

Enrolment No./Seat No_____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER-VI (NEW) EXAMINATION – SUMMER 2024

Subject Code:3165201

Date:15-05-2024

Subject Name:Fundamentals of Neural Networks

Time:10:30 AM TO 01:00 PM

Total Marks:70

Instructions:

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.
4. Simple and non-programmable scientific calculators are allowed.

- Q.1**
- (a) Distinguish between Learning and Training. **03**
 - (b) Define bias and variance. **04**
 - (c) Explain the basic neuron models with necessary graphical representation. **07**
Compare and contrast biological neuron with Artificial Neural Networks.

- Q.2**
- (a) Difference between supervised learning and unsupervised learning. **03**
 - (b) Explain Hebbian Learning rule. **04**
 - (c) Explain the single layer continuous perceptron training algorithm for linearly separable classification. **07**

OR

- (c) Explain the concept of a Perceptron with a neat diagram. Discuss the Perceptron training rule. **07**

- Q.3**
- (a) List out types of Neuron activation function along with their equations. **03**
 - (b) Explain architecture of Feed-Forward Neural Network, **04**
 - (c) Discuss the step by step procedure of back propagation learning algorithm in detail. **07**

OR

- Q.3**
- (a) Draw the diagram for boltzman machine. **03**
 - (b) Explain Naïve Bayes Classifier with an Example. **04**
 - (c) Explain the architecture and functioning of a Multilayer Perceptron (MLP) in detail. **07**

- Q.4**
- (a) List the role of hidden layers in a Multilayer FeedForward network. **03**
 - (b) Draw architecture of Hopfield Model. **04**
 - (c) Draw the architecture of SOM and explain in detail. Explain the SOM algorithm. **07**

OR

- Q.4**
- (a) Describe feature of ART network. **03**
 - (b) What are the two processes involved in RBF network design? List some applications of RBF network. **04**
 - (c) Explain the algorithm and architecture of learning vector quantization. **07**

- Q.5**
- (a) Define Support Vector Machine (SVM) and briefly explain its primary objective in machine learning. **03**
 - (b) Give some examples for Nonrecurrent and Recurrent ANNs.. **04**

- (c) Describe the key characteristics that differentiate deep learning from traditional machine learning approaches. Provide real world example of deep learning. **07**

OR

- Q.5** (a) Explain the Kohonen Self-Organizing Map (SOM) algorithm. **03**
- (b) Describe the basic idea behind Support Vector Machines (SVMs) in machine learning. **04**
- (c) Discuss the steps involved in PCA, including the computation of principal components and the selection of the desired number of components. Highlight the advantages and limitations of PCA. **07**
