AI Question Bank

Unit-1

1. Explain Conditions, Loops, List, Dictionary, and User Defined Functions in python.
2. Explain role of NumPy, Pandas and Matplotlib.
3. Types of Machine learning.
4. Vector, Matrices Do product.
5. Calculate the regression coefficient.
6. Mean, Median, mod, Standard Deviation and Variance calculation.
7. Solve 2x+3y+4z=4, 3x-2y+4z=5, x+y-3z=6 using Gauss elimination method.

Unit-2

1. Explain any of the following Algorithm and its pseducode (python code).
   Tips to write answer (introduction, working, math equation, pusedocode, evaluation matrices)
   Supervised & Unsupervised ML
   a) DST (entropy, information gain, and impurity)
   b) Linear Regression ($y = \beta0 + \beta1x + \varepsilon$)
   c) Logistic Regression ($p = 1 / (1 + e^{(-(\beta0 + \beta1x))})$)
   d) Naive Bayes (Conditional Probablity)
   e) KNN algorithm (Euclidean, Manhattan)
   f) SVM algorithm
   g) K-means algorithm
   h) Hierarchal clustering algorithm
2. List Unsupervised and supervised evolution matrices
   1) Accuracy 2) F1 score 3) Precision 4) Recall 5) Specificity 6) MSE 7) MAE 8) ROC CURVE 9) AUC Curve 10) Silhouette Coefficient

Unit-3

1. Compare and contrast the structure and function of a biological neuron with an artificial neuron in an ANN.
2. Explain the concept of backpropagation algorithm and its crucial role in training ANNs. Discuss the gradient descent optimization technique used in backpropagation
3. Define perceptron neural network. Calculate the output y of three input neurons with a bias. The input feature vector is (x1, x2, x3) = (0.6,0.3,0.2) and weight values are [w 1 ,w 2 ,w 3 , b] =[0.3, 0.2, -0.4, 0.3]. Use binary Sigmoid function as activation function.
4. Discuss the architecture and States of Long Short-term Memory network (LSTM).
5. Derive mathematical equation for output of each Gate used in LSTM by assuming the weights and bias.
6. Explain in detail the architecture of CNN.
7. Define vanishing gradient descent problem. Why it happens in RNN. How it can be overcomes?

Unit-4

1. Explain the fundamental differences between object detection and image segmentation. Discuss two popular algorithms or techniques for each task, highlighting their strengths and limitations.
2. Define Computer vision. Discuss its advantages and disadvantages. List any two application of computer vision.
3. Describe the process of text pre-processing for NLP tasks. What factors should be considered when cleaning and preparing textual data for machine learning models? Provide examples of pre-processing techniques.
4. Define text vectorization. Explain bag of words method. Write steps to convert the document “This pizza is very tasty and affordable. This cookie is not tasty and is affordable. This cookie

is very delicious and affordable.” into feature vector using bag of words method.

Unit-5

1. Write short note on Role of ML in Cyber Security.
2. Write pseudo code and explain Role of ML in Malware Detection.
3. Explain Anomaly Detection using ML
4. What is Pen testing? Type of Pentesting. Explain Pentesting using ML.
5. What is Social Engineering and its type? Write Short notes on Social Engineering using Machine learning.
6. What is Intrusion Detection how Machine learning help in Intrusion Detection give brief notes on it.