**QUESTION BANK**

1. Define machine learning and explain its significance in artificial intelligence.
2. How does machine learning differ from traditional programming?
3. Discuss the key components of a machine learning system.
4. What is the role of data preprocessing in developing a machine learning model?
5. Identify and explain common challenges in machine learning, such as overfitting and bias.
6. Differentiate between supervised, unsupervised, and reinforcement learning.
7. Provide examples of real-world applications for each type of machine learning.
8. Explain the concept of bias in machine learning algorithms and propose methods to mitigate it.
9. Discuss the significance of feature selection mechanisms in machine learning.
10. What are the challenges associated with imbalanced data, and how can they be addressed?
11. Define dimensionality reduction in the context of unsupervised learning.
12. Compare K-Means clustering and hierarchical clustering, highlighting their strengths and weaknesses.
13. Explain the steps involved in the K-Means clustering algorithm.
14. Introduce the Fuzzy C-Means clustering algorithm and its key differences from K-Means.
15. Define the EM (Expectation-Maximization) algorithm and its applications in clustering.
16. Provide an overview of reinforcement learning and its distinctions from supervised and unsupervised learning.
17. Compare model-based and model-free reinforcement learning approaches.
18. Explain the Bellman equation and its role in reinforcement learning.
19. Define Markov Decision Process (MDP) and discuss its components.
20. Introduce Q learning as a model-free reinforcement learning algorithm.
21. Explain the concept of value function approximation in reinforcement learning.
22. Define Temporal Difference (TD) learning and its significance.
23. Explain the role of neural networks in reinforcement learning.
24. Define Deep Q Network (DQN) and its integration with reinforcement learning.
25. Provide examples of applications where reinforcement learning, especially using DQN, has shown success.
26. Choose one specific application of machine learning and explain its real-world implementation.
27. Discuss challenges and potential future developments in the field of reinforcement learning.
28. Provide examples of scenarios where dimensionality reduction is particularly useful.
29. Explain the significance of feature selection mechanisms in the context of imbalanced data.
30. Discuss the role of association analysis in handling large databases and its practical applications.