**Machine Learning Continuous Assessment Test (CAT)**

**Question 1: (6 marks)**

a) Differentiate between supervised and unsupervised learning. Provide examples of each. (3 marks)  
 b) Explain the concept of overfitting in machine learning models and how it can be mitigated. (3 marks)

**Question 2: (8 marks)**

a) Briefly describe the working principles of the following algorithms:  
i. Linear Regression (2 marks)  
ii. K-Nearest Neighbors (2 marks)  
b) Machine learning is used in recommendation systems. Explain how collaborative filtering works in building recommendations. (4 marks)

**Question 3: (6 marks)**

a) Discuss the importance of feature scaling in machine learning and compare two common methods used: Min-Max Scaling and Standardization. (3 marks)  
b) Explain the role of training, validation, and test datasets in machine learning projects. (3 marks)

**Question 4: (10 marks)**

**Case Study Scenario:**  
An e-commerce company wants to build a machine learning model to predict customer churn. The company has historical customer data, including demographics, purchase history, customer support interactions, and feedback.

**Tasks:**  
a) Identify the type of machine learning problem the company is solving. Justify your answer. (2 marks)  
b) Outline the steps involved in preparing the data for this model. (4 marks)  
c) Recommend two suitable machine learning algorithms for this task and explain why they would be effective. (4 marks)