Code No: **RT42024C**

R13

Set No. 1

IV B.Tech II Semester Regular/Supplementary Examinations, April - 2018
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
*****

PART–A *(22 Marks)*

1. a) Why computer processes information nearly a million times faster than neural network?   [3]
    b) Why the reinforcement learning is not preferred in neural network literature?   [4]
    c) What are the limitations of back propagation algorithm?   [4]
    d) Define the following with examples (i) Power set (ii) Super set   [4]
    e) What do you mean by basic hybrid system?   [4]
    f) Explain the concept of load flow studies.   [3]

PART–B *(3x16 = 48 Marks)*

2. a) Justify your answer "Biological neural networks exhibit fault tolerance"?   [8]
    b) Discuss with neat schematic diagram, supervised and unsupervised learning? [8]

3. a) Prove that the two classes of patterns are trainable in a finite number of training steps?   [8]
    b) What do you mean by topology of artificial neural networks? Give a few basic topological structures of artificial neural networks?   [8]

4. a) Define feedforward recall? Draw the block diagram of error back propagation algorithm and explain?   [8]
    b) Differentiate between discrete time Hopfield network and continuous type Hopfield network.   [8]

5. a) What do you mean by uncertainty? How it is occur in real time?   [4]
    b) Let $\tilde{A} = \{(x_1, 0.4)(x_2, 0.5)(x_3, 0.5)\}$ and $\tilde{B} = \{(y_1, 0.7)(y_2, 0.2)\}$ be two fuzzy sets defined on the universes of discourse X={x_1, x_2, x_3} and Y={y_1, y_2} respectively. Compute the fuzzy Cartesian product and Verify the following fuzzy set operation and its properties (i) Difference (ii) Disjunctive Sum (iii) Commutativity (iv) Associativity (v) Distributivity   [12]

6. a) What are the various principal design parameters for an fuzzy logic controller? [8]
    b) Explain the following membership value assignment (i) Intuition (ii) Rank ordering.   [8]

7.   Explain the concept of reactive power control in power system? Discuss the economic load dispatch with suitable example using fuzzy logic controller.   [16]

Code No: **RT42024C**

R13

Set No. 2

IV B.Tech II Semester Regular/Supplementary Examinations, April - 2018
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
*****

PART–A *(22 Marks)*

1. a) Justify your answer, "the information in the brain is adaptable where as in the computer it is strictly replaceable"   [4]
    b) What is perceptron learning in the pattern classification problem?   [3]
    c) Write approximation properties of radial basis function network.   [4]
    d) What are different types of membership functions with neat schematic?   [4]
    e) Explain about the intuition in membership value assignment.   [3]
    f) Explain the concept of load frequency control.   [4]

PART–B *(3x16 = 48 Marks)*

2. a) What is meant by learning process? How do you train the artificial neural network?   [8]
    b) Explain the following learning tasks
        (i) pattern association   (ii) Filtering   (iii) function approximation   [8]

3. a) What do you mean by perceptron? Define and classify the pattern. How do you classify two classes of patterns in two dimension space with neat schematic?   [8]
    b) Implement the Mc-Culloch pitts networks for NAND logic function.   [8]

4.   What are the modes of operation of a Hopfield network? Explain the algorithm for storage of information in a Hopfield network. Similarly explain the recall algorithm.   [16]

5. a) Define with examples (i) Cardinalities (ii) Uncertainty   (iii) Membership (iv) Fuzzy sets.   [8]
    b) Let $\tilde{R} = \begin{bmatrix} 0.4 & 0.3 \\ 0.1 & 0.9 \\ 0.8 & 0.5 \end{bmatrix}$ be a fuzzy relation on X={x_1, x_2, x_3}, Y={y_1, y_2} and

        $\tilde{S} = \begin{bmatrix} 0.5 & 0.4 & 0.6 \\ 0.3 & 0.5 & 0.7 \end{bmatrix}$ be a fuzzy relation on Y={y_1, y_2} , Z={z_1, z_2, z_3} . Find
        RoS by max-min composition?   [8]

6. a) Explain the following (i) Rank ordering in membership value assignment (ii) Decision making system   [8]
    b) Draw the block diagram of fuzzy logic system components and explain in brief.   [8]

7.   Explain the concept of load forecasting. Discuss the reactive power control with suitable example using fuzzy logic controller.   [16]

|''|'|'||||''|'''|||'|

R13

IV B.Tech II Semester Regular/Supplementary Examinations, April - 2018
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
*****

PART–A *(22 Marks)*

1. a) What is size and complexity of neural network? [3]
   b) Express the differentiate between perceptron representation and perceptron training. [4]
   c) What happens if number of hidden layers increases in back propagation? [4]
   d) Discuss the fuzzy versus crisp with neat diagram. [4]
   e) Explain about the inference in membership value assignment. [4]
   f) Explain the concept of reactive power control. [3]

PART–B *(3x16 = 48 Marks)*

2. a) How do you classify the methods of AI techniques? Explain any one method with neat schematic. [8]
   b) How do you differentiate between learning process and learning tasks? [8]

3. a) How do you justify that brain is a parallel distributed processing system? [8]
   b) Differentiate between the discrete and continuous perceptron networks. [8]

4. Give the architecture and algorithm of Back propagation network and derive the weight change formula in each layer. [16]

5. a) Explain the following with examples (i) Cartesian product (ii) Other crisp relations (iii) Operations on relations. [8]
   b) The fuzzy sets $\tilde{A}$, $\tilde{B}$, $\tilde{C}$, are all defined on the universe X = {0, 5} with the following membership functions $\mu_{\tilde{A}}(x) = \frac{1}{1+5(x-5)^2}$; $\mu_{\tilde{B}}(x) = 2^{-x}$; $\mu_{\tilde{C}}(x) = \frac{2x}{x+5}$ Sketch the membership functions. [8]

6. Let $\tilde{A}$, $\tilde{B}$, $\tilde{C}$ are three fuzzy sets as shown in figure (1) below. Find the aggregated fuzzy sets of $\tilde{A}$, $\tilde{B}$, $\tilde{C}$. Find the defuzzification using centroid and mean of maximum methods.
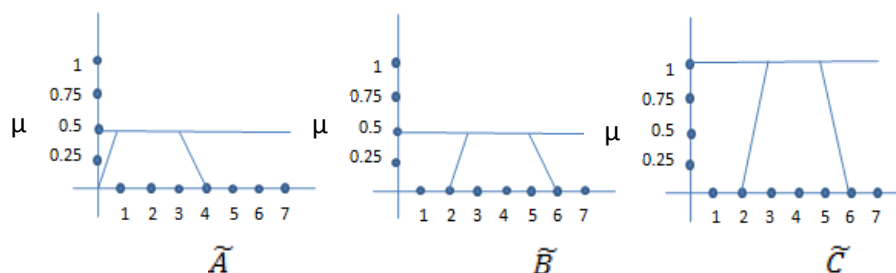

Figure (1) [16]

7. Obtain the transfer function of dc motor? How can an artificial neural network be applied for speed control of ac motor? [16]

R13 Set No. 4

IV B.Tech II Semester Regular/Supplementary Examinations, April - 2018
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
*****

PART–A *(22 Marks)*

1. a) List out the characteristics of neural networks. [3]
   b) Write the limitations of the perceptron model. [3]
   c) Justify you answer, "The optimum number of hidden layers in back propagation is two". [4]
   d) How the uncertainty may arise in reality? [4]
   e) Explain about the rank ordering in membership value assignment. [4]
   f) Explain the concept of load forecasting. [4]

PART–B *(3x16 = 48 Marks)*

2. a) In what way the humans are better than computers? Explain. [8]
   b) What do you mean by knowledge representation? Where it is used in neural networks? [8]

3. a) Compare the biological and artificial neuron models. [8]
   b) Implement the Mc-Culloch pitts networks for OR logic function. [8]

4. a) What are the steps involved in the back propagation algorithm? Explain. [10]
   b) What are the learning difficulties in back propagation and how do you overcome it? [6]

5. a) If $\tilde{A} = \{(x_1, 0.4)(x_2, 0.6)(x_3, 0.1)\}, \tilde{B} = \{(x_1, 0.5)(x_2, 0.7)(x_3, 1)\}$ and $\tilde{C} = \{(x_1, 0.2)(x_2, 0.8)(x_3, 0.3)\}$, Verify the following fuzzy set operation and its properties (i) Difference (ii) Disjunctive Sum (iii) Commutativity (iv) Associativity (v) Distributivity (vi) De Morgan's laws. [12]
   b) Let the universe of discourse be given by U = {5, 15, 20, 30, 40, 60, 80, 90}. (i). Suggest a fuzzy set to describe the term "young". (ii). Suggest a fuzzy set to describe the term "old". (iii). Derive a fuzzy set to describe "not old". (iv). Derive a fuzzy set to describe "very young". [4]

6. a) Discuss the following (i) Fuzzification module (ii) Knowledge base (iii) Rule base (iv) Defuzzification module [8]
   b) Discuss the different types of defuzzification methods. Express them mathematically. [8]

7. Explain the concept of speed control of d.c motor. How can an artificial neural network be applied for load flow studies? [16]

|"|'|||||"|'"|||'|