BIRLA INSTITUTE OF TECHNOLOGY, MESRA, RANCHI
(END SEMESTER EXAMINATION)

CLASS: BE **SEMESTER : VII**
BRANCH: EEE **SESSION : MO/19**

SUBJECT: MEE2101 SOFT COMPUTING TECHNIQUES

TIME: 3:00 HOURS **FULL MARKS: 60**

INSTRUCTIONS:
1. The question paper contains 7 questions each of 12 marks and total 84 marks.
2. Candidates may attempt any 5 questions maximum of 60 marks.
3. The missing data, if any, may be assumed suitably.
***4*. Before attempting the question paper, be sure that you have got the correct question paper.**
5. Tables/Data hand book/Graph paper etc. to be supplied to the candidates in the examination hall.

Q.1(a)	Explain the biological neural network and artificial neural network with suitable diagram.	[2]
Q.1(b)	Elucidate basic models of ANN. Outline different types of learning.	[4]
Q.1(c)	What do you mean by soft computing Technique? With suitable examples illustrate the difference between soft and hard computing.	[6]
Q.2(a)	Differentiate between supervised and unsupervised learning.	[2]
Q.2(b)	Explain linearly and non-linearly separable problems. Write MATLAB codes to implement OR function using multilayer neural network.	[4]
Q.2(c)	Explain the error back propagation algorithm. What are the factors that improve the convergence of learning in a neural network?	[6]
Q.3(a)	With suitable example differentiate between crisp set and fuzzy set.	[2]
Q.3(b)	With suitable example illustrate the extension principle. Generate a graphical illustration of the extension principle for continuous functions.	[4]
Q.3(c)	What are the methods to assign membership function to fuzzy variables? Deduce the membership functions of the following composite linguistic terms i.e. (i) young but not old (ii) young but not too young.	[6]
Q.4(a)	What is max-min and max-product composition?	[2]
Q.4(b)	Explain fuzzy reasoning by considering multiple rules with multiple antecedents.	[4]
Q.4(c)	What is a Genetic Algorithm (GA)? How GA can be implemented to find the maximum value of a single variable function?	[6]
Q.5(a)	With suitable example explain one point crossover, roulette wheel selection procedure in Genetic Algorithm (GA).	[2]
Q.5(b)	Elucidate the procedure of optimizing the weights of a neural network using Genetic Algorithm (GA).	[4]
Q.5(c)	Explain various approaches for hybridizing fuzzy logic, artificial neural network and genetic algorithm. List out any two applications of hybrid system in control engineering.	[6]
Q.6(a)	What is Channel Equalization/Inverse modeling?	[2]
Q.6(b)	Write the algorithm for identification of a non-linear system by applying any variants of artificial neural network.	[4]
Q.6(c)	Draw the flow chat to forecast electrical load consumption in a particular area, using any artificial neural network. Write MATLAB code with proper comment in each line.	[6]
Q.7(a)	What is adaptive control? How soft computing technique can be implemented in this area?	[2]
Q.7(b)	Write short notes on noise cancellation from a signal by applying any variants of artificial neural network.	[4]
Q.7(c)	Write short note on Model reference Control for single input single output plant. Describe the incorporation of Artificial Neural Network (ANN), Fuzzy logic and ANFIS based control in MRAC.	[6]

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