

EXTC: TE sem VI Reg. C'scheme Summer 2025

Time: (3 Hours)

Total Marks: 80

N.B: 1. Question No 1 is Compulsory

2. Answer any 3 questions from the remaining questions

1 Answer any 4 of the following:

- a) What are fuzzy rules? Explain with an example how IF-THEN rules are used in fuzzy systems. [05]
- b) Explain the basic concept of deep learning. [05]
- c) What is a competitive learning network? How does it differ from other neural networks? [05]
- d) Explain in brief what you mean by linearly separable and linearly non-separable systems. [05]
- e) How does an error function contribute to the performance of a neural network? Why is minimizing the error function crucial in the training process? [05]

2 a) What is an activation function in a neural network? Describe at least four activation functions with their mathematical formula, graphical representation and applications. [10]

b) Discuss the training algorithm of Kohonen self-organizing network. [10]

3 a) Discuss the stopping criteria used during the training of an artificial neural network. [10]

b) Explain any two techniques of de-fuzzification. [10]

4 a) What are the key steps involved in the error backpropagation algorithm? Illustrate with a flowchart or diagram. [10]

b) With examples, explain supervised, unsupervised and reinforcement learning in artificial neural networks. [10]

5 a) Explain the complete architecture of a Convolutional Neural Network (CNN) with a detailed block diagram. Describe the function of each layer in the network. [10]

b) Discuss Mamdani fuzzy inference system in detail. [10]

6 a) Discuss the concept of support vector machines. What are the applications of support vector machines? [10]

b) With the help of a suitable example, explain the working of K-Means clustering algorithm. [10]