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Daffodil International University

Faculty of Science & Information Technology
Department of Computer Science and Engineering
Midterm Examination, Fall 2026
Course Code: CSE506, Course Title: Advanced Data Analytics

Date: 06.11.2026
Time: 1.5 Hour **Full Marks: 25**

Instructions:

A. Answer ALL Questions
B. Each question carries 5 marks.
C. Symbols used to carry their usual meaning

Question 1 : Grameenphone has noticed that many customers are discontinuing their SIM connections. The company has customer data containing monthly bills, contract types, customer complaints, and churn status (Yes/No).

As a Data Analytics Consultant:

1. Formulate a clear analytical question for this problem. (1)
2. Explain how the six phases of the CRISP-DM lifecycle can be applied to address this problem. (2)
3. Illustrate the four types of analytics with relevant examples from this scenario. (1)
4. If 30% of customers churn, propose a simple baseline model, calculate its expected accuracy, and explain why a more advanced model must be evaluated against the baseline. (1)

Question 2: Standard Chartered Bank Bangladesh collects loan transaction data from its PostgreSQL database and external financial data sources. During data inspection, an analyst finds that some ongoing loan applications have missing loan amounts, 5% of approved loan applications also have missing amounts due to a possible data-entry error, some numerical values are stored as text, and duplicate loan records are found.

As a Data Analyst:

1. Propose suitable strategies for handling missing values in ongoing and approved loan applications. (2)
2. Explain how incorrect data types should be handled. (1)
3. Explain how duplicate records should be handled. (1)
4. Explain why filling all missing loan amounts with the mean could produce misleading results. (1)

Question 3: Airtel finds that customers who churn have an average monthly charge of $74.44, while retained customers have an average monthly charge of $61.27. An independent-samples t-test reports a p-value of less than 0.001.

Answer the following:

1. State the null hypothesis (H_0) and alternative hypothesis (H_1). (2)
2. Interpret the result at a 5% significance level and state your statistical decision. (2)
3. Recommend one practical action the company could take to reduce customer churn. (1)

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Question 4 : Standard Chartered Bank uses the following regression model to predict loan amounts based on customer income and existing debt:

$$\widehat{Loan} = 20 + 2X_1 - 0.5X_2$$

Where X_1 is monthly income and X_2 is existing debt, both measured in thousand taka.

A customer has a monthly income of Tk. 50,000 and existing debt of Tk. 20,000.

Answer the following:

1. Calculate the predicted loan amount. (2)
2. Interpret both coefficients in business terms. (2)
3. State one reason why this prediction alone should not be used as the final loan-approval decision. (1)

Question 5: Grameenphone reports the following customer analytics results:

- Overall churn rate: 26.54%
- Month-to-month customer churn rate: 42.71%
- Two-year contract customer churn rate: 2.83%
- Churned customers' monthly charges: $139,130.85

Answer the following:

1. Write a DAX measure named `Revenue at Risk %` to calculate the percentage of total monthly charges attributable to churned customers. (2)
2. Recommend one retention action based on the results. (1)
3. Explain how Power BI can help management evaluate the effectiveness of the retention strategy. (2)