

Enrollment No.....



Faculty of Engineering  
End Sem Examination Dec-2023  
CA5EL52 Machine Learning

Programme: MCA / BCA- Branch/Specialisation: Computer  
MCA (Integrated) Application

**Duration: 3 Hrs.****Maximum Marks: 60**

Note: All questions are compulsory. Internal choices, if any, are indicated. Answers of Q.1 (MCQs) should be written in full instead of only a, b, c or d. Assume suitable data if necessary. Notations and symbols have their usual meaning.

- Q.1 i. Among the following option identify the one which is not a type of learning? **1**
- (a) Semi unsupervised learning (b) Supervised learning  
(c) Reinforcement learning (d) Unsupervised learning
- ii. What is the difference between AI and ML? **1**
- (a) AI is a broader field that encompasses ML and other subfields  
(b) AI is a subset of ML that focuses on creating intelligent agents  
(c) AI and ML are synonymous terms that refer to the same field  
(d) AI and ML are unrelated fields that have different goals and applications
- iii. What is the cost function used in linear regression? **1**
- (a) Cross entropy (b) Mean squared error  
(c) Hinge loss (d) Kullback-Leibler divergence
- iv. What is the name of the algorithm that can be used to find the optimal weights for linear regression? **1**
- (a) K-means clustering (b) Newton's method  
(c) Gradient descent (d) Genetic algorithm
- v. What is the name of the algorithm that can be used to find frequent itemsets in a large dataset? **1**
- (a) K-means (b) PCA (c) AdaBoost (d) Apriori
- vi. What is the name of the technique that can be used to find the optimal number of clusters in a dataset? **1**
- (a) Silhouette analysis (b) Elbow method  
(c) Gap statistic (d) All of these

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- vii. What is the name of the ensemble method that combines multiple weak classifiers into a strong classifier? **1**  
 (a) Bagging (b) Boosting (c) Stacking (d) Voting
- viii. What is the name of the algorithm that can be used to implement bagging? **1**  
 (a) Random forest (b) AdaBoost  
 (c) Gradient boosting (d) XGBoost
- ix. What is the name of the basic building block of a neural network? **1**  
 (a) Neuron (b) Node (c) Perceptron (d) All of these
- x. What is the name of the function that can be used to activate or deactivate a neuron? **1**  
 (a) Activation function (b) Transfer function  
 (c) Threshold function (d) All of these
- Q.2 i. List and briefly define the two main types of machine learning algorithms. **2**  
 ii. Explain the process of building a supervised machine learning model from data, step by step. Provide a detailed description of each stage and its significance in the model-building process. **8**
- OR iii. Explain the key difference between supervised and unsupervised learning. Provide one real-world example for each. **8**
- Q.3 i. Discuss the fundamental differences between linear regression and logistic regression. **3**  
 ii. Explain how decision trees are used in supervised learning for both classification and regression tasks. Provide an example of a real-world application where decision trees are commonly employed. **7**
- OR iii. Introduce the concept of Support Vector Machines (SVM) in supervised learning. Describe the primary objective of SVM and discuss an application where SVM is particularly effective. **7**
- Q.4 i. Explain the fundamental differences between K-means clustering and hierarchical clustering. **3**  
 ii. Define the Apriori algorithm for association analysis. How does it work? What are the key measures used to identify significant associations between items in a dataset? **7**
- OR iii. Introduce the concept of reinforcement learning in unsupervised learning. Discuss the primary goal of reinforcement learning and

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- provide an example of a real-world application where reinforcement learning is commonly used.
- Q.5 i. Explain the importance of evaluating machine learning algorithms and the role of model selection in this process. **4**  
 ii. Differentiate between bagging and boosting as ensemble methods. Provide a practical example where bagging and boosting are commonly employed. Explain why each method is effective in the given scenario. **6**
- OR iii. Explain the AdaBoost algorithm and its main principles. Describe how AdaBoost combines multiple weak learners to create a strong classifier. **6**
- Q.6 Attempt any two:  
 i. Explain the fundamental concept of a neural network and its relevance in the field of deep learning. **5**  
 ii. Define a perceptron and how it serves as a basic building block in feedforward neural networks. Explain the feedforward process and its role in making predictions using a neural network. **5**  
 iii. Introduce Convolutional Neural Networks (CNNs) and explain their significance in image and pattern recognition. **5**

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## Marking Scheme

### CA5EL52 (T)-Machine Learning (T)

- Q.1 i) Among the following option identify the one which is not a type of learning? **1**  
 a) **Semi unsupervised learning**
- ii) What is the difference between AI and ML? **1**  
 a) **AI is a broader field that encompasses ML and other subfields**
- iii) What is the cost function used in linear regression? **1**  
 b) **Mean squared error**
- iv) What is the name of the algorithm that can be used to find the optimal weights for linear regression? **1**  
 c) **Gradient descent**
- v) What is the name of the algorithm that can be used to find frequent itemsets in a large dataset? **1**  
 d) **Apriori**
- vi) What is the name of the technique that can be used to find the optimal number of clusters in a dataset? **1**  
 d) **elbow method**
- vii) What is the name of the ensemble method that combines multiple weak classifiers into a strong classifier? **1**  
 b) **Boosting**
- viii) What is the name of the algorithm that can be used to implement bagging? **1**  
 a) **Random Forest**
- ix) What is the name of the basic building block of a neural network? **1**  
 d) **All of the above**
- x) What is the name of the function that can be used to activate or deactivate a neuron? **1**  
 a) **Activation function**
- Q.2 i. List and briefly define the two main types of Machine Learning algorithms.? **2**  
 type of ML Algorithms. **One Marks** for each
- ii. Explain the process of building a supervised machine learning model from data, step by step. Provide a detailed description of each stage and its significance in the model-building process. **8**

#### Marks Scheme

- Problem Definition 1 Mark  
 Data Collection 1 Mark  
 Data Preprocessing 1 Mark  
 Data Splitting 1 Mark  
 Model Selection 1 Mark  
 Model Training 1 Mark  
 Model Evaluation 1 Mark  
 Conclusion and Model Deployment 1 Mark

- OR iii. Explain the key difference between supervised and unsupervised learning. Provide one real-world example for each.? **8**

#### Marking:

for correctly explaining the difference between supervised and unsupervised learning. **2 Marks**

for providing a real-world example of supervised learning. **2 Marks**

for providing a real-world example of unsupervised learning. **2 Marks**

for clarity and accuracy in the responses. **2 Marks**

- Q.3 i. Discuss the fundamental differences between linear regression and logistic regression. **3**
- ii. Explain how decision trees are used in supervised learning for both classification and regression tasks. Provide an example of a real-world application where decision trees are commonly employed? **7**

explaining how decision trees are used in supervised learning. **3 Marks**

providing a real-world application and its relevance **4 Marks.**

- OR iii. Introduce the concept of Support Vector Machines (SVM) in supervised learning. Describe the primary objective of SVM and discuss an application where SVM is particularly effective? **7**

Introduction to Support Vector Machines (SVM) - **3 Marks**

Explaining the primary objective of SVM and providing an application example where SVM excels - **4 Marks**

- Q.4 i. Explain the fundamental differences between K-means clustering and hierarchical clustering? **3**

3 Marks

- ii. Define the Apriori algorithm for association analysis. How does it **7**

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work, and what are the key measures used to identify significant associations between items in a dataset?

Defining the Apriori algorithm 3 Marks.  
Explaining how it works and mentioning key measures used for identifying significant associations 4 Marks.

OR iii. Introduce the concept of reinforcement learning in unsupervised learning. Discuss the primary goal of reinforcement learning and provide an example of a real-world application where reinforcement learning is commonly used? 7

Introducing reinforcement learning and explaining its primary goal. 3 Marks  
Providing a real-world application example and its relevance to reinforcement learning. 4 Marks

Q.5 i. Explain the importance of evaluating machine learning algorithms and the role of model selection in this process. 4

Explaining the importance of evaluating machine learning algorithms 2 Marks  
For explaining role of model selection. 2 Marks

ii. Differentiate between Bagging and Boosting as ensemble methods. Provide a practical example where Bagging and Boosting are commonly employed and explain why each method is effective in the given scenario. 6

Accurately differentiating between Bagging and Boosting. 2 Marks

Providing a real-world example (2 Marks)  
explaining the effectiveness of Bagging and Boosting in that scenario. (2 Marks)

OR iii. Explain the AdaBoost algorithm and its main principles. Describe how AdaBoost combines multiple weak learners to create a strong classifier. 6

Explaining the AdaBoost algorithm and its main principles. (2 Marks),  
Describing how AdaBoost combines multiple weak learners and providing a real-world example. (4 Marks)

Q.6 i. Attempt any two:  
Explain the fundamental concept of a neural network and its relevance in the field of deep learning. 5

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Explaining the concept of a neural network (2 Marks)  
Its relevance in deep learning. (3 Marks)

ii. Define a perceptron and how it serves as a basic building block in feedforward neural networks. Explain the feedforward process and its role in making predictions using a neural network. 5

Defining a perceptron and its role in feedforward neural networks. (2 Marks)

Explaining the feedforward process and its significance in making predictions with neural networks. (3 Marks)

iii. Introduce Convolutional Neural Networks (CNNs) and explain their significance in image and pattern recognition? 5

Introducing CNNs (2 Marks),  
Explaining their importance in image and pattern recognition. (3 Marks)

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