

12/05/18

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Question Paper Code : 40981

B.E./B.Tech. DEGREE EXAMINATION, APRIL/MAY 2018
Seventh Semester
Electrical and Electronics Engineering
EE6006 – APPLIED SOFT COMPUTING
(Common to Electronics and Instrumentation Engineering/Instrumentation and Control Engineering)
(Regulations 2013)

Time : Three Hours Maximum : 100 Marks

Answer ALL questions

PART – A (10×2=20 Marks)

1. Define : supervised learning. Give an example.
2. Recall the architectural components of a neural network.
3. List the applications of artificial neural network.
4. What is activation function in NN ?
5. What is FAM Table ?
6. Define defuzzification.
7. Mention the key role of knowledge based systems.
8. Recall the assumptions in a Fuzzy Control System Design.
9. State Darwins theory of evolution.
10. Define : Cross over rate.

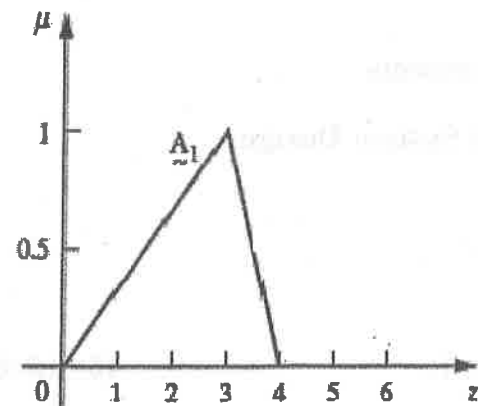
PART – B (5×16=80 Marks)

11. a) i) Compare Bio neuron with artificial neuron. (8)
ii) Compare supervised learning with unsupervised learning. (8)

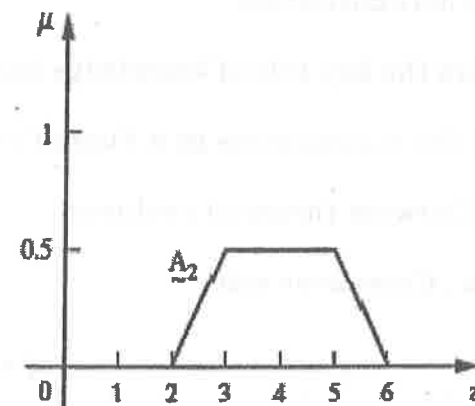
(OR)



- b) Examine the working principle of feed forward neural network and compare the activation used with other network models. Mention the error function and techniques used up to adjust the weights over the network. (16)
12. a) Illustrate the working principle of Hebbian learning rule for Hopfield networks. Draw and explain the architecture of discrete time Hopfield networks. (16)
- (OR)
- b) Demonstrate the workflow model of neural networks for control of Inverted pendulum. Illustrate its applicability by a mathematical model with parameters such as mass of pendulum, mass of cart, length of the bar, standard gravity and moment of inertia of the bar. Draw the free body diagrams for the cart and the pendulum. (16)
13. a) In metallurgy materials are made with mixtures of various metals and other elements to achieve certain desirable properties. In a particular preparation of steel, three elements, namely iron, manganese and carbon, are mixed in two different proportions. The samples obtained from these two different proportions are placed on a normalized scale, as shown in the figure and the represented as fuzzy sets A_1 and A_2 . You are interested in finding some sort of "average" steel proportion. For the logical union of the membership functions shown we want to find the defuzzified quantity. For each of the methods learned assess (i) whether each is applicable and, if so, ii) calculate the defuzzified value z^* . (16)



(a)



(b)

(OR)

- b) List and explain the different methods of assigning membership functions. (16)



14. a) Discuss briefly about the fuzzy rule base for the liquid level control system with a fuzzy rule function condition. (16)
- (OR)
- b) Let $A = \{(x_1, 0.2), (x_2, 0.7), (x_3, 0.4)\}$ and $B = \{(y_1, 0.5), (y_2, 0.6)\}$ be two fuzzy sets defined on the universe of discourse $X = \{x_1, x_2, x_3\}$ and $Y = \{y_1, y_2\}$ respectively. Find Cartesian product of A and B union, intersection of A and B, algebraic sum of A and B and algebraic product of A and B. (16)
15. a) Examine the steps involved in designing simple Genetic Algorithm by explaining population of binary strings, fitness function, selection, cross over and mutation operators. (16)
- (OR)
- b) Explain the step by step procedure for solving economic dispatch problems using genetic algorithms. (16)