make suitable assumptions wherever necessary.**
- 3. Figures to the right indicate full marks.**
- 4. USE of SIMPLE calculators AND non-programmable scientific calculators are permitted.**

	Marks
Q.1 ALL 7 Questions must be Compulsory.	14
(a) Business Analytics	
(b) Descriptive Analytics	
(c) OLAP	
(d) Data Warehouse	
(e) Structured Data with example	
(f) Sentiment Analysis	
(g) Dashboard	
Q.2 (a) Explain the components of Business Analytics with examples.	07
(b) A company tracks online customer purchases and wants to analyze patterns. Prepare a frequency distribution table using the following dataset: Number of Purchases in a Month by 10 Customers: 5, 2, 3, 8, 6, 4, 3, 7, 6, 5 Also, draw a bar graph and comment on the buying trend.	07
OR	
(b) Prepare a pie chart using the following product sales data of an e-commerce business: Electronics – ₹40,000, Fashion – ₹25,000, Grocery – ₹20,000, Furniture – ₹15,000 Comment on which category dominates and suggest one decision based on this chart.	07
Q.3 (a) Discuss the characteristics and differences among structured, semi-structured, and unstructured data with examples.	07
(b) A company uses customer reviews, sensor data, and order records. Classify these data types and suggest suitable storage formats. Also, suggest one BI tool that can be used to analyze each type.	07
OR	
(a) Differentiate between OLTP and OLAP systems. How do OLAP operations help in managerial decision-making?	07

- (b) A supermarket chain wants to analyze its product sales weekly. Suggest OLAP operations (roll-up, drill-down, slice, dice) and apply them hypothetically using sales data. 07

Q.4 (a) Explain the concept of Business Performance Management. Discuss how KPIs and dashboards are used to evaluate organizational performance. 07

- (b) A retail chain wants to track and improve its store performance across regions. The management has identified the following KPIs for the dashboard: 07
- Average Sales per Store
 - Customer Footfall per Day
 - Inventory Turnover Ratio
 - Customer Satisfaction Score

Design a sample dashboard using these KPIs and evaluate how such a dashboard can help in managerial decision-making. Also, suggest one improvement action based on assumed trends.

OR

- (a) Explain the applications of analytics in Sales & Marketing and Financial Services with practical examples. 07
- (b) Assume a telecom company wants to reduce churn rate. Suggest an analytics model using customer data (usage pattern, complaints, subscription history). Provide a sample framework for predictive analytics 07

Q.5 Town of Cary Uses Analytics to Analyze Data from Sensors, Assess Demand, and Detect Problems

A leaky faucet. A malfunctioning dishwasher. A cracked sprinkler head. These are more than just a headache for a home owner or business to fix. They can be costly, unpredictable, and, unfortunately, hard to pinpoint. Through a combination of wireless water meters and a data-analytics-driven, customer-accessible portal, the Town of Cary, North Carolina, is making it much easier to find and fix water loss issues. In the process, the town has gained a big-picture view of water usage critical to planning future water plant expansions and promoting targeted conservation efforts. When the Town of Cary installed the wireless meters for 60,000 customers in 2010, it knew the new technology wouldn't just save money by eliminating manual monthly readings; the town also realized it would get more accurate and timely information about water consumption. The Aquastar wireless system reads meters once an hour—that's 8,760 data points per customer each year instead of 12 monthly readings. The data had tremendous potential, if it could be easily consumed.

"Monthly readings are like having a gallon of water's worth of data. Hourly meter readings are more like an Olympic-size pool of data," says Karen Mills, Finance Director for the Town of Cary. "SAS helps us manage the volume of that data nicely." In fact, the solution enables the town to analyze a half-billion data points on water usage and make them available, and easily consumable, to all customers.

The ability to visually look at data by household or commercial customer, by the hour, has led to some very practical applications:

- The town can notify customer of potential leaks within days.
- Customers can set alerts that notify them within hours if there is a spike in water usage.
- Customers can track their water usage online, helping them to be more

proactive in conserving water.

Through the online portal, one business in the Town of Cary saw a spike in water consumption on weekends, when employees are away. This seemed odd, and the unusual reading helped the company learn that a commercial dishwasher was malfunctioning, running continuously over week-ends. Without the wireless water-meter data and the customer-accessible portal, this problem could have gone unnoticed, continuing to waste water and money.

The town has a much more accurate picture of daily water usage per person, critical for planning future water plant expansions. Perhaps the most interesting perk is that the town was able to verify a hunch that has far-reaching cost ramifications: Cary residents are very economical in their use of water. "We calculate that with modern high-efficiency appliances, indoor water use could be as low as 35 gallons per person per day. Cary residents average 45 gallons, which is still phenomenally low," explains town Water Resource Manager Leila Goodwin. Why is this important? The town was spending money to encourage water efficiency-rebates on low-flow toilets or discounts on rain barrels. Now it can take a more targeted approach, helping specific consumers understand and manage both their indoor and outdoor water use.

SAS was critical not just for enabling residents to understand their water use, but also in working behind the scenes to link two disparate databases. "We have a billing database and the meter-reading database. We needed to bring that together and make it presentable," Mills says.

The town estimates that by just removing the need for manual readings, the Aquastar system will save more than \$10 million above the cost of the project. But the analytics component could provide even bigger savings. Already, both the town and individual citizens have saved money by catching water leaks early. As the Town of Cary continues to plan its future infrastructure needs, having accurate information on water usage will help it invest in the right amount of infrastructure at the right time. In addition, understanding water usage will help the town if it experiences something detrimental like a drought.

"We went through a drought in 2007," says Goodwin. "If we go through another, we have a plan in place to use Aquastar data to see exactly how much water we are using on a day-by-day basis and communicate with customers. We can show 'here's what's happening, and here is how much you can use because our supply is low.' Hopefully, we'll never have to use it, but we're prepared.

- (a) Identify and analyze the key challenges that the Town of Cary was facing before implementing the data analytics system. How did these challenges affect the efficiency of civic operations? 07
- (b) Explain the proposed data analytics solution adopted by the Town of Cary. What technologies or analytics features were involved, and how did they address the identified problems? 07

OR

- (a) Evaluate the outcomes of implementing the analytics solution in the Town of Cary. What improvements were observed in operations, citizen services, or cost-efficiency? 07
- (b) Imagine you are a consultant for a similar town. Based on Cary's case, design a basic analytics solution with suggested KPIs or dashboard elements to address common municipal issues like waste management, traffic control, or emergency response. 07
