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

**Ans:** Machine learning is a branch where we make intelligent software application which are used to predict/ classify /self learn tasks.

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

**Ans:** Speech recognition, medical (disease) diagnosis, image recognition, task prediction(fraud mail, cost estimation etc)

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

**Ans:** Labelled training dataset means where we have output data also recorded against all input features.

Labelled dataset are considered as the ground truth for the prediction and we decide accuracy by comparing the predicted output with the actual output.

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

**Ans: Two** major tasks of supervised are:

Regression: (where we have to predict the continuous range of values like house price etc)

Classification: (where we have to predict the binary classification type like Yes/No, 1/0 etc

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:** Reinforcement Learning

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

**Ans:** K- Means Clustering algorithm

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

**Ans:** Supervised Machine Learning and we provide the labelled dataset.

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

**Ans:** In online learning method we continuously train and update repeatedly in real time when there is continuous stream of data and tuning happen accordingly

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

**Ans:** Out-of-core learning means when model with data does not fit into memory of single computer and we need extra data storage and core learning do not need extra storage

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

**Ans:** Instance based learning

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

**Ans: Model Parameter:** are learned by the training of model through training data and not explicitly set by the user. Example in deep learning model parameter are weight, bias.

**Hyperparameter:** are the parameter whose values are used to control the learning process of the model. Example: no. of hidden layer, learning rate, number of unit in each layer etc.

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 look to generalize the pattern for the prediction and they look optimal value for the model data.

Model first train on available dataset and then use that learning on the prediction

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

**Ans:**

1. Data Collection
2. Improper data
3. Underfitting/Overfitting
4. Real time deployment

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: Overfitting:** when model learns well for training data and fails for new data

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

**Ans:** The test data on the machine learning model is the set of data use to test the model performance after the model training.

**Test data** is usually used to verify the performance of model.

17.What is a validation set's purpose?

**Ans:** Validation set data is used to train the model with the goal to optimize an tune the model wrt to error

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 rank the models in term of there accuracy and will need to decide that with which model we want to go further.

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

**Ans:** If we use test data to train the model, somewhere we are exposing our model to see the pattern of unseen data and train accordingly.

So in this case result will be biased for unseen data.