UNIT I

Two Marks – Part A

1. What is Deep Learning?
2. What are the main differences between AI, Machine Learning, and Deep Learning? AI stands
3. Differentiate supervised and unsupervised deep learning procedures.
4. What are the applications of deep learning?
5. What is scalar and vector?
6.Define SVM.
7. Why is probability important in deep learning?
8. Define Random Variable.

9. Do random variables is discrete or continuous?

10. What are probability distributions?
11. Define Probability mass function?

12. List the properties that probability mass function satisfies?

13. List the properties that probability density function satisfies?

14. What is Gradient based optimizer?

15. Why overfitting and underfitting in ML?

16. What is capacity of a model?

17. How to control the capacity of learning algorithms?

18. Define Bayes error.

19. Why hyperparameters in ML?
20. How to solve the overfitting problem caused by learning hyperparameters on training dataset?
21.Define Perceptrons
22.What is the loss function?
23. Define Stochastic Gradient Descent with merits and demerits.

24. What is a deep feedforward network?

25. What is the working principle of a feed forward neural network?

26.Define Neural networks are considered universal function approximators
27. Brief on classification of activation function.
28. What is Regularization?
29. What is dropout in neural network?

30. Difference between regularization and optimization.

PART C

1. Explain the working of Support Vector Machines (SVM) in detail. Discuss the role of the kernel trick in SVMs.
2. Describe the perceptron learning algorithm and explain its convergence properties with a suitable example
3. Explain logistic regression in detail. How does it differ from linear regression? Discuss its applications in machine learning.

4.What is backpropagation? Explain the step-by-step working of backpropagation in training a neural network with an example.

5. Discuss different types of loss functions used in neural networks. How do they influence model performance? Compare loss functions used in classification and regression problems.
6. Explain stochastic gradient descent (SGD). How does it differ from batch gradient descent? Discuss its importance in training deep learning models.

7.State and explain the Universal Approximation Theorem. How does it demonstrate the power of neural networks in function approximation?

8.How can a neural network approximate any function? Explain the role of activation functions, layers, and weights in this process.

9.What are the limitations of neural networks despite being universal function approximators? Discuss challenges like overfitting, vanishing gradients, and computational complexity.

10. Explain the role of activation functions in neural networks. Compare different activation functions (ReLU, Sigmoid, Tanh) and their impact on network performance.