

Code No: RT42024C

**R13**

**Set No. 1**

**IV B.Tech II Semester Regular Examinations, April/May - 2017**

**AI TECHNIQUES**

**(Electrical and Electronics Engineering)**

**Time: 3 hours**

**Max. Marks: 70**

*Question paper consists of Part-A and Part-B*

*Answer ALL sub questions from Part-A*

*Answer any THREE questions from Part-B*

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**PART-A (22 Marks)**

1. a) Explain why neural network exhibit fault tolerance? [3]
- b) Define the pattern? How do you classify two classes of patterns in two dimension space with neat schematic? [4]
- c) What do you mean by feed forward recall? [3]
- d) Define with examples (i) cardinalities (ii) fuzzy sets [4]
- e) Explain the centroid method in defuzzification? [4]
- f) What are the different methods used to control speed of d.c motors? [4]

**PART-B (3x16 = 48 Marks)**

2. a) Discuss about the Humans and computers? [8]
- b) Explain the following comparison of computer and biological neural networks  
(i) Speed (ii) Processing (iii) Size and complexity (iv) Storage [8]
3. a) What are the different learning rules? Explain [10]
- b) Explain the concept of Artificial Neural Networks and its basic mathematical model? [6]
4. a) Describe the energy analysis of discrete Hopfield Network. [8]
- b) Derive the equation for weight change in the input layer and hidden layer for Back Propagation Network. [8]
5. a) Write mathematical crisp equations for max-min composition? [8]
- b) For the fuzzy set  $\tilde{A}$  and  $\tilde{B}$  defined by  $\tilde{A} = \{(x_1, 0.2), (x_2, 0.5), (x_3, 0.6)\}$  &  $\tilde{B} = \{(x_1, 0.1), (x_2, 0.4), (x_3, 0.5)\}$ , Find (i)  $(\tilde{A} - \tilde{B})$  (ii)  $(\tilde{A} - \tilde{B}^c)$  (iii) Verify De Morgan's law  $(\tilde{A} \cup \tilde{B})^c = \tilde{A}^c \cap \tilde{B}^c$  [8]
6. a) Explain briefly the basic hybrid system? [6]
- b) Lambda-cut can be considered as an example of a way to convert a fuzzy set into a crisp one. What is this conversion necessary for? [10]
7. Explain the concept of load frequency control? Explain how do you control load frequency in power system using fuzzy logic? [16]



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**Set No. 2**

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Time: 3 hours

Max. Marks: 70

*Question paper consists of Part-A and Part-B*

*Answer ALL sub questions from Part-A*

*Answer any THREE questions from Part-B*

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**PART-A (22 Marks)**

1. a) Explain briefly sequence of learning process? [3]
- b) Explain with neat sketch bidirectional associative memory and auto associative memory? [4]
- c) Write short note on the recurrent networks? [4]
- d) Define with examples (i) membership (ii) uncertainty [4]
- e) Discuss the centre of sums method in defuzzification? [3]
- f) Explain the importance of reactive power control in power system? [4]

**PART-B (3x16 = 48 Marks)**

2. a) Illustrate the characteristics of neural networks? [4]
- b) What are the different learning processes? Explain briefly [12]
3. a) List out the limitations of perceptron model with examples? [8]
- b) What are the different types of activation functions with neat schematic? [8]
4. a) Explain the Hopfield network algorithm and its limitations. [8]
- b) Compare RBF Network with multilayer perceptron. [8]
5. a) How can you distinguish the crisp and fuzzy sets with examples? [6]
- b) Let us define two fuzzy sets  
 $\tilde{A} = \{(x_1, 0.5)(x_2, 0.7)(x_3, 0.1)\}$  and  $\tilde{B} = \{(x_1, 0.6)(x_2, 0.2)(x_3, 0.4)\}$   
Find (i)  $\tilde{A} \cdot \tilde{B}$  (ii) Product of a fuzzy set with a crisp number  $\alpha = 0.4$  [10]  
(iii) Power of a fuzzy set with  $\alpha = 2$  (vi) Difference  $\tilde{A} - \tilde{B}$  ( $\tilde{A} \oplus \tilde{B}$ )
6. a) What are the different ways to assign membership values to fuzzy variables? [10]
- b) Compute  $x^*$  by using mean of maxima method as shown in figure.1

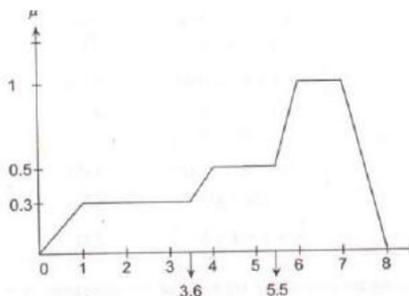


Figure.1

7. What do you mean by load forecasting? How do you estimate the forecasting of load in power system using Neural networks? [16]



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**PART-A (22 Marks)**

1. a) Explain briefly supervised learning with neat sketch? [4]
- b) Define neural network architectures? Explain with neat sketch instar network? [4]
- c) Comparison between single layer and multilayer feed forward network? [4]
- d) Explain the cartesian product in crisp relations? [3]
- e) Explain the inference mechanism? [3]
- f) What are the different methods used to control speed of a.c motors? [4]

**PART-B (3x16 = 48 Marks)**

2. a) Discuss the methods of AI techniques? [8]
- b) Explain the following learning tasks [8]
  - (i) Control
  - (ii) Filtering
  - (iii) Beam forming
3. a) Describe the linear non separable problem with example? [8]
- b) Implement the Mc-Culloch pitts networks for XOR logic function? [8]
4. a) Explain with suitable example about back propagation algorithm. [6]
- b) Discuss the convergence of the algorithm. What are the methods followed to select weight vector. [10]
5. a) Illustrate the basic fuzzy set operations with examples? [10]
- b) Let X,Y,Z are three fuzzy sets defined on the universe of discourse  $X = \{x_1, x_2, x_3\}$   $Y = \{y_1, y_2\}$  and  $Z = \{z_1, z_2, z_3\}$  respectively. Fuzzy relation  $\tilde{R} = \begin{bmatrix} 0.5 & 0.1 \\ 0.2 & 0.9 \\ 0.8 & 0.6 \end{bmatrix}$  and  $\tilde{S} = \begin{bmatrix} 0.6 & 0.4 & 0.7 \\ 0.5 & 0.8 & 0.9 \end{bmatrix}$ , Find the max-min composition? [6]
6. a) Explain about the development of rule base system? [8]
- b) Compute  $x^*$  by using centre of sums method as shown in figure.1 [8]

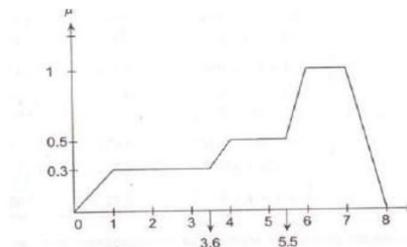


Figure.1

7. Discuss about the reactive power control? Explain how you control the reactive power in power system by using neural networks? [16]



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**Set No. 4**

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Max. Marks: 70

*Question paper consists of Part-A and Part-B*

*Answer ALL sub questions from Part-A*

*Answer any THREE questions from Part-B*

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**PART-A (22 Marks)**

1. a) Justify your answer “Humans beings are more intelligent than computers” [3]
- b) How do you differentiate biological and artificial neuron models? [4]
- c) Explain briefly how back propagation network is used as differentiator. [4]
- d) Discuss the fuzzy cartesian product? [3]
- e) Describe the mean of maxima in defuzzification? [4]
- f) Explain the concept of load forecasting? [4]

**PART-B (3x16 = 48 Marks)**

2. a) Describe about the knowledge representation? [8]
- b) Explain the following learning tasks [8]  
(i) pattern association (ii) pattern recognition (iii) function approximation
3. a) Illustrate the organization of brain? [8]
- b) Describe how a pattern can be trained and classified using discrete perceptron algorithm? [8]
4. a) Explain about generalized radial basis networks. [8]
- b) Enumerate approximation properties of radial basis function network. [8]
5. a) Explain the operations on fuzzy relations? [6]
- b) Describe the operations on crisp sets with examples? [10]
6. a) Discuss about the membership value assignment? [8]
- b) Compute  $\mu_{A \cap B}$  using centroid method as shown in figure.1 [8]

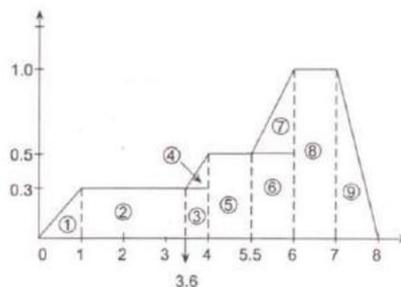


Figure.1

7. What do you mean by economic load dispatch? Explain the economic load dispatch by using fuzzy logic controller with neat sketch? [16]