Code No: N0221 /R07 **Set No. 1**

IV B.Tech. I Semester Supplementary Examinations, February/March - 2011

NEURAL NETWORKS AND FUZZY LOGIC

(Common to Electrical & Electronics Engineering, Aeronautical Engineering and Instrumentation & Control Engineering)

Time: 3 Hours **Max Marks: 80**

Answer any FIVE Questions
All Questions carry equal marks
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1. a) Describe in detail about the operation of organization of the brain and biological neuron.
   b) Explain in detail potential applications of artificial neural networks. [8+8]

2. a) Discuss with block diagrams different learning strategies.
   b) Give and explain different types of neuron activation functions. Explain the role of bias in activation function. [8+8]

3. a) State and prove perceptron convergence theorem
   b) Discuss in detail about single layer continuous perceptron networks for linearly separable classifications. [8+8]

4. a) State and explain in detail about kolmogorov theorem.
   b) Give suggestions to improve and modify back propagation network. [8+8]

5. a) Give discrete and continuous versions of Hopfield networks.
   b) Discuss in detail about instance /memory based learning algorithms. [8+8]

6. a) Discuss in detail fuzzy relations with suitable examples.
   b) Describe the role of membership function in fuzzy logic. What are different member ship functions in fuzzy logic, also explain their significance in detail. [8+8]

7. a) Mention the need for the De-Fuzzification, explain the three types of De-Fuzzification with its formulae.
   b) What is fuzzy interference? Discuss two important inferring procedures.

8. a) Explain how ANN is used for load forecasting.
   b) Describe in detail about fuzzy logic control and fuzzy classification using fuzzy logic. Explain the operation of the fuzzy logic control with the process inference block. [8+8]

Code No: N0221 /R07 **Set No. 2**

IV B.Tech. I Semester Supplementary Examinations, February/March - 2011

NEURAL NETWORKS AND FUZZY LOGIC

(Common to Electrical & Electronics Engineering, Aeronautical Engineering and Instrumentation & Control Engineering)

Time: 3 Hours **Max Marks: 80**

Answer any FIVE Questions
All Questions carry equal marks
****

1. a) Using Mc-Culloh Pitts model implement logic functions for AND and OR gates.
   b) Discuss in detail about Hodgkin-Huxley neuron model and spiking neuron model. [8+8]
2. a) Distinguish between supervised and unsupervised learning.
   b) Explain in detail different artificial neural network architectures in detail. [8+8]
3. a) Explain the architecture and algorithm of continuous perceptron network
   b) Discuss about multi category single layer perceptron network. [8+8]
4. a) Explain generalized delta rule in detail.
   b) Prove that for n=2 , the number of hidden layer neurons j needed for hyper plane partition into M regions is
   $j=1/2\ [(8M-7)^{1/2}-1]$ [8+8]
5. a) Prove BAM stability theorem .
   b) Discuss in detail about BAM training algorithms. [8+8]
6. a) Discuss the measure of fuzziness and dissonance.
   b) Explain properties, operations and relations of fuzzy sets. [8+8]
7. Explain the following:
   a) Singular value decomposition
   b) Combs method [8+8]
8. a) Explain a step by step procedure in designing of a fuzzy logic controller.
   b) Explain in detail about the application of fuzzy logic used in air conditioner controller. [8+8]

Code No: N0221 /R07

Set No. 3

IV B.Tech. I Semester Supplementary Examinations, February/March - 2011

NEURAL NETWORKS AND FUZZY LOGIC

(Common to Electrical & Electronics Engineering, Aeronautical Engineering and Instrumentation & Control Engineering)

Time: 3 Hours **Max Marks: 80**

Answer any FIVE Questions
All Questions carry equal marks
****

1. a) Discuss in detail about practical issues in training of neural networks. [8+8]
   b) Discuss in detail about learning strategy of artificial neural networks.

2. a) Explain Widrow-Hoff and delta learning rule in detail. [8+8]
   b) Give in detail about classification taxonomy of artificial neural networks.

3. a) State and prove perceptron convergence theorem. [8+8]
   b) Discuss in detail about the limitations of perceptron model.

4. a) Give derivation for back propagation training. [8+8]
   b) Which criteria is followed to decide the number of neurons in back propagation network. (8+8)

5. a) Explain the storage and recall algorithms of associative memories. [8+8]
   b) Explain BAM training algorithm with neat sketch.

6. a) Explain the fuzziness in fuzzy set theory. [8+8]
   b) Let X = {1, 2, 3, . . . , 10}. Determine the cardinalities and relative cardinalities of the following fuzzy sets.
      i) ˜A = {(3, 10), (4, 0.2), (5, 0.3), (6, 0.4), (7, 0.6), (8, 0.8), (10, 1), (12, 0.8), (14, 0.6)}.
      ii) ˜B = {(2, 0.4), (3, 0.6), (4, 0.8), (5, 1.0), (6, 0.8), (7, 0.6), (8, 0.4)}
      iii) ˜C = {(2, 0.4), (4, 0.8), (5, 1.0), (7, 0.6)}

7. a) Choose three fuzzy sets and illustrate the aggregation of the fuzzy sets. [8+8]
   b) Discuss in detail about the maxima method with an example.

8. Explain the application of ANNs for the following [8+8]
   a) Load forecasting
   b) Process identification

Code No: N0221 /R07 **Set No. 4**

IV B.Tech. I Semester Supplementary Examinations, February/March - 2011

NEURAL NETWORKS AND FUZZY LOGIC

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Time: 3 Hours **Max Marks: 80**

Answer any FIVE Questions
All Questions carry equal marks
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1. a) Draw the model of an artificial neural network and derive the mathematical equations for that model. [8+8]
   b) List and explain the learning methods of a neural network.

2. a) Give a brief note on neural Dynamics. [8+8]
   b) Discuss in detail operations of artificial neuron.

3. a) Explain the architecture and algorithm of continuous perceptron network [8+8]
   b) Discuss about multi category single layer perceptron network.

4. a) Explain in detail about learning difficulties and improvements of multilayer feed forward neural networks. [8+8]
   b) State credit assignment Problem. Explain in detail.

5. a) Define associative matrix, association rules and hamming distance in detail. [8+8]
   b) Explain in detail about Hebbian learning.

6. a) Give and explain the properties of crisp sets. With a neat sketch of Venn diagrams, discuss about the operation of crisp sets. [8+8]
   b) Let R,S be defined on the sets $\{1, 3, 5\} \times \{1,3,5\}$. Let R: $\{(x, y)/y = x + 2\}$, S : $\{(x, y)/x < y\}/$. Using max min composition, find
      i) RoS
      ii) SoR.

7. a) Explain in detail about development of rule base and decision making system. [8+8]
   b) Explain different defuzzification methods.

8. a) Design and develop a pressure process control by FLC model. Formulate necessary Membership functions and required fuzzy rules for the application. [8+8]
   b) What are the limitations of specialized on-line learning control architecture?