1. What does one mean by the term "machine learning"?

**Ans:** Machine learning is augmented AI. With machine learning we ca develop a kind of system which solves problems with the help of machines as well as human beings.

2.Can you think of 4 distinct types of issues where it shines?

**Ans:** Following are the problems where Machine learning is used:

1.Customer segmentation

2.Fraud detection

3. Spam Detection

4.Games

3.What is a labeled training set, and how does it work?

**Ans**: Labeled dataset comes with a output tag. It is used in supervised learning in which

imply use previous data in order to predict the label of new data points

4.What are the two most important tasks that are supervised?

Ans:The two most common supervised tasks are **regression and classification**

5.Can you think of four examples of unsupervised tasks?

Ans: Examples of unsupervised tasks:

1.Recommender system

2.Customer Segmentation

3. Targeted marketing

4.Structure Discovery

6.State the machine learning model that would be best to make a robot walk through various unfamiliar terrains?

**Ans:** Reinforcement learning

7.Which algorithm will you use to divide your customers into different groups?

**Ans:** Some type of clustering algorithms likeK-means clustering should be used.

8.Will you consider the problem of spam detection to be a supervised or unsupervised learning problem?

**Ans:** supervised learning

9.What is the concept of an online learning system?

**Ans:** An online learning system learns from new data. System is trained incrementally by using one example at a time. It is cheap and memory efficient

10.What is out-of-core learning, and how does it differ from core learning?

Ans: Some algorithms working with large data cannot fit into the memory of a single computer.

Out-of-core refers to those set of algorithms.

11.What kind of learning algorithm makes predictions using a similarity measure?

Ans: Instance-based learning algorithms

12.What's the difference between a model parameter and a hyperparameter in a learning algorithm?

Ans: A model parameter is internal to the model. Its value can be estimated from data.

They are often saved as part of the learned model.

A model hyperparameter is external to the model . Its value cannot be estimated from data. They are often tuned for a given predictive modelling problem.

13.What are the criteria that model-based learning algorithms look for? What is the most popular method they use to achieve success? What method do they use to make predictions?

Ans: Model-based algorithm try to generalize to new examples. For achieving this, model based algorithms search for optimal values for the model's parameters, often called theta.. Model-based system learn by minimizing a cost function that measures how bad the system is at making predicitons on new data, plus a penalty for model complexity if the model is regularized. To make a prediction, a new instance's features are fed into a hypothesis function which uses the minimized theta found by repeatedly running the cost function.

14.Can you name four of the most important Machine Learning challenges?

**Ans:** Following are challenges in machine learning.

1. Inadequate training data for most of the algorithms to function properly.
2. Need to clean up the data due to poor quality.
3. Irrelevant Features
4. Nonrepresentative training data

15.What happens if the model performs well on the training data but fails to generalize the results to new situations? Can you think of three different options?

**Ans:** This is a example of overfitting the training data. To deal with overfitting, we can reduce the complexity of the model by removing features or constraining the parameters. We could feed more data to the algorithm which leads to generalisation. Data Augmentation in which istead of giving loads of data,we can feed data in increments.

16.What exactly is a test set, and why would you need one?

**Ans:**  A test set is a portion of a data set used to assess the likely future performance of a machine learning model.

17.What is a validation set's purpose?

Ans: Validation set is used to give an unbiased estimate of the skill of the final tuned model when comparing or selecting between final models.

18.What precisely is the train-dev kit, when will you need it, how do you put it to use?

Ans: The goal of **dev-set** is to rank the models in term of their accuracy and helps us decide which model to proceed further with. Using Dev set we rank all our models in terms of their accuracy and pick the best performing model.

19.What could go wrong if you use the test set to tune hyperparameters?