**1. Match the Following**

Match the type of analytics with its correct application in banking. Write the correct option (A, B, C, or D) in the blank space.

| **Type of Analytics** | **Banking Use Case** |
| --- | --- |
| **Descriptive Analytics** | \_\_\_ A. Identifying why a customer’s loan application was rejected multiple times. |
| **Diagnostic Analytics** | \_\_\_ B. Predicting the probability of a customer repaying a personal loan on time. |
| **Predictive Analytics** | \_\_\_ C. Determining the number of customers who have missed a loan EMI in the last six months. |
| **Prescriptive Analytics** | \_\_\_ D. Suggesting personalized credit card offers based on spending behavior. |

**2. Arrange the ML Workflow Steps in the Correct Order**

Below are the steps involved in a machine learning workflow for banking applications. However, they are not in the correct order. Arrange them properly by numbering them from 1 to 6.

* \_\_\_ Model Training
* \_\_\_ Data Collection & Preprocessing
* \_\_\_ Model Evaluation & Validation
* \_\_\_ Problem Definition & Business Understanding
* \_\_\_ Model Deployment & Monitoring
* \_\_\_ Feature Engineering & Selection

A bank wants to predict whether a customer is eligible for a loan based on their income, employment history, credit score, and debt-to-income ratio.

**Answer the following:**  
a) Identify the target variable in this problem.  
b) If the bank wants to minimize the chances of rejecting a genuinely eligible customer, which metric should it optimize—precision or recall? Why?

**3. Unusual Transaction Detection**

A bank wants to detect unusual transactions that could indicate potential account misuse. The system uses transaction history, customer location, time of transaction, and spending patterns to flag unusual activity.

A **false positive** means the system incorrectly flags a legitimate transaction as **fraudulent**.

**Answer the following:**  
a) What type of machine learning problem is this—classification or regression?  
b) Suggest two supervised learning algorithms suitable for this task and explain why.  
c) If the model detects too many false positives, what impact could it have on customers, and how can it be improved?

**4. Performance Metrics**

A bank builds a customer retention model to predict customers who may close their accounts soon. The model achieves **Positive" case** is a **churning customer** (one who will leave).

* Precision = 80%
* Recall = 50%
* F1-score = 62%

**Answer the following:**  
a) What does the recall value indicate in this context?  
b) If the bank wants to retain as many at-risk customers as possible, which metric should it optimize—precision or recall? Why?  
c) How does the F1-score help in evaluating the model’s performance?

**5.** A bank deploys an AI-based credit approval system. Some customers claim the system is biased against certain demographics.

* What steps can be taken to ensure fairness and transparency in the model?
* How can AI models in banking be made explainable to customers?