1. What is Machine Learning?

Machine Learning (ML) is a branch of artificial intelligence where computers learn from data and improve performance without being explicitly programmed.

2. Give one real-life example of Machine Learning.

Email spam filters use ML to automatically detect and move spam messages to the spam folder.

3. What is the difference between Artificial Intelligence (AI) and Machine Learning (ML)?

- **AI** is the broader field of creating intelligent systems that can simulate human thinking.
- **ML** is a subset of AI that allows machines to learn patterns from data.

4. What are the types of Machine Learning?

- **Supervised Learning**
- **Unsupervised Learning**
- **Reinforcement Learning**

5. What is supervised learning? Give an example.

Supervised learning uses labeled data (input with correct output).
👉 Example: Predicting house prices based on size and location.

6. What is unsupervised learning? Give an example.

Unsupervised learning uses unlabeled data to find hidden patterns.
👉 Example: Customer segmentation in marketing.

7. What is reinforcement learning? Give an example.

Reinforcement learning trains an agent to make decisions by rewarding good actions and penalizing bad ones.
👉 Example: Teaching a robot to walk.

8. What is the difference between training data and test data?

- **Training data** is used to teach the model.
- **Test data** is used to evaluate the model's performance.

9. What are features in a dataset?

Features are input variables or attributes used to make predictions.
👉 Example: Age, salary, and location when predicting credit score.

10. What are labels (targets) in a dataset?

Labels are the correct output values the model learns to predict.
👉 Example: "Will buy" or "Will not buy" in a shopping prediction model.

11. What is the difference between classification and regression?

- **Classification** predicts categories (e.g., spam or not spam).
- **Regression** predicts continuous values (e.g., predicting house prices).

12. What does the term model mean in ML?

A model is the mathematical representation of a real-world problem created after training on data.

13. What is overfitting in ML?

Overfitting happens when a model learns the training data too well, including noise, and performs poorly on new data.

14. What is underfitting in ML?

Underfitting happens when a model is too simple and fails to capture important patterns in the data.

15. What is a confusion matrix used for?

It is used to evaluate classification models by showing true positives, false positives, true negatives, and false negatives.

16. Why do we split data into training and testing sets?

To check how well the model performs on unseen data and avoid overfitting.

17. What is a decision tree?

A decision tree is a model that makes decisions by splitting data into branches based on rules.
Example: Predicting whether a person will play tennis based on weather conditions.

18. What is a linear regression model used for?

It is used to predict a continuous value by finding the best straight-line relationship between variables.
Example: Predicting salary based on years of experience.

19. What does accuracy mean in ML?

Accuracy is the percentage of correct predictions made by a model compared to the total predictions.

20. What are some common applications of Machine Learning in daily life?

- Spam email detection
- Online shopping recommendations
- Voice assistants (Alexa, Siri)
- Face recognition in phones
- Google Maps traffic predictions