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

Ans. Machine learning is a subfield of artificial intelligence, which is broadly defined as the capability of a machine to imitate intelligent human behavior. Artificial intelligence systems are used to perform complex tasks in a way that is similar to how humans solve problems.

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

Ans.

1. Spam detection in mail or sms

2. cancer diagnosis

3. self driven car

4. recomendation system

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

Ans. Labeled training set is used in Supervised ML problem statements which has specific tags or names for each Independent and Dependent features.

The ML Algorithm first gets trained with training dataset and then it will be able to predict the dependent variable with the help of another labeled data (test data) that contains same number of Independent features with the same tags or names.

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

Ans. Two most important supervised tasks are classification and regression.

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

Ans: Four common unsupervised tasks inclused **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 unknown terrain is **Reinforced Learning.**

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

Ans. Any clustering Algorithm.

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

Ans. Supervised.

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

Ans: Online learning refers to instruction that is delivered electronically through various multimedia and Internet platforms and applications. It is used interchangeably with other terms such as web-based learning, e-learning, computer-assisted instruction, and Internet-based learning.

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

Ans: Out-of-core learning refers to the machine learning algorithms working with data that cannot fit into a single machine's memory but can easily fit into some data storage, such as a local hard disk or web repository.

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 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: 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:   
i) get more data,   
ii) implement a simpler model,   
iii) 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 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?

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.