Knowledge Test

Time: 2 hrs Marks: 50

Section A: Artificial Intelligence (10 Marks)

1. Definition and Historical Context (2 Marks)
2. Define Artificial Intelligence. (1 Mark)
3. Briefly describe the historical context of AI from the 1950s to the 1980s. (1 Mark)
4. Milestones in AI Development (2 Marks)
5. List two significant milestones in AI development and explain their importance. (2 Marks)
6. Applications of AI (2 Marks)
7. Describe two different applications of AI in different industries. (2 Marks)
8. Types of AI (4 Marks)
9. Differentiate between Narrow AI and General AI with examples. (2 Marks)
10. Explain the concept of Superintelligent AI and its current status. (2 Marks)

Section B: Machine Learning (20 Marks)

1. Introduction to Machine Learning (3 Marks)
2. Define Machine Learning and explain its basic principles. (3 Marks)
3. Types of Machine Learning (3 Marks)
4. Differentiate between Supervised Learning, Unsupervised Learning, and Reinforcement Learning with examples. (3 Marks)
5. Machine Learning Workflow (2 Marks)
6. Outline the typical workflow of a machine learning project. (2 Marks)
7. Deep Learning and Neural Networks (4 Marks)
8. Explain the basic structure and functioning of artificial neurons. (2 Marks)
9. Describe the concept of a loss function in neural networks. (2 Marks)
10. Feature Engineering and Representation Learning (2 Marks)
11. Define feature engineering and representation learning. (2 Marks)
12. Training and Testing Data (3 Marks)
13. Explain the concepts of training data, testing data, overfitting, and generalization in machine learning. (3 Marks)
14. Machine Learning Algorithms (3 Marks)
15. Choose one of the following and explain its working: Linear Regression, Logistic Regression, or Decision Trees. (3 Marks)

Section C: Model Evaluation and Hyperparameter Tuning (10 Marks)

1. Model Evaluation Techniques (5 Marks)
2. Explain the concept of a confusion matrix and its interpretation. (2 Marks)
3. Describe K-fold cross-validation and stratified cross-validation techniques. (3 Marks)
4. Model Selection and Hyperparameter Tuning (3 Marks)
5. What is hyperparameter tuning, and why is it important? (2 Marks)
6. Give an example of a method used for hyperparameter tuning. (1 Mark)
7. Implementation and Hands-on (2 Marks)

8. Outline the steps for implementing a simple machine learning algorithm using any programming language or framework. (2 Marks)

Section D: Deep Learning (10 Marks)

1. Introduction to Deep Learning (2 Marks)
2. Highlight key differences between traditional machine learning and deep learning. (2 Marks)
3. Artificial Neural Networks (ANNs) (3 Marks)
4. Describe the structure of neural networks. (2 Marks)
5. Explain the role of weights and biases in forward propagation. (1 Mark)
6. Backpropagation and Optimization Algorithms (3 Marks)
7. Explain the process of backpropagation in neural networks. (2 Marks)
8. Mention one optimization algorithm used in training neural networks and describe its significance. (1 Mark)
9. Convolutional Neural Networks (CNNs) (2 Marks)
10. Describe the function of convolutional layers in CNNs. (1 Mark)
11. Provide one application of CNNs in computer vision. (1 Mark)