1. **What is prior probability? Give an example.**

Prior probability shows the likelihood of an outcome in a given dataset. For example, in the mortgage case, P(Y) is the default rate on a home mortgage, which is 2%.

2. **What is posterior probability? Give an example.**

Posterior probability is a revised probability that takes into account new available information. For example, let there be two urns, urn A having 5 black balls and 10 red balls and urn B having 10 black balls and 5 red balls. Now if an urn is selected at random, the probability that urn A is chosen is 0.5.

3. **What is likelihood probability? Give an example.**

The term "probability" refers to the possibility of something happening. The term Likelihood refers to the process of determining the best data distribution given a specific situation in the data.

4. **What is Naïve Bayes classifier? Why is it named so?**

A Naive Bayes classifier is a probabilistic machine learning model that's used for classification task. The crux of the classifier is based on the Bayes theorem.

5. **What is optimal Bayes classifier?**

Bayes Optimal Classifier is a probabilistic model that finds the most probable prediction using the training data and space of hypotheses to make a prediction for a new data instance

**6. Write any two features of Bayesian learning methods.**

* Bayesian methods can accommodate hypotheses that make probabilistic predictions
* New instances can be classified by combining the predictions of multiple hypotheses, weighted by their probabilities.

7. **Define the concept of consistent learners.**

A learner L using a hypothesis H and training data D is said to be a consistent learner if it always outputs a hypothesis with zero error on D whenever H contains such a hypothesis.

By definition, a consistent learner must produce a hypothesis in the version space for H given D.

8. **Write any two strengths of Bayes classifier.**

Advantages of Naive Bayes Classifier

* It is highly scalable with the number of predictors and data points.
* It is fast and can be used to make real-time predictions.

9. **Write any two weaknesses of Bayes classifier.**

Disadvantages of Using Naive Bayes Classifier

* Conditional Independence Assumption does not always hold. ...
* Zero probability problem : When we encounter words in the test data for a particular class that are not present in the training data, we might end up with zero class probabilities.

**10. Explain how Naïve Bayes classifier is used for**

1. **Text classification**

Since a Naive Bayes text classifier is based on the Bayes's Theorem, which helps us compute the conditional probabilities of occurrence of two events based on the probabilities of occurrence of each individual event, encoding those probabilities is extremely useful.

2**. Spam filtering**

Naive Bayes classifiers work by correlating the use of tokens (typically words, or sometimes other things), with spam and non-spam e-mails and then using Bayes' theorem to calculate a probability that an email is or is not spam.

3. **Market sentiment analysis**

Naïve Bayes classifier is one of the supervised classification technique which classifies the text/sentence that belongs to particular class. It is the probabilistic algorithm which calculates the probability of each word in the text/sentence and the word with highest probability is considered as output