MACHINE LEARNING – WORKSHEET

(CLUSTERING)

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

2. On which data type, we cannot perform cluster analysis?
a. Time series data
b. Text data
c. Multimedia data
d. None

3. Netflix's movie recommendation system uses-
a. Supervised learning
b. Unsupervised learning
c. Reinforcement learning
d. All of the above

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

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

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 neighbor is same as k-means
d. None

7. Which of the following metrics, do we have for finding dissimilarity between two clusters in hierarchical clustering?

1. Single-link
2. Complete-link
3. Average-link

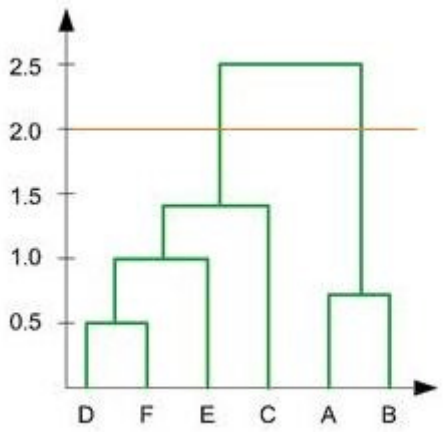
Options:
a. 1 and 2
b. 1 and 3
c. 2 and 3
d. 1, 2 and 3

8. Which of the following are true?

1. Clustering analysis is negatively affected by multicollinearity of features
2. Clustering analysis is negatively affected by heteroscedasticity

Options:
a. 1 only
b. 2 only
c. 1 and 2
d. None of them

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

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.

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

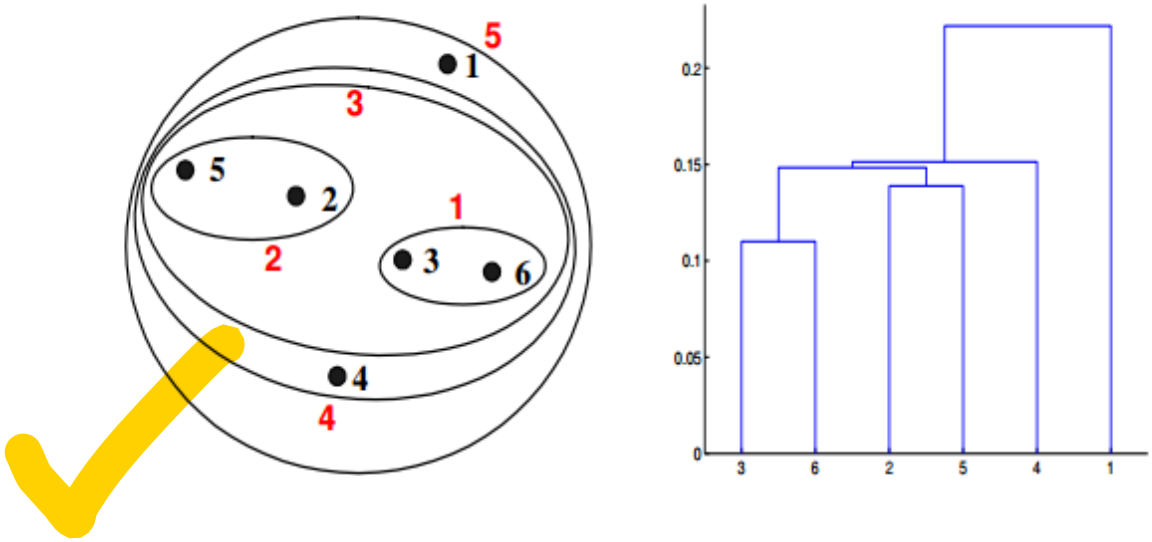
Table : X-Y coordinates of six points.

	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
p6	0.2347	0.2540	0.1100	0.2216	0.3921	0.0000

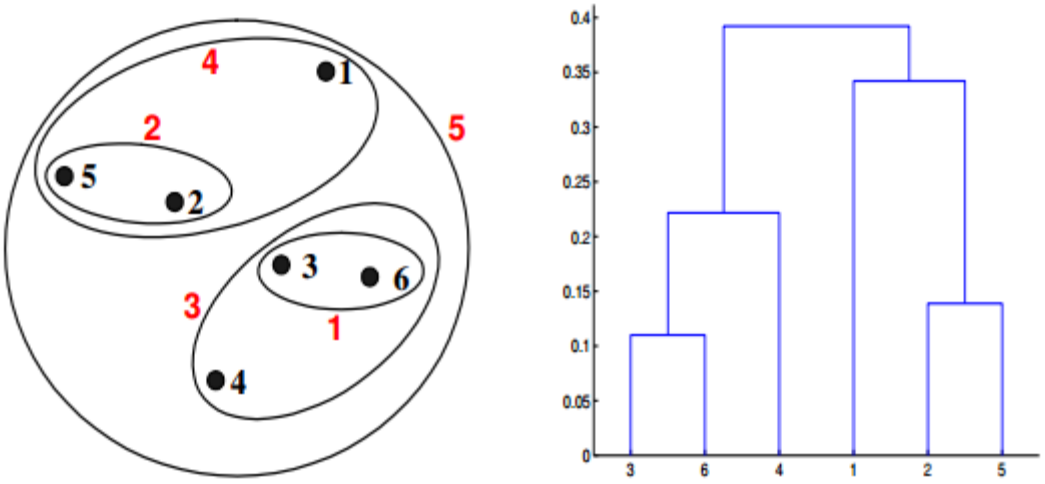
Table : Distance Matrix for Six Points

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

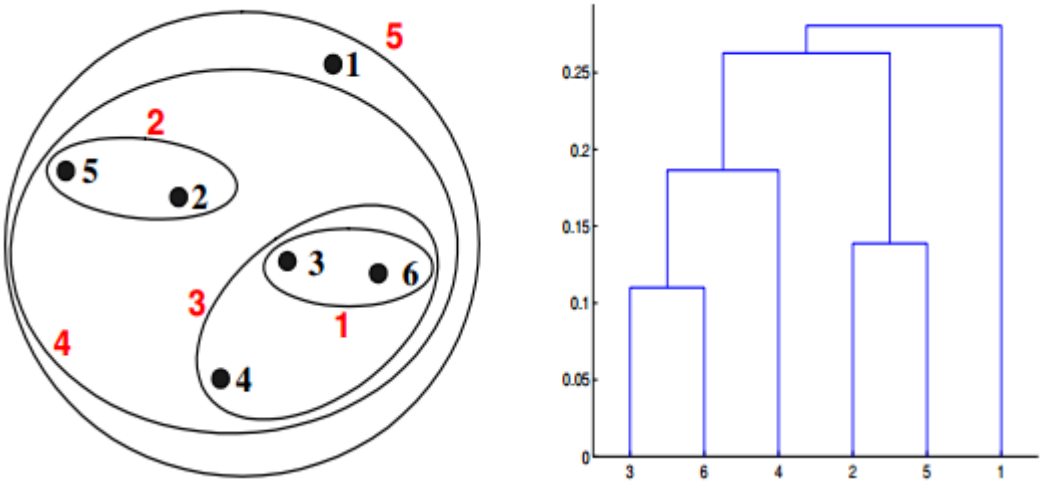
A.



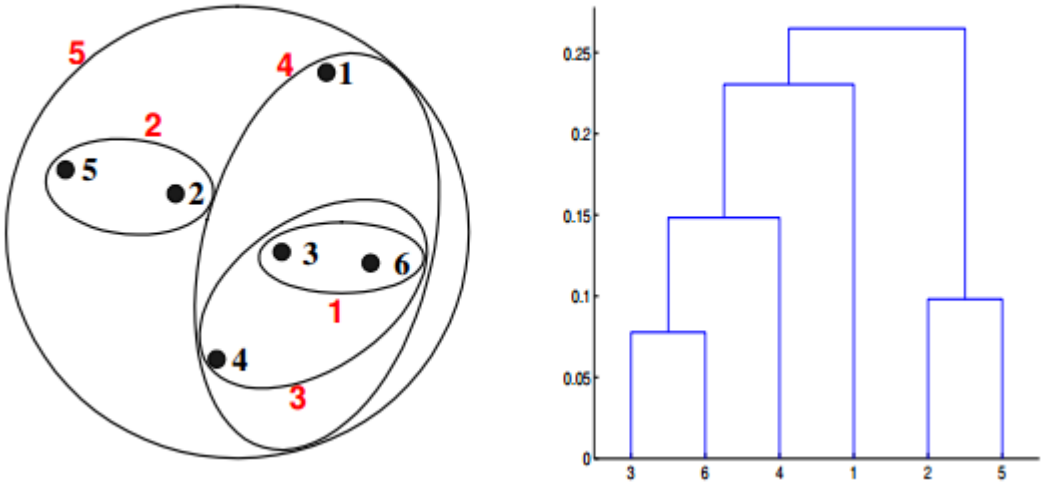
B



C.



D.



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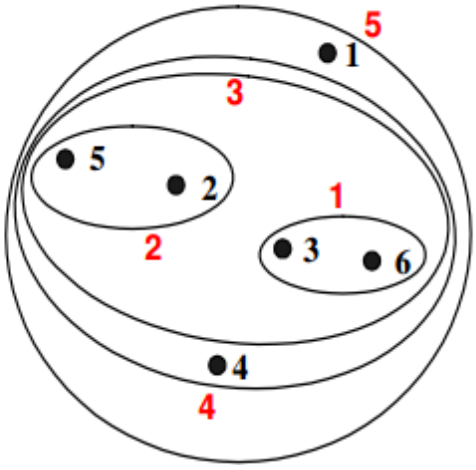
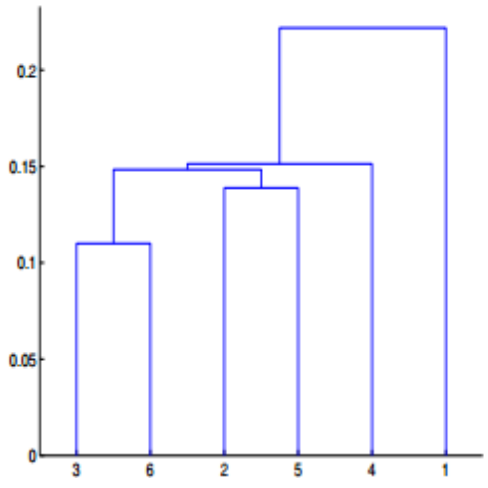
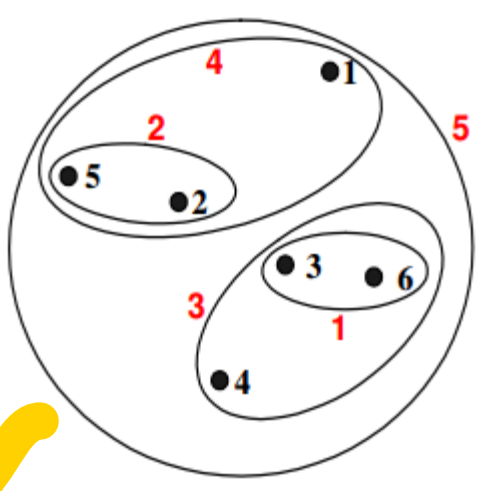
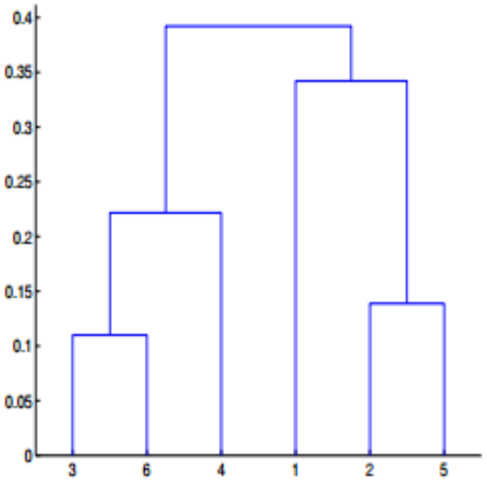




B.





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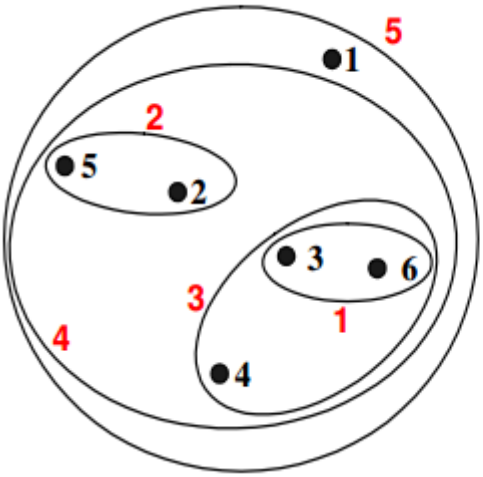
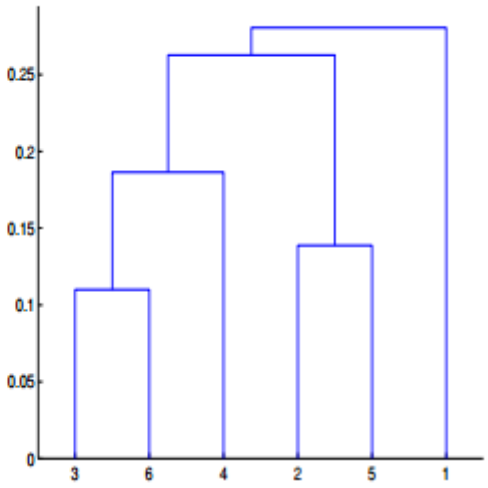
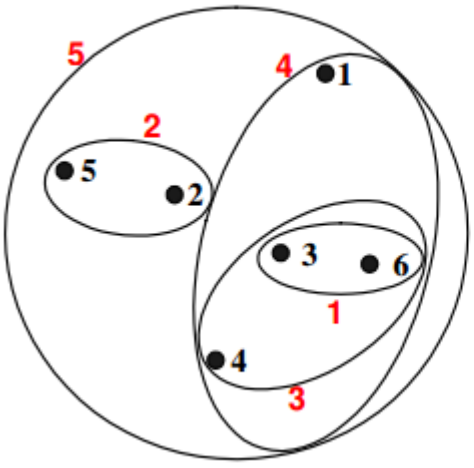
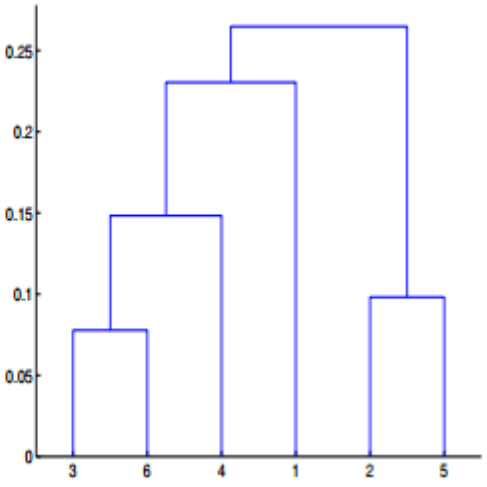




D.





Q13 to Q15 are subjective answers type questions, Answers them in their own words briefly

13. What is the importance of clustering?
14. How do you cluster a profile?
15. How can I improve my clustering performance?

13 answer: Clustering is useful for exploring data.
If there are many cases and no obvious groupings, clustering algorithms can be used to find natural groupings.
Clustering can also serve as a useful data-preprocessing step to identify homogeneous groups on which to build supervised models.

14 answer: Profiling involves generating descriptions of the clusters with reference to the input variables you used for the cluster analysis.
Profiling acts as a class descriptor for the clusters and will help you to 'tell a story' so that you can understand this information and use it across your business.

15 answer:@sid100158 - Clustering segment the data into a similar group instead of prediction , then you can build a predictive model for each group.
It helps in finding the pattern within the data.
Always be careful not to overfit your model.