**Question 1:**

List and describe four key steps involved in training a supervised machine learning model. (3 marks)

**Answer**

- Collecting and preprocessing data: Gather labeled data and clean, normalize, or transform it for analysis.
- Splitting data: Divide the dataset into training, validation, and test sets to evaluate performance effectively.
- Choosing a model: Select an appropriate algorithm (e.g., decision tree, logistic regression, neural network) based on the problem type.
- Training the model: Use the training data to adjust the model parameters by minimizing the error through optimization techniques (e.g., gradient descent).
- Evaluating the model: Use validation or test data to measure performance using metrics such as accuracy, precision, recall, or RMSE.
- Hyperparameter tuning: Adjust hyperparameters like learning rate, depth of trees, or number of layers to improve model performance.
- Testing the model: Final evaluation on a separate test dataset to assess its generalizability.

**Marking Rubric**

3 points: Four key steps are listed and described accurately.

2 points: Three key steps are listed and described accurately.

1 point: One or two key steps are listed and described accurately.

0 points: No relevant or correct steps are provided.

**Question 2:**

What is the purpose of hyperparameter tuning in machine learning, and name a common techniques? (2 marks)

**Answer**

- Hyperparameter tuning is used to optimize the model's performance by adjusting hyperparameters.
- Besides, It helps improve the accuracy and generalization of the model.
- Common techniques: State either Grid Search OR Random Search.

**Marking Rubric**

2 points: Able to state 1 purpose and 1 common technique

1 point: Able to state 1 purpose or 1 common technique

0 point: No relevant answers are provided.