#### **MACHINE LEARNING WORKSHEET 3**

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 and Unsupervised learning
- d. All of the above

#### 4. The final output of Hierarchical clustering is-

- a. The number of cluster centroids
- b. The tree represents 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. The 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?

- 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

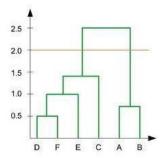
#### 8. Which of the following is true?

- i. Clustering analysis is negatively affected by the 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

## 9. In the figure above, if you draw a horizontal line on the 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. Predict whether the 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:

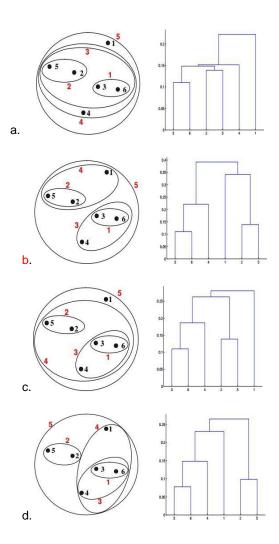
point	x coordinate	y coordinate 0.5306	
p1	0.4005		
p2	0.2148	0.3854	
p3	0.3457	0.3156 0.1875 0.4139 0.3022	
p4	0.2652		
p5	0.0789		
p6	0.4548		

Table : X-Y coordinates of six points.

	p1	p2	р3	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
р3	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
р6	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:



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

#### 13. What is the importance of clustering?

Ans. Clustering or cluster analysis is a machine learning technique, which groups the unlabelled dataset. They can cluster different customer types into one group based on different factors, such as purchasing patterns. The factors analyzed through clustering can have a big impact on sales and customer satisfaction, making it an invaluable tool to boost revenue, cut costs, or sometimes even both.

## 14. How can I improve my clustering performance?

Ans. Applying unsupervised feature learning to input data using either RICA or SFT, improves clustering performance. Surprisingly for some cases, high clustering performance can be achieved by simply performing K-means clustering on the ICA components after PCA dimension reduction on the input data.