MACHINE LEARNING

Q1 to Q12 have only one correct answer. Choose the correct option to answer your question.

1. Which of the following is an application of clustering?

a) Biological network analysis

b) Market trend prediction

c) Topic modeling

d) All of the above

Answer – d) All of the above

2. On which data type, we cannot perform cluster analysis?

a) Time series data

b) Text data

c) Multimedia data

d) None

Answer – d) None

3. Netflix's movie recommendation system uses-

a) Supervised learning

b) Unsupervised learning

c) Reinforcement learning and Unsupervised learning

d) All of the above

Answer – c) Reinforcement learning and Unsupervised learning

4. The final output of Hierarchical clustering is-
a) The number of cluster centroids

b) The tree representing how close the data points are to each other

c) A map defining the similar data points into individual groups

d) All of the above

Answer – b) The tree representing how close the data points are to each other

5. Which of the step is not required for K-means clustering?

a) A distance metric

b) Initial number of clusters

c) Initial guess as to cluster centroids

d) None

Answer – d) None

6. Which is the following is wrong?

a) k-means clustering is a vector quantization method

b) k-means clustering tries to group n observations into k clusters

c) k-nearest neighbour is same as k-means

d) None

Answer – c) k-nearest neighbour is same as k-means

7. Which of the following metrics, do we have for finding dissimilarity between two clusters in hierarchical clustering? i. Single-link ii. Complete-link

iii. Average-link

Options:
a) 1 and 2

b) 1 and 3
c) 2 and 3

d) 1, 2 and 3

Answer – d) 1, 2 and 3

8. Which of the following are true?

i. Clustering analysis is negatively affected by multicollinearity of features ii.

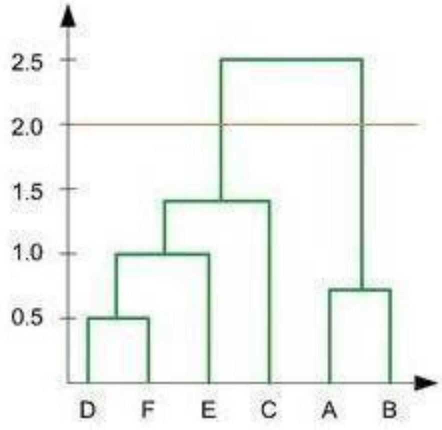
Clustering analysis is negatively affected by heteroscedasticity

Options:

a) 1 only
b) 2 only
c) 1 and 2
d) None of them

Answer – a) 1 only

9. In the figure above, if you draw a horizontal line on y-axis for y=2. What will be the number of clusters formed?



a) 2
b) 4
c) 3
d) 5

Answer – a) 2

10. For which of the following tasks might clustering be a suitable approach?

a) Given sales data from a large number of products in a supermarket, estimate future sales for each of these products.

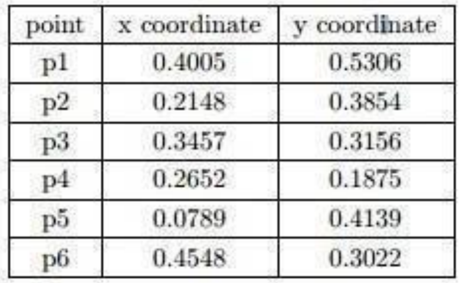
b) Given a database of information about your users, automatically group them into different market segments.

c) Predicting whether stock price of a company will increase tomorrow.

d) Given historical weather records, predict if tomorrow's weather will be sunny or rainy.

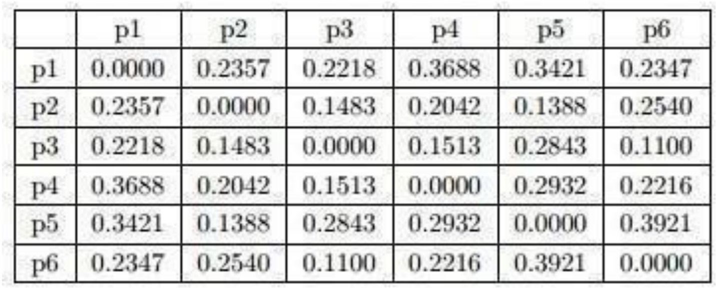
Answer – b) Given a database of information about your users, automatically group them into different market segments.

11. Given, six points with the following attributes:



point	x coordinate	y coordinate
p1	0.4005	0.5306
p2	0.2148	0.3854
p3	0.3457	0.3156
p4	0.2652	0.1875
p5	0.0789	0.4139
p6	0.4548	0.3022

Table : X-Y coordinates of six points.



	p1	p2	p3	p4	p5	p6
p1	0.0000	0.2357	0.2218	0.3688	0.3421	0.2347
p2	0.2357	0.0000	0.1483	0.2042	0.1388	0.2540
p3	0.2218	0.1483	0.0000	0.1513	0.2843	0.1100
p4	0.3688	0.2042	0.1513	0.0000	0.2932	0.2216
p5	0.3421	0.1388	0.2843	0.2932	0.0000	0.3921
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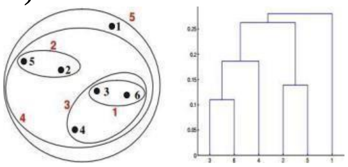
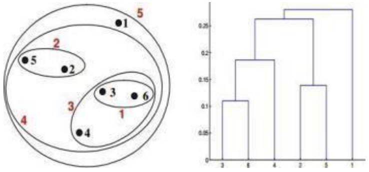
Table : Distance Matrix for Six Points

Which of the following clustering representations and dendrogram depicts the use of MIN or Single link proximity function in hierarchical clustering:

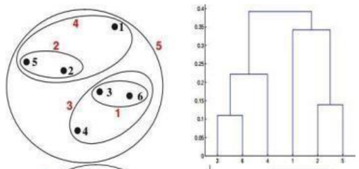
a)



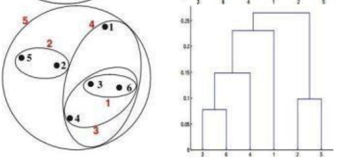
b)



c)

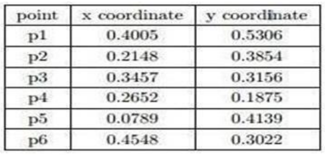


d)



Answer – **a)**

12. Given, six points with the following attributes:



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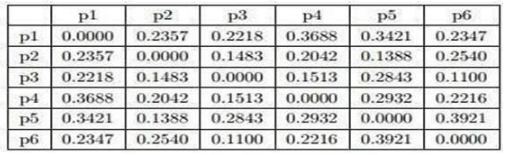

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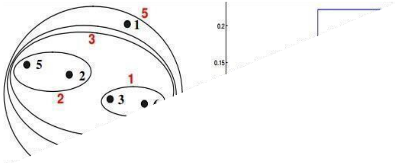
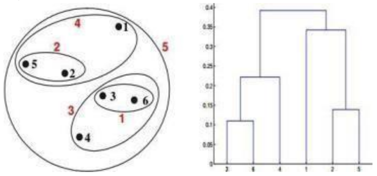
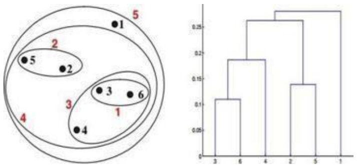
Which of the following clustering representations and dendrogram depicts the use of MAX or Complete link proximity function in hierarchical clustering. a)



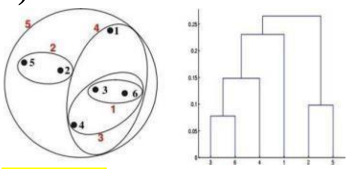
b)



c)



d)



Answer - b)

Q13 to Q14 are subjective answers type questions, Answers them in their own words briefly

13. What is the importance of clustering?

Answer –

Clustering is beneficial for exploring knowledge. If their area unit several cases and no obvious groupings, agglomeration algorithms will be accustomed realize natural groupings. agglomeration may function a helpful knowledge pre-processing step to spot homogenous teams on that to create supervised models.

Clustering or unsupervised knowledge analysis will be helpful for many functions. the foremost frequent case is for alpha analysis, once no one is aware of if the info {you area unit|you're} analyzing are characterised by alittle range of representative patterns which will be accustomed outline the dataset during a a lot of compact illustration (groups, partitions, centroids, etc.)

Discovering doable partitions is sometimes supported some variety of similarity between the info variables. doable underlined once more. And everything depends on however you outline the matter you would like to review (variable engineering) and the way you outline "these 2 things area unit a lot of similar than these alternative 2 things".

Another case is to judge the presence of outliers. IF you're certain that the info ought to show an exact set of patterns (similarity-based teams etc.) you'll check if some knowledge samples don't seem to be following those patterns, and analyses them singly to grasp why.

Clustering helps in understanding the natural grouping during a dataset. Their purpose is to create sense to partition the info into some cluster of logical groupings. agglomeration quality depends on the ways and also the identification of hidden patterns.

14. How can I improve my clustering performance?

Answer –

Improving agglomeration performance exploitation freelance element analysis and unattended feature learning. Principal element Analysis (PCA) is a crucial approach to unattended spatiality reduction technique. The central plan of PCA is to scale back the spatiality of the information set consisting of an outsized variety of variables. it's a applied mathematics technique for deciding key variables in an exceedingly high dimensional knowledge set that designate the variations within the observations and might be accustomed alter the analysis and visual image of high dimensional knowledge set.

K-means agglomeration algorithmic program will be considerably improved by employing a higher initialisation technique, and by continuance (re-starting) the algorithmic program. once the information has overlapping clusters, k-means will improve the results of the initialisation technique.

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When the information has overlapping clusters, k-means will improve the results of the initialisation technique.

When the information has well separated clusters, the performance of k-means depends fully on the goodness of the initialisation.

Initialization exploitation straightforward furthest purpose heuristic (Maximin) reduces the agglomeration error of k- means that from V-J Day to six, on average.