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**Question Paper Code : X86434**

M.E./M.Tech. DEGREE EXAMINATIONS, APRIL/MAY 2021  
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 supervised learning and unsupervised learning.
2. Why Hopfield network is called as recurrent neural network ?
3. Define membership functions in fuzzy logic.
4. Draw the block diagram of a Fuzzy inference systems.
5. What is meant by regression trees in neuro-fuzzy modeling ?
6. Sketch the architecture of the co-active neuro-fuzzy inference system.
7. Define the term optimization.
8. Compare the difference between interior penalty function and external penalty function method of optimization.
9. What is meant by building block hypothesis ?
10. Compare soft computing and hard computing.

PART – B

(5×13=65 Marks)

11. a) Explain the construction and principle of operation of machine learning using neural network.

(OR)

- b) Draw and explain the operation of feed forward networks. Also discuss the radial basis function.



12. a) Illustrate the operations on fuzzy sets and fuzzy relations with an example.

(OR)

b) Present a framework of a fuzzy expert system and explain the same.

13. a) Explain the architecture of adaptive neuro-fuzzy inference systems with suitable diagram.

(OR)

b) Describe the methods of data clustering algorithms in neuro-fuzzy modeling.

14. a) Briefly discuss the classification of conventional optimization techniques.

(OR)

b) Discuss the Newton's method and Marquardt methods of optimization.

15. a) Explain the working principle, basic operators and terminologies of genetic algorithm.

(OR)

b) Explain the working methodology of travelling salesman problem in evolutionary optimization.

PART – C

**(1×15=15 Marks)**

16. a) Consider four travel packages offered by Thomas Cook, Club Mahindra, World around and Himalaya Travels. We want to choose one. Their costs are INR 100,000, INR 200,000, INR 150,000 and INR 175,000. Their travel times in hours are 150, 200, 100 and 125 respectively. They are viewed as interesting with degrees 0.4, 0.3, 0.6, 0.5. Define your own fuzzy set of acceptable travel times. Then determine the fuzzy set of interesting travel packages whose cost and travel times are acceptable and use this set to choose one of your own packages.

(OR)

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

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