

1129  
M.E. (Electronics and Communication Engineering)  
Third Semester  
ECE-1301: Neural Networks and Fuzzy Logic

Time allowed: 3 Hours

Max. Marks: 50

**NOTE:** Attempt five questions in all, including Question No. 1 which is compulsory and selecting two questions from each Unit.

x-x-x

- I. Answer in brief:
- Relate terminologies of artificial neuron model with that of human neuron.
  - What is the Hebb's learning law for artificial neural networks?
  - What is McCulloch-Pitts neural model? Describe its functioning
  - What is Sugeno fuzzy inference engine? Explain.
  - What is competitive learning in artificial neural networks?
  - What is defuzzification? Explain center of gravity method of defuzzification.
  - Differentiate crisp and fuzzy sets operations.
  - What activation function and its role in neural behavior?
  - List advantages of fuzzy logic in solving engineering problems?
  - What is Hopfield's neural model? Describe. (10x1)

UNIT - II

- II.
  - What is knowledge representation? Explain its importance.
  - What are multi-layer perceptron networks? Give their advantages over single layer perceptron networks? (2x5)
- III.
  - Explain architecture and working of Radial Basis Function?
  - What are auto-associative & hetero-associative memories? Explain. (2x5)
- IV.
  - Explain working of fuzzy logic system with the help of block diagram.
  - Differentiate feedforward and backpropagation neural networks? (2x5)

UNIT - II

- V.
  - Describe distinct types of fuzzy rules. Give examples of each.
  - Differentiate between Sugeno & Mamdani fuzzy inference techniques. (2x5)

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- VI. What are learning laws used for training of artificial neural networks? Explain with suitable mathematical expressions. (10)
- VII. a) Discuss simplified ART architectures and their advantages.  
b) Explain working of self-organizing maps. (2x5)

x-x-x