SSLC, HSE, DIPLOMA, B.E/B.TECH, M.E/M.TECH, MBA, MCA

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Reg. No. :

Question Paper Code : 70080

M.E./M.Tech. DEGREE EXAMINATIONS, NOVEMBER/DECEMBER 2019
Second Semester
Applied Electronics
AP5251 – SOFT COMPUTING AND OPTIMIZATION TECHNIQUES
(Common to M.E. VLSI Design)
(Regulations 2017)

Time : Three Hours   Maximum : 100 Marks

Answer ALL questions

PART – A   (10×2=20 Marks)

1. Distinguish between artificial neuron and biological neuron.

2. Why Hopfield network is called as recurrent neural network ?

3. What is membership function ?

4. Define Fuzzy inference system.

5. What are regression trees in Neuro-Fuzzy Modeling ?

6. State the rule base structure identification ?

7. What is the difference between interior and external penalty function method ?

8. Define constrained and unconstrained optimization.

9. What is soft computing ?

10. Compare soft computing vs. hard computing.

PART – B   (5×13=65 Marks)

11. a) i) Explain the supervised and unsupervised basic learning laws.   (4)

    ii) Compare Least Mean Square (LMS), perceptron and delta learning laws.   (4)

    iii) Distinguish between artificial neuron and biological neuron.   (5)

(OR)

b) i) Explain the terms cell body, axon, synapse, dendrite and neuron with
   reference to biological Neural Network.   (7)

   ii) What is the purpose of Hopfield Network ? Give an example.   (6)

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12. a) i) Explain about the operations of fuzzy sets. (6)

   ii) Draw and explain the block diagram of a Fuzzy logic system. (7)

(OR)

   b) i) Explain about the fuzzy relations with an example. (5)

   ii) What is Fuzzification ? Illustrate the procedure with the help of an example. (8)

13. a) Explain Coactive Neuro-Fuzzy Modeling in detail. (13)

(OR)

   b) Describe adaptive Neuro-Fuzzy inference system in detail. (13)

14. a) Use Newton's method to find the maximum of $f(x) = 2\sin x - \dfrac{x^2}{10}$ with an initial guess of $x_0 = 2.5$. (13)

(OR)

   b) Use Steepest Descent method to minimize the function $f(x_1, x_2) = 1 - e^{-(10x_1^2 + x_2^2)}$ where, x_1 varies from (-0.2 to 0.2) and x_2 varies from (-0.6 to 0.6). (13)

15. a) Discuss on the terms chromosome, fitness function, crossover and mutation and selection operator as used in genetic algorithms with examples. (13)

(OR)

   b) Explain the working methodology of ant colony optimization with an example. (13)

PART – C   (1×15=15 Marks)

16. a) Consider a function $f(x, y) = x + y$. Use GA with randomly initialized population in the range (-10, 10) for both x and y. Calculate the minimum value of $f(x)$ up to two iterations. (15)

(OR)

   b) Consider a function $f(x) = x(x - 8)$. Use PSO with randomly initialized in the range (-10, 10). Calculate the minimum value of $f(x)$ up to two iterations. (15)

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