

B.E DEGREE EXAMINATIONS: APRIL/MAY 2014

Seventh Semester

ELECTRONICS AND INSTRUMENTATION ENGINEERING

EIE116: Applied Soft Computing

Time: Three Hours

Maximum Marks: 100

Answer all the Questions:-

PART A (10 x 1 = 10 Marks)

1. The component Soma of Biological neuron relates to _____ of Artificial neuron
 - a) Neuron
 - b) Net input
 - c) Weights
 - d) Output
2. The function of Dendrites is to
 - a) Receive incoming signals
 - b) Produce output signals
 - c) Do not transmit signals at all
 - d) Act as signal amplifiers
3. The Distributive property of fuzzy set $A \cup (B \cap C)$
 - a) $(A \cap B) \cup (A \cap C)$
 - b) $(A \cup B) \cap (A \cup C)$
 - c) $(A \cup B) \cap (A \cap C)$
 - d) $(A \cap B) \cup (A \cup C)$
4. For the given classical set $X = \{2, 4, 6\}$, Find the Cardinality Power set.
 - a) 16
 - b) 8
 - c) 3
 - d) 4
5. The Core of a membership function for a fuzzy set A is defined as that the region of universe that is characterized by _____ Membership in set A
 - a) Zero
 - b) Partial
 - c) Complete
 - d) Non-Zero
6. The function of Defuzzifier unit is to convert _____
 - a) Crisp to Fuzzy Quantity
 - b) Crisp to imprecise Quantity
 - c) Fuzzy to imprecise Quantity
 - d) Fuzzy to Crisp Quantity
7. Fuzzy logic cannot be used for _____
 - a) Complex models where understanding is limited
 - b) Process which lacks information regarding a particular element
 - c) Simple linear systems
 - d) System which involves human reasoning
8. Who is the founder of fuzzy logic?
 - a) Aristotle
 - b) Buddha
 - c) Zader Lotfi
 - d) Bart Kosko

9. Which of the following is not a genetic algorithm operator
 - a) Mutation
 - b) Intuition
 - c) Cross-over
 - d) Selection
10. Ranking is a technique used for
 - a) deleting undesirable members of the population.
 - b) obtaining the selection probabilities for reproduction.
 - c) copying the fittest member of each population into the mating pool.
 - d) preventing too many similar individuals from surviving to the next generation.

PART B (10 x 2 = 20 Marks)

11. Define Activation function and mention its types
12. Write the limitation of Single Layer Perceptron
13. Define Recurrent Network
14. Mention the steps involved in System Identification
15. Distinguish between Crisp set and Fuzzy set
16. Define Convex Fuzzy set
17. List the different types of membership functions.
18. What is the need for Fuzzy Knowledge Base?
19. Draw the model of Fuzzy Neuron
20. Define One-point and Two-point crossover

PART C (5 x 14 = 70 Marks)

21. a) (i) Write an algorithm to cluster the vectors using kohonen self organising maps. (7)
(ii) Define learning process and explain delta learning rule in detail. (7)

(OR)

- b) With a neat diagram. Explain the architecture of ART, network and write an algorithm to train the network.
22. a) Explain in brief the various schemes of Neuro-Control
 - b) Discuss in detail about Adaptive Neuro-Controller with neat block diagram
23. a) Consider two fuzzy sets given by

(OR)

$$A = \left\{ \frac{1}{LOW} + \frac{0.2}{MEDIUM} + \frac{0.5}{HIGH} \right\} \quad B = \left\{ \frac{0.9}{POSITIVE} + \frac{0.4}{ZERO} + \frac{0.9}{NEGATIVE} \right\} \quad (3)$$

i) Find fuzzy relation for Cartesian product of A and B ie, $R = A \times B$

ii) Introduce a fuzzy set C given by $C = \left\{ \frac{0.1}{LOW} + \frac{0.2}{MEDIUM} + \frac{0.7}{HIGH} \right\}$ (3)

Find the fuzzy relation between C and B using Cartesian product

ie, $S = C \times B$. (8)

iii) Find $C \circ R$ and $C \circ S$ using Max-Min Composition.

(OR)

b) i) Explain in detail the fuzzy conditional statements. (7)

ii) Discuss in brief about the aggregation of fuzzy rules. (7)

24. a) Explain the de-fuzzification methods of fuzzy logic control system.

(OR)

b) Discuss the Design of fuzzy logic controller with an example

25. a) Briefly explain the Optimization of membership function and rule base using Genetic Algorithm with an example

(OR)

b) Explain the Fuzzy Transfer functions in Neural Networks
