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| **Prepared By: Dr. Khushboo Jain**  **Moderated By:**  **Year : 2024** | https://s3.amazonaws.com/upes-prod/media/7026/upes-logo.png |
| **QUESTION BANK**  **Subject Name: Elements of AIML Semester : III**  **Course Code: CSAI2015 Programme Name: B.Tech (CSE)+BCA** | |

**Unit-4**

**MCQ Type Questions**

**1 Marks each**

1. **Which of the following is NOT a type of machine learning?**
   * 1. Supervised learning
     2. Unsupervised learning
     3. Reinforcement learning
     4. Encrypted learning
2. **Supervised learning involves:**
   * 1. Training with labeled data
     2. Training with unlabeled data
     3. No training
     4. Data collected from sensors
3. **In which type of machine learning is the output known during training?**
   * 1. Unsupervised learning
     2. Supervised learning
     3. Reinforcement learning
     4. None of the above
4. **Classification is a type of:**
   * 1. Unsupervised learning
     2. Supervised learning
     3. Reinforcement learning
     4. Semi-supervised learning
5. **Which of the following is an example of regression?**
   * 1. Predicting the weather
     2. Classifying emails as spam
     3. Grouping customers by behavior
     4. Detecting an anomaly in a network
6. **Unsupervised learning focuses on:**
   * 1. Predicting future values
     2. Discovering hidden patterns
     3. Reinforcing positive behavior
     4. Labeling data
7. **Which of the following is an unsupervised learning algorithm?**
   * 1. Linear regression
     2. K-means clustering
     3. Decision tree
     4. Logistic regression
8. **In reinforcement learning, the agent learns by:**
   * 1. Imitating supervised examples
     2. Receiving rewards or penalties
     3. Clustering data points
     4. None of the above
9. **Which type of problem is addressed by classification?**
   * 1. Predicting continuous values
     2. Predicting categories
     3. Grouping data without labels
     4. Optimizing decision-making
10. **Which is an example of classification?**
    * 1. Predicting stock prices
      2. Predicting whether an email is spam or not
      3. Predicting house prices
      4. Grouping similar products
11. **Which of the following is a regression algorithm?**
    * 1. K-means
      2. Decision tree
      3. Linear regression
      4. Naive Bayes
12. **Clustering is a common technique in:**
    * 1. Supervised learning
      2. Unsupervised learning
      3. Reinforcement learning
      4. None of the above
13. **Which is a popular clustering algorithm?**
    * 1. Logistic regression
      2. K-means
      3. Decision tree
      4. Support Vector Machine (SVM)
14. **Semi-supervised learning is a combination of:**
    * 1. Supervised and unsupervised learning
      2. Supervised and reinforcement learning
      3. Reinforcement and unsupervised learning
      4. None of the above
15. **Which of the following is an example of unsupervised learning?**
    * 1. Email filtering
      2. Customer segmentation
      3. House price prediction
      4. Sentiment analysis
16. **The primary goal of reinforcement learning is to:**
    * 1. Predict categories
      2. Maximize cumulative rewards
      3. Cluster unlabeled data
      4. Predict continuous values
17. **A support vector machine (SVM) is primarily used for:**
    * 1. Clustering
      2. Regression
      3. Classification
      4. Reinforcement
18. **Which type of learning uses both labeled and unlabeled data?**
    * 1. Supervised learning
      2. Unsupervised learning
      3. Semi-supervised learning
      4. Reinforcement learning
19. **Which of the following methods is used in reinforcement learning?**
    * 1. Decision tree
      2. Q-learning
      3. K-means clustering
      4. Linear regression
20. **The primary output of regression is:**
    * 1. A label
      2. A category
      3. A continuous value
      4. A reward
21. **Which of the following is an example of reinforcement learning?**
    * 1. Game AI learning to play chess
      2. Predicting customer churn
      3. Grouping customers into segments
      4. Labeling images
22. **Which of the following is a supervised learning task?**
    * 1. Spam detection
      2. Customer segmentation
      3. Finding anomalies in data
      4. Reinforcement learning in robotics
23. **Decision trees can be used for:**
    * 1. Classification
      2. Regression
      3. Both classification and regression
      4. Clustering
24. **Anomaly detection is commonly done using:**
    * 1. Supervised learning
      2. Unsupervised learning
      3. Semi-supervised learning
      4. Reinforcement learning
25. **Which of the following is NOT an unsupervised learning technique?**
    * 1. K-means
      2. Hierarchical clustering
      3. Random forests
      4. DBSCAN
26. **Which of the following is used for continuous value prediction?**
    * 1. Clustering
      2. Classification
      3. Regression
      4. Reinforcement
27. **Which of the following is an application of reinforcement learning?**
    * 1. Grouping customers into segments
      2. A robot learning to walk
      3. Predicting stock prices
      4. Spam detection
28. **What is the main feature of unsupervised learning?**
    * 1. Labeled data
      2. Unlabeled data
      3. Combination of labeled and unlabeled data
      4. None of the above
29. **Which type of machine learning deals with feedback?**
    * 1. Supervised learning
      2. Unsupervised learning
      3. Reinforcement learning
      4. Semi-supervised learning
30. **In semi-supervised learning, what is the proportion of labeled data?**
    * 1. 0%
      2. 100%
      3. Small percentage
      4. Equal percentage
31. **The goal of clustering is to:**
    * 1. Label data
      2. Group similar data points
      3. Predict continuous values
      4. Maximize rewards
32. **Which algorithm is used for classification?**
    * 1. K-means
      2. Logistic regression
      3. Q-learning
      4. Hierarchical clustering
33. **The learning agent in reinforcement learning learns by:**
    * 1. Observing data only
      2. Receiving feedback in the form of rewards or penalties
      3. Discovering hidden patterns
      4. Using a combination of labeled and unlabeled data
34. **Linear regression predicts:**
    * 1. Categorical values
      2. Continuous values
      3. Clusters
      4. Rewards
35. **K-means is primarily used for:**
    * 1. Regression
      2. Classification
      3. Clustering
      4. Reinforcement
36. **In which learning method does the agent interact with the environment?**
    * 1. Supervised learning
      2. Unsupervised learning
      3. Reinforcement learning
      4. Semi-supervised learning
37. **Hierarchical clustering is an example of:**
    * 1. Supervised learning
      2. Unsupervised learning
      3. Reinforcement learning
      4. Semi-supervised learning
38. **Which of the following is NOT an application of machine learning?**
    * 1. Spam detection
      2. Predicting house prices
      3. Creating web pages
      4. Image classification
39. **Which algorithm is commonly used in supervised learning?**
    * 1. K-means
      2. Logistic regression
      3. DBSCAN
      4. Hierarchical clustering
40. **Q-learning is used in:**
    * 1. Supervised learning
      2. Unsupervised learning
      3. Reinforcement learning
      4. Semi-supervised learning
41. **Which of the following is a clustering technique?**
    * 1. Linear regression
      2. K-means
      3. Support Vector Machine (SVM)
      4. Decision tree
42. **A key characteristic of supervised learning is:**
    * 1. No training required
      2. Training with labeled data
      3. Training with unlabeled data
      4. Trial and error learning
43. **Which of the following is an example of semi-supervised learning?**
    * 1. Predicting future sales using historical data
      2. Identifying fraudulent transactions with few labeled examples
      3. Grouping documents by topic
      4. A robot learning to navigate a maze
44. **Which learning method is best for detecting patterns without prior labels?**
    * 1. Supervised learning
      2. Unsupervised learning
      3. Reinforcement learning
      4. Semi-supervised learning
45. **Predicting whether a student will pass or fail based on their grades is an example of:**
    * 1. Regression
      2. Clustering
      3. Classification
      4. Reinforcement
46. **An agent in reinforcement learning is trying to:**
    * 1. Group data into clusters
      2. Find the best strategy by trial and error
      3. Predict a label for each input
      4. Discover hidden patterns
47. **Which method deals with labeled data for training?**
    * 1. Supervised learning
      2. Unsupervised learning
      3. Reinforcement learning
      4. Semi-supervised learning
48. **Clustering is typically used to:**
    * 1. Predict future outcomes
      2. Group similar data points
      3. Label unknown data
      4. None of the above
49. **Which is a primary goal of supervised learning?**
    * 1. Discovering hidden patterns
      2. Making predictions using labeled data
      3. Maximizing rewards
      4. None of the above
50. **A self-driving car is an example of which type of learning?**
    * 1. Supervised learning
      2. Unsupervised learning
      3. Reinforcement learning
      4. Semi-supervised learning

**Answers:**

1. d
2. a
3. b
4. b
5. a
6. b
7. b
8. b
9. b
10. b
11. c
12. b
13. b
14. a
15. b
16. b
17. c
18. c
19. b
20. c
21. a
22. a
23. c
24. b
25. c
26. c
27. b
28. b
29. c
30. c
31. b
32. b
33. b
34. b
35. c
36. c
37. b
38. c
39. b
40. c
41. b
42. b
43. b
44. b
45. c
46. b
47. a
48. b
49. b
50. c

**Descriptive Type Questions**

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| S. NO | Question | Marks | CO |
| 51 | Define supervised learning. How does it differ from unsupervised learning? | 5 | CO 1, CO 3 |
| 52 | What is the goal of regression in supervised learning? | 5 | CO 3 |
| 53 | Briefly explain the concept of classification in machine learning. | 5 | CO 1, CO 3 |
| 54 | What is clustering in unsupervised learning? | 5 | CO 3 |
| 55 | Explain the key concept behind reinforcement learning. | 5 | CO 1, CO 3 |
| 56 | What are the advantages of using semi-supervised learning? | 5 | CO 3 |
| 57 | Distinguish between linear regression and logistic regression. | 5 | CO 1, CO 3 |
| 58 | What is meant by 'labeled data' in supervised learning? | 5 | CO 1, CO 3 |
| 59 | Provide a real-world example of classification in supervised learning. | 5 | CO 4 |
| 60 | Briefly explain the role of rewards in reinforcement learning. | 5 | CO 1, CO 3 |
| 61 | Explain the different types of regression techniques used in machine learning. | 10 | CO 3 |
| 62 | Discuss the differences between supervised, unsupervised, and reinforcement learning. | 10 | CO 1, CO 3 |
| 63 | Describe the steps involved in implementing a classification algorithm. | 10 | CO 3, CO 4 |
| 64 | Explain the K-means clustering algorithm with an example. | 10 | CO 3 |
| 65 | Discuss the importance of exploration and exploitation in reinforcement learning. | 10 | CO 3, CO 4 |
| 66 | Compare and contrast regression and classification in supervised learning. | 10 | CO 3 |
| 67 | How does semi-supervised learning work? Provide a suitable example. | 10 | CO 3 |
| 68 | Explain the significance of clustering techniques in machine learning applications. | 10 | CO 3, CO 4 |
| 69 | Discuss the challenges faced in reinforcement learning applications. | 10 | CO 2, CO 4 |
| 70 | Describe the process of training a supervised learning model with labeled data. | 10 | CO 3, CO 4 |
| 71 | Explain in detail the types of regression techniques and their applications. | 15 | CO 3 |
| 72 | Discuss various classification algorithms in machine learning, such as Decision Trees, Support Vector Machines, and K-Nearest Neighbors. | 15 | CO 3, CO 4 |
| 73 | How do clustering techniques like K-means and Hierarchical clustering work? Provide examples. | 15 | CO 3, CO 4 |
| 74 | Explain the process of reinforcement learning in detail, focusing on the reward system, policy learning, and value functions. | 15 | CO 3 |
| 75 | Discuss the advantages and limitations of semi-supervised learning, providing examples of its applications. | 15 | CO 3 |
| 76 | Compare and contrast supervised learning, unsupervised learning, and reinforcement learning in terms of their methodologies and applications. | 15 | CO 1, CO 3, CO 4 |
| 77 | Discuss how clustering is applied in real-world scenarios such as customer segmentation and image analysis. | 15 | CO 4 |
| 78 | Explain how regression techniques like linear and polynomial regression are used for predictive modeling. | 15 | CO 3, CO 4 |
| 79 | Discuss the key components and workflow of a reinforcement learning model using a real-world example. | 15 | CO 4 |
| 80 | Explain the process of building and evaluating a machine learning model for classification. | 15 | CO 3, CO 4 |
| 81 | Discuss in detail the types of supervised learning techniques: regression and classification, with examples of algorithms and real-world applications. | 20 | CO 3, CO 4 |
| 82 | Explain how unsupervised learning techniques, particularly clustering, are used to discover patterns in data. | 20 | CO 3, CO 4 |
| 83 | Provide a detailed overview of reinforcement learning, including concepts such as the agent, environment, rewards, actions, and policies, with a real-world example. | 20 | CO 3, CO 4 |
| 84 | Compare regression, classification, and clustering techniques, explaining their differences, methodologies, and applications in machine learning. | 20 | CO 1, CO 3, CO 4 |
| 85 | Discuss the full lifecycle of a machine learning project, starting from data preprocessing to the deployment of a supervised learning model (including regression and classification). | 20 | CO 4 |
| 86 | Explain the different types of regression, including linear, polynomial, and ridge regression, providing mathematical explanations and real-world applications. | 20 | CO 3, CO 4 |
| 87 | Discuss the detailed architecture of reinforcement learning models, including Q-learning and Deep Q Networks (DQN), and their applications in robotics or gaming. | 20 | CO 4 |
| 88 | Describe the key challenges in unsupervised learning and explain how clustering algorithms like K-means and DBSCAN address these challenges. | 20 | CO 3, CO 4 |
| 89 | Explain in detail how semi-supervised learning is used in real-world scenarios, such as image recognition or natural language processing, and discuss the advantages and challenges it presents. | 20 | CO 3, CO 4 |
| 90 | Discuss the concepts of bias and variance in supervised learning, how they impact the performance of machine learning models, and techniques to reduce them, such as regularization and cross-validation. | 20 | CO 3, CO 4 |

**Project ideas in machine learning (datasets taken from Kaggle):**

**1. House Price Prediction**

* **Project Idea:** Build a regression model to predict house prices based on various features like location, size, number of rooms, etc.
* **ML Technique:** Supervised Learning (Regression)
* **Dataset:** House Prices: Advanced Regression Techniques

**2. Titanic Survival Prediction**

* **Project Idea:** Predict whether a passenger survived the Titanic disaster based on passenger data such as age, sex, and ticket class.
* **ML Technique:** Supervised Learning (Classification)
* **Dataset:** Titanic: Machine Learning from Disaster

**3. Customer Segmentation for E-commerce**

* **Project Idea:** Use clustering techniques to segment customers based on their purchasing behavior, which can help with targeted marketing.
* **ML Technique:** Unsupervised Learning (Clustering)
* **Dataset:** Online Retail Dataset

**4. Movie Recommendation System**

* **Project Idea:** Build a system that recommends movies based on a user's viewing history using collaborative filtering techniques.
* **ML Technique:** Unsupervised Learning (Clustering, Collaborative Filtering)
* **Dataset:** MovieLens Dataset

**5. Iris Flower Classification**

* **Project Idea:** Classify different types of Iris flowers based on sepal and petal measurements using classification techniques.
* **ML Technique:** Supervised Learning (Classification)
* **Dataset:** Iris Species

**6. Predict Diabetes Outcome**

* **Project Idea:** Develop a model to predict whether a person has diabetes based on health features like blood pressure, BMI, and glucose levels.
* **ML Technique:** Supervised Learning (Classification)
* **Dataset:** Pima Indians Diabetes Database

**7. Customer Churn Prediction**

* **Project Idea:** Predict whether a customer will stop using a company's services based on usage data, account age, and other factors.
* **ML Technique:** Supervised Learning (Classification)
* **Dataset:** Telco Customer Churn

**8. Credit Card Fraud Detection**

* **Project Idea:** Build a classification model to detect fraudulent transactions in a credit card dataset.
* **ML Technique:** Supervised Learning (Classification)
* **Dataset:** Credit Card Fraud Detection

**9. Handwritten Digit Recognition**

* **Project Idea:** Create a model that can recognize handwritten digits (0–9) using the MNIST dataset.
* **ML Technique:** Supervised Learning (Classification)
* **Dataset:** Digit Recognizer (MNIST)

**10. Stock Price Prediction**

* **Project Idea:** Develop a time series model to predict future stock prices based on historical price and trading volume data.
* **ML Technique:** Supervised Learning (Regression)
* **Dataset:** Historical Stock Prices