

Instructions to the Students:

1. All the questions are compulsory.
2. The level of question/expected answer as per OBE or the Course Outcome (CO) on which the question is based is mentioned in () in front of the question.
3. Use of non-programmable scientific calculators is allowed.
4. Assume suitable data wherever necessary and mention it clearly.

(Level/CO) Marks

Q. 1 Solve Any Two of the following.

- A) What are the limitations of MP model? How perceptron model is better than MP model? (BT2/CO1) 6
- B) How neural network learn from the data? Explain the working procedure of an Artificial Neural Network. (BT2/CO1) 6
- C) Explain Linearly separable vs non-linearly separable data with suitable examples. (BT2/CO1) 6

Q.2 Solve Any Two of the following.

- A) What will be the predicted output for the given neural network? Consider 3 neurons in the input layer, 3 in the first hidden layer, 2 in the second hidden layer, and only one in the output layer. (BT3/CO2) 6

$$W1 = \begin{bmatrix} 1 & 1 & 2 \\ 3 & 1 & 1 \\ 1 & 2 & 3 \end{bmatrix} \quad W2 = \begin{bmatrix} 1 & 1 & 2 \\ 3 & 1 & 1 \end{bmatrix} \quad W3 = [2 \quad 5]$$

The input to the network is: $x = \begin{bmatrix} 1 \\ 1 \\ 1 \end{bmatrix}$

- B) What is the significance of the loss function? Explain any four loss functions with formula and use. (BT2/CO2) 6
- C) What is an optimizer? Consider a function $f(x) = x^3 - 3x^2 + 2$. What is the updated value of x after 2nd iteration of the gradient descent update, if the learning rate is 0.1 and the initial value of x is 4?. (BT3/CO2) 6

Q. 3 Solve Any Two of the following.

- A) What is the suitable loss function for given values of the True label and Target label? Which Activation function seems to be used? Calculate the loss. (BT3/CO3) 6

Y= [A, B, C, A, A, B, C]

Yhat=[[0.6,0.4,0], [0.5, 0.5, 0], [0.3 ,0.1, 0.6], [0.8, 0, 0.2],

[0.7, 0.2 ,0.1],[0.3, 0, 0.7], [0, 0, 1]]

B) Define backpropagation. Describe the basic steps in backpropagation learning. (BT2/CO3) **6**

C) Explain the multilayered feedforward Neural Network with a suitable example. (BT2/CO1) **6**

Q.4 Solve Any Two of the following.

A) Discuss various techniques to deal with overfitting in ANN. (BT3/CO4) **6**

B) Explain the steps to build any model in Keras. (BT3/CO4) **6**

C) Discuss Bias and Various tradeoffs. (BT2/CO4) **6**

Q. 5 Solve Any Two of the following.

A) What is fuzzy logic? Where is it used? Explain any three applications. (BT2/CO5) **6**

B) Explain the basic architecture of the fuzzy system. (BT2/CO5) **6**

C) What is a Genetic Algorithm? Explain any four applications of the Genetic Algorithm. (BT2/CO5) **6**

***** End *****