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

Ans: Make the machine learn with given dataset

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

Ans:

* Weather prediction: Based on historical seasonal data and other conditions, the weather parameters are predicted.
* Product recommendations: Machine learning is widely used by various e-commerce and entertainment companies such as Amazon, Netflix, etc., for product recommendation to the user.
* Image recognition: ML algorithm identifies the images and label them. The machine learns from previously fed data.
* Speech recognition: Programs like Siri, Alexa use this tool where the voice instructions are converted into text.

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

Ans: Each column in the training set has some known label.

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

Ans: Regression and Classification.

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

Ans: Clustering, Visualization, Dimensionality Reduction, and Association Rule Learning

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

Ans: The best Machine Learning algorithm to allow a Robot to walk in unfamiliar terrains is Reinforced Learning, where the robot can learn from response of the terrain to optimize itself.

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

Ans: Clustering algorithms i.e. Unsupervised algorithms

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

Ans: Supervised learning as the features are labelled.

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

Ans: In online learning the machine learns continuously, as data is given in small streams continuously.

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

Ans: A system that can handle data that cannot fit into your computer memory. It uses online learning system to feed data in small bits.

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

Ans: Instance Based Algorithm.

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

Ans: Model parameter determines how a model will predict given a new instance. Model usually has more than one parameter (i.e. slope of a linear model). Hyperparameter is a parameter for the learning algorithm, not of a model.

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 learning algorithm search for the optimal value of parameters in a model that will give the best results for the new instances. We often use a cost function or similar to determine what the parameter value has to be in order to minimize the function. The model makes prediction by using the value of the new instance and the parameters in its function.

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

Ans:

* Overfitting the Data (using a model too complicated)
* Underfitting the data (using a simple model)
* Insufficient Data
* Non Representative 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: In such cases, overfitting happens, this issue can be solved by as below

* Get more data
* Implement a simpler model
* Eliminate outliers or noise from the existing data set

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

Ans: Test set is selected from main data set to test the model prediction.

17.What is a validation set's purpose?

Ans: Validation set is within training set to validate the accuracy of the model prediction.

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

Ans: Cross-validation is a tool to compare models without needing a separate validation set. It is preferred over validation set because we can save from breaking of part of the training set to create a validation set, as having more data is valuable regardless.

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

Ans: The model may not perform well on the out-of-sample data because the model is tuned just for that specific set.