1. What is prior probability? Give an example.

Prior probability, in Bayesian statistical inference, is the probability of an event before new data is collected.

2. What is posterior probability? Give an example.

Conditional probability distribution representing what parameters are likely after observing the data object

3. What is likelihood probability? Give an example.

Likelihood refers to how well a sample provides support for particular values of a parameter in a model

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

Naive Bayes classifiers are a collection of classification algorithms based on Bayes' Theorem. It is not a single algorithm but a family of algorithms where all of them share a common principle, i.e. every pair of features being classified is independent of each other.

5. What is optimal Bayes classifier?

The Bayes Optimal Classifier is a probabilistic model that makes the most probable prediction for a new example

6. Write any two features of Bayesian learning methods.

A probability distribution over observed data for each possible hypothesis.

New instances can be classified by combining the predictions of multiple hypotheses, weighted by their probabilities.

7. Define the concept of consistent learners.

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.

8. Write any two strengths of Bayes classifier.

It is simple and easy to implement.

It doesn't require as much training data.

9. Write any two weaknesses of Bayes classifier.

Naive Bayes assumes that all predictors (or features) are independent, rarely happening in real life.

This algorithm faces the 'zero-frequency problem' where it assigns zero probability to a categorical variable whose category in the test data set wasn't available in the training dataset.

10. Explain how Naïve Bayes classifier is used for

1. Text classification –

Naive Bayes is a learning algorithm commonly applied to text classification. Some of the applications of the Naive Bayes classifier are: (Automatic) Classification of emails in folders, so incoming email messages go into folders such as: “Family”, “Friends”, “Updates”, “Promotions”, etc.

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

Sentiment analysis is a field dedicated to extracting subjective emotions and feelings from text. One common use of sentiment analysis is to figure out if a text expresses negative or positive feelings. Written reviews are great datasets for doing sentiment analysis because they often come with a score that can be used to train an algorithm. Naive Bayes is a popular algorithm for classifying text. Although it is fairly simple, it often performs as well as much more complicated solutions.