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%. P(Y|X) is called the conditional probability, which provides the probability of an outcome given the evidence, that is, when the value of X is known

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.

3. What is likelihood probability? Give an example.

Probability is about a finite set of possible outcomes, given a probability. Likelihood is about an infinite set of possible probabilities, given an outcome.

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

Naive Bayes is a simple and powerful algorithm for predictive modelling. Naive Bayes is called naive because it assumes that each input variable is independent. This is a strong assumption and unrealistic for real data; however, the technique is very effective on a large range of complex problems.

5. What is optimal Bayes classifier?

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

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.

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.

This algorithm works quickly and can save a lot of time. Naive Bayes is suitable for solving multi-class prediction problems. If its assumption of the independence of features holds true, it can perform better than other models and requires much less training data.

9. Write any two weaknesses of Bayes classifier.

The greatest weakness of the naïve Bayes classifier is that it relies on an often-faulty assumption of equally important and independent features which results in biased posterior probabilities. Although this assumption is rarely met, in practice, this algorithm works surprisingly well.

10. Explain how Naïve Bayes classifier is used for

1. Text classification

2. Spam filtering

3. Market sentiment analysis