## BIRLA INSTITUTE OF TECHNOLOGY, MESRA, RANCHI (END SEMESTER EXAMINATION MO/SP20\*\*)

CLASS: BTECH SEMESTER: V
BRANCH: EEE SESSION: MO-2022

SUBJECT: EE449 ARTIFICIAL INTELLIGENCE FOR ELECTRICAL ENGINEERING

TIME: 03 Hours FULL MARKS: 50

## INSTRUCTIONS:

- 1. The question paper contains 5 questions each of 10 marks and total 50 marks.
- 2. Attempt all questions.
- 3. The missing data, if any, may be assumed suitably.
- 4. Tables/Data handbook/Graph paper etc., if applicable, will be supplied to the candidates

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Illustrate an intelligent system? Elucidate in brief components of intelligent system. CO-1, PO-1 [2] Define the basic terminology used in multiobjective optimization. Q.1(b) CO-2,PO-2 [3] Q.1(c) Elucidate basic models of ANN. Outline different types of learning. Write notes on any two variants [5] of neural network. CO-2,PO-2 Write short notes on (i) Activation function. (ii) Supervised learning. CO-2,PO-2 Q.2(a) [2] Q.2(b) Develop an algorithm/MATLAB code for implementation XOR function by applying any variants of [3] artificial neural network. CO-3,PO-3 Q.2(c) Draw the flow-chat to forecast electrical load consumption in a particular area, using any variant of [5] artificial neural network. Write MATLAB code with proper comment in each line. CO-4,PO-3 Q.3(a) Describe the methods to assign membership function to fuzzy variables? Write the mathematical [2] equations for different membership function. CO-2.PO-2 Q.3(b) Using negation, hedges and connectives find the membership functions of the following composite [3] linguistic terms (i) more or less old (ii) not young and not old (iii) young but not too young (iv) extremely old. CO-3,PO-3 Explain fuzzy reasoning by considering (i) single rules with multiple antecedents (ii) multiple rules [5] with multiple antecedents. CO-4.PO-4 With suitable example illustrate the extension principle. Generate a graphical illustration of the Q.4.(a) [2] extension principle for continuous functions. CO-3,PO-4 Q.4(b) Write short on fuzzy set-theoretic operations (i) Subset (containment) (ii) Union (disjunction) (iii) [3] Intersection (conjunction). CO-3,PO-4 Describe noise cancellation from a signal (1-dimentional or 2-dimentional) by applying any artificial CO-5.PO-4 intelligence model. Q.5(a) Define the basic terminology in Genetic algorithm. CO-1.PO-2 [2] Q.5(b) Explain various approaches for hybridizing artificial neural network and Genetic Algorithm. Describe [3] any one applications of hybrid system. Describe the steps for finding the maximum value of function f(x), where  $f(x) = x^2$  using genetic [5] algorithm, where 0< x <50. Use Roulette wheel selection method for selecting all the individuals for the next generation. CO-5,PO-5

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