UNIT 5: Unsupervised_Clustering_Reinforcement

1. "Reinforcement learning maps states or situations to actions in order to maximise some numerical reward". Justify this statement with appropriate examples of your choice.
2. Explain Reinforcement Learning Cycle with suitable examples.
3. What is reinforcement learning?Explain with suitable examples.
4. Write and explain the k-means clustering algorithm. What are the four distance measures used by the classic k-means algorithm?
5. Write a note on Markov Decision Process.
6. Write and explain the SOM Algorithm. Explain with proper example why does it fall under the category of *'competitive learning'* algorithms?
7. Explain the Reinforcement Learning in Detail.
8. Cluster the dataset = { 2,3,4,10,11,12, 20, 25,30 } using k-means algorithm. We need to group into two clusters. Assume the initial centroids as 2 and 12.
9. Cluster the following eight data points A1(2,10), A2(2,5), A3(8,4), A4(5,8), A5(7,5), A6(6,4), A7(1,2), A8(4,9). Use k-means clustering with k = 3. Initial centroids are the data points A1, A4 and A7.
10. Explain the following terms with appropriate examples:
    (i) Hierarchical Clustering
    (ii) Mixture Densities
11. Compare and Contrast K-Means and Hierarchical Clustering.
12. State and explain the Self-Organizing Feature Map with necessary illustrations.
13. Write *'Q – learning algorithm'* for deterministic rewards and functions.
14. What is *Q learning*? Derive an equation for *Q function.*
15. What is the criteria for choosing the number of clusters? Explain.
16. Answer the following:
    (i) How do you choose the value of 'k' in k-means algorithm?
    (ii) What are the stopping criterion of k-means algorithm.
17. List and briefly explain a few applications of the Expectation Maximisation Algorithm.
18. What are the two distinctive steps of the Expectation Maximisation Algorithm? Briefly explain how it this algorithm fits into the Gaussian Mixture Model.