Register Number…………………….

B.E. DEGREE EXAMINATIONS: APRIL / MAY 2010

Sixth Semester

ELECTRONICS AND INSTRUMENTATION ENGINEERING

U07EI604: Neural Network & Fuzzy Logic Control

Time: Three Hours   **Maximum Marks: 100**

Answer ALL the Questions:-

PART A (10 x 1 = 10 Marks)

1. The net input to the neuron is

    A. multi of input signals   B. division of input signals

    C. sum of weighted input signals   D. sum of signals

2. In which type of learning, a teacher is not required

    A. Reinforced   B. Unsupervised

    C. Supervised   D. Gradient descent

3. A discrete hop field is a model of

    A. Associative memory   B. Adaptive Resonance Theory

    C. System memory   D. Process identification

4. It is the process by which strings with better fitness values receive correspondingly better copies with new generation

    A. Reproduction   B. Cross over   C. population   D. Mutation

5. Region of the universe containing elements that have a non-zero membership function but not complete membership

    A. Boundary   B. Support   C. core   D. convex

6. Converting crisp quantity to fuzzy is,

    A. defuzzification   B. normalization

    C. fuzzification   D. fuzzy relation

7. Fuzzy decision are sometimes made on the basis of the rank is

    A. Fuzzy synthetic evaluation   B. Fuzzy ordering

    C. Preference   D. Consensus

8. It decides what type of changes should be made on adaptive fuzzy system

    A. Performance index   B. Term set

    C. Output variable   D. Adaptation machine

9. It is used for the measurement of the controlled signal in a fuzzy system

    A. Plant   B. Sensor   C.Knowledge base   D. Membership function

10. It is the process of mapping the point wise value of the control output into its physical domain

    A. Defuzzification   B. Denormalization

    C. Knowledge base   D. Data base

PART B (10 x 2 = 20 Marks)

11. Draw the artificial neuron model for AND gate.

12. State the functions of soma in biological neural network.

13. Write the energy function of Hop field network.

14. What is meant by neuro control?

15. What are the applications of fuzzy logic system?

16. Give the expression for Max-Min composition and Max-Dot composition.

17. List the three operators in Genetic algorithm.

18. Define convex fuzzy set.

19. What are the assumptions to be made in fuzzy control system design?

20. What is the purpose of knowledge base module?

PART C (5 x 14 = 70 Marks)

21. a) How do you determine the number of hidden layers in back propagation network? Discuss the architecture of back propagation network with the aid of training algorithm. Also derive the expression of learning rule.

(OR)

    b) Develop a perceptron network to implement an AND function for binary input and bipolar target.

22. a) Write an algorithm of discrete time hop field networks with its architecture.

(OR)

    b) With help of neat sketch, illustrate the principle and operation of inverted pendulum and process identification.

23. a) Two fuzzy sets $A = \left\{ \frac{1}{2} + \frac{0.5}{3} + \frac{0.3}{4} + \frac{0.2}{5} \right\}$ and $B = \left\{ \frac{0.5}{2} + \frac{0.7}{3} + \frac{0.2}{4} + \frac{0.4}{5} \right\}$. Find Complement, Union, Intersection, Difference, Demorgan's law and Excluded middle laws.

(OR)

b) Why we go for defuzzification methods? Explain the defuzzification methods available in fuzzy system

24. a) Illustrate the steps involved in fuzzy decision making with suitable examples.

(OR)

b) Write a short note on (i) Adaptive fuzzy system, (ii) Membership function.

25. a) Draw the block diagram of fuzzy logic control system and describe the function of each block. Also list the features of fuzzy logic control.

(OR)

b) Discuss the operation of fuzzy logic based blood pressure control during anesthesia with relevant diagrams.

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