MACHINE LEARNING

1. What is Machine Learning?
Machine Learning (ML) is a branch of Artificial Intelligence where computers learn patterns from data and make predictions or decisions without being explicitly programmed.

2. Give one real-life example of Machine Learning.
Spam email detection in Gmail is an example where ML algorithms learn from past emails to classify new emails as "spam" or "not spam."

3. What is the difference between Artificial Intelligence (AI) and Machine Learning (ML)?
AI is a broad field focused on creating machines that can perform tasks requiring human intelligence, while ML is a subset of AI that specifically deals with learning from data and improving automatically.

4. What are the types of Machine Learning?
The main types are:

- Supervised Learning
- Unsupervised Learning
- Reinforcement Learning

5. What is supervised learning? Give an example.
Supervised learning is when the model is trained using labeled data (input + correct output). Example: Predicting house prices based on size, location, etc.

6. What is unsupervised learning? Give an example.
Unsupervised learning deals with unlabeled data where the algorithm finds hidden patterns. Example: Customer segmentation in marketing.

7. What is reinforcement learning? Give an example.
Reinforcement learning is where an agent learns by interacting with the environment and receiving rewards or penalties.
Example: A robot learning to walk.

8. What is the difference between training data and test data?
Training data is used to teach the model, while test data is used to evaluate the model's performance on unseen data.

9. What are features in a dataset?
Features are the input variables (independent variables) that are used by the model for making predictions. Example: Age, income, and education in a dataset predicting loan approval.

10. What are labels (targets) in a dataset?
Labels are the outputs (dependent variables) that the model tries to predict. Example: "Approved" or "Not Approved" in a loan dataset.

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 price).

12. What does the term model mean in ML?
A model is the mathematical representation of a real-world problem that has been trained on data to make predictions.

13. What is overfitting in ML?
Overfitting occurs when the model learns the training data too well, including noise, and performs poorly on new data.

14. What is underfitting in ML?
Underfitting happens when the model is too simple to capture the underlying patterns in the data, leading to poor performance on both training and test data.

15. What is a confusion matrix used for?
A confusion matrix is used to evaluate classification models by showing the correct and incorrect predictions across different classes.

16. Why do we split data into training and testing sets?
To check how well the model performs on unseen data and avoid overfitting, ensuring the model generalizes well.

17. What is a decision tree?
A decision tree is a model that splits data into branches based on conditions, leading to a decision. It works like a flowchart with "if-else" rules.

18. What is a linear regression model used for?
Linear regression is used to predict a continuous value by finding the linear relationship between dependent and independent variables.

19. What does accuracy mean in ML?
Accuracy measures the percentage of correct predictions made by the model compared to the total predictions.

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

- Voice assistants like Siri or Alexa
- Movie recommendations on Netflix
- Product recommendations on Amazon
- Face recognition on smartphones
- Fraud detection in banking