Machine Learning Solution:

1)B

2)D

3)D

4)A

5)B

6)D

7)A

8)B

9)D

10)A

11)D

12)A

13)Determining the optimal number of clusters in a data set is a fundamental issue in partitioning clustering, such as k-means clustering, which requires the user to specify the number of clusters k to be generated.

Unfortunately, there is no definitive answer to this question. The optimal number of clusters is somehow subjective and depends on the method used for measuring similarities and the parameters used for partitioning.

A simple and popular solution consists of inspecting the dendrogram produced using hierarchical clustering to see if it suggests a particular number of clusters.

2 methods which can be used are as below:

a) Direct methods: consists of optimizing a criterion, such as the within cluster sums of squares or the average silhouette. The corresponding methods are named elbow and silhouette methods, respectively.

b) Statistical testing methods: consists of comparing evidence against null hypothesis. An example is the gap statistic.

14) To measure a cluster's fitness within a clustering, we can compute the average silhouette coefficient value of all objects in the cluster. To measure the quality of a clustering, we can use the average silhouette coefficient value of all objects in the data set. The silhouette coefficient and other intrinsic measures can also be used in the elbow method to heuristically derive the number of clusters in a data set by replacing the sum of within-cluster variances.

15)Clustering is a type of unsupervised learning method of machine learning. In the unsupervised learning method, the inferences are drawn from the data sets which do not contain labelled output variable. It is an exploratory data analysis technique that allows us to analyze the multivariate data sets.

Clustering is a task of dividing the data sets into a certain number of clusters in such a manner that the data points belonging to a cluster have similar characteristics. Clusters are nothing but the grouping of data points such that the distance between the data points within the clusters is minimal.

In other words, the clusters are regions where the density of similar data points is high. It is generally used for the analysis of the data set, to find insightful data among huge data sets and draw inferences from it. Generally, the clusters are seen in a spherical shape, but it is not necessary as the clusters can be of any shape.

It depends on the type of algorithm we use which decides how the clusters will be created. The inferences that need to be drawn from the data sets also depend upon the user as there is no criterion for good clustering.

Different types of Clustering Methods are as below:

1. Density-Based Clustering
2. DBSCAN (Density-Based Spatial Clustering of Applications with Noise)
3. OPTICS (Ordering Points to Identify Clustering Structure)
4. HDBSCAN (Hierarchical Density-Based Spatial Clustering of Applications with Noise)
5. Hierarchical Clustering
6. Fuzzy Clustering
7. Partitioning Clustering
8. PAM (Partitioning Around Medoids)
9. Grid-Based Clustering