Seat No:-_____

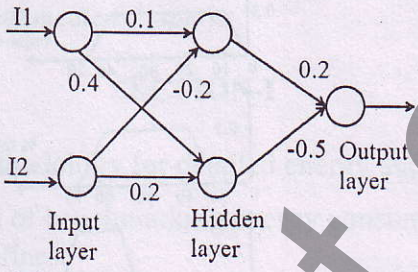
GANPAT UNIVERSITY
M.Tech. (EE) Sem. II
Regular Examination July 2013
3EE201: APPLICATIONS OF AI IN ELECTRICAL ENGINEERING

**Time:-3 Hours** **Total Marks-70**

**Instruction:-**
1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.

## Section-I

**Que-1** **(a)** The neural network architecture is shown in figure below. **[9]**




Using the following training set adjusts the weights of above neural network for one epoch.

| Sr. No. | Input I1 | Input I2 | Output O |
|---|---|---|---|
| 1 | 0.4 | -0.7 | 0.1 |
| 2 | 0.3 | -0.5 | 0.05 |

**(b)** Explain how the radial basis function network can be used for pattern reorganization? **[3]**

**OR**

**Que-1** **(a)** How the discrete Hopfield model is used as a Content Addressable memory? **[5]**
**(b)** In what ways does the ANN resembles brain? **[3]**
**(c)** How the error is back propagated in a BPN? **[4]**

**Que-2** **(a)** Explain Pseudo-inverse learning technique of RBF network. **[5]**
**(b)** Derive the generalized delta learning rule for BPN network. **[6]**

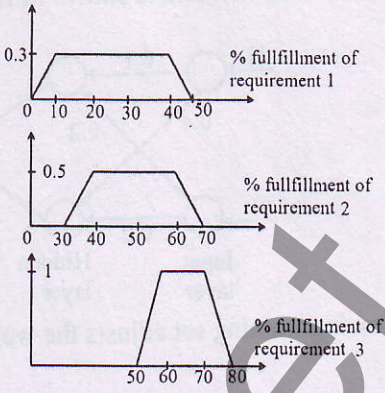
**OR**

**Que-2** **(a)** Why Hopfield network should be stable? Apply liapunov stability criterion in Hopfield network. **[8]**
**(b)** What is activation function? Why sigmoid activation function is most popular in BPN network? **[3]**

**Que-3** Attempt any three.
**(a)** What is mean by learning system? Explain supervised and unsupervised learning with example. **[4]**
**(b)** Explain Knowledge Representation and Reasoning in terms of intelligence. **[4]**
**(c)** Write a short note on "knowledge acquisition for machine and human". **[4]**
**(d)** Explain the basic building block of perceptron network. **[4]**

## Section-II

**Que-4** **(a)** Suppose the control system needs to fulfill three requirements. The fulfillment of these requirements will give some performance index. The requirement fulfillment is affecting the performance index in such a way that it can be represented in the form of three fuzzy sets on a universe of their percentage fulfillment. These three fuzzy sets are shown in fig. find the most nearly representative of percentage fulfillment of three requirements using centroid method for Defuzzification. **[8]**



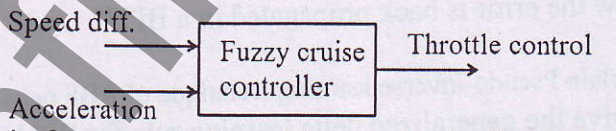

**(b)** Explain the fundamental genetic algorithm with diagram. **[4]**

**OR**

**Que-4** **(a)** What is mean by fuzzy inference? Explain with example. **[7]**

**(b)** Does the genetic algorithm always converge to optimal solution? How? **[5]**

**Que-5** **(a)** The fuzzy cruise controller is used to maintain a vehicle at a desire speed. The system consists of two inputs, namely speed difference and acceleration, and one fuzzy output namely throttle control as shown in figure. **[9]**




Explain how this fuzzy controller will to maintain the desire speed. (three fuzzy seta are used to represent each input and output)

**(b)** What is composite relation? **[2]**

**OR**

**Que-5** **(a)** Explain Defuzzification to crisp set and Defuzzification to scalars. **[8]**

**(b)** How neural network can be used for load forecasting? **[3]**

**Que-6** Attempt any three.

**(a)** Why genetic algorithm is found more popularity in some complicated optimization problem, even though simpler optimization techniques are available? **[4]**

**(b)** Write a short note on encoding with respect to genetic algorithm. **[4]**

**(c)** Explain fuzzy rule base system. **[4]**

**(d)** What is mean by fitness function? What is its importance? **[4]**

**----------END OF PAPER----------**