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

**Ans:** Machine learning is basically means , that machine is learning something and it is able to perform an operation for which it is not being programmed explicitly.

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

**Ans:** Customer service automation, Credit card fraud detection, Spam filtering, Digital marketing.

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

**Ans:** Labeled training set is something where output is already labelled and expected to be within this label.

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

**Ans:** Any labeled task is considered as supervised task, example of supervised task is Spam filtering, and object recongnition.

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

**Ans:** Customer segmentation, recognize DNA patterns, Recommender system, Anomaly detection.

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

**Ans:** this is a best example of reinforcement learning, where agent is being rewarded or penalised as per actions in a particular environment.

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

**Ans:** The best algorithm to segment customers into multiple groups is either supervised learning (if the groups have known labels) or unsupervised learning (if there are no group labels).

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

**Ans:** Supervised, this this is a labelled task.

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

**Ans:** Online learning system is something where data is available online and it is updating frequently, so every time we need to get updated data and our system will learn and make decisions as per the latest available data.

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

**Ans:** The term out-of-core typically refers to processing data that is too large to fit into a computer’s main memory, however in core learning processing data fits into computer’s main memory.

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

**Ans:** Learning algorithm that relies on a similarity measure to make predictions is instance-based algorithm.

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

**Ans:** Model parameter - A model parameter is a variable of the selected model which can be estimated by fitting the given data to the model. e.g. m(slope) and c(intercept) in Linear Regression

Hyper parameter - A model hyperparameter is the parameter whose value is set before the model start training. They cannot be learned by fitting the model to the data. e.g. Learning rate in gradient descent.

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:** Four main challenges in Machine Learning include overfitting the data (using a model too complicated), underfitting the data (using a simple model), lacking in data and nonrepresentative 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:** If the model performs poorly to new instances, then it has overfit on the training data. To solve this, we can do any of the following three: get more data, implement a simpler model, or 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 a set that you test your model (fit using training data) to see how it performs. Test set is necessary so that you can determine how good (or bad) your model performs.

17.What is a validation set's purpose?

**Ans:** Validation set is a set used to compare between different training models.

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

**Ans:** The train-dev kit is used to select the parameters, tune them and then use them to choose the best model of a training algorithm. Nevertheless, it also helps in avoiding or minimizing overfitting and simultaneously controls the learning rate.

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

**Ans:** If you tune hyperparameters using the test sets, then it may not perform well on the out-of-sample data because the model is tuned just for that specific set.