Reg. No. \_\_\_\_\_\_\_\_\_\_\_\_\_



**End Semester Examination – Nov / Dec – 2019**

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| **Code :** | **14EC2061** | **Duration :** | **3hrs** |
| **Sub. Name :** | **SOFT COMPUTING** | **Max. Marks :** | **100** |

**ANSWER ALL QUESTIONS (5 x 20 = 100 Marks)**

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| **Q. No.** | **Sub Div.** | **Questions** | **Course**  **Outcome** | **Marks** |
| 1. | a. | Generate the output of logic AND function by McCulloch-Pitts neuron model. | CO1 | 10 |
| b. | If the net input to an output neuron is 0.64, find its output when the activation function is binary sigmoidal and bipolar sigmoidal, assume λ=1. | CO1 | 5 |
| c. | Distinguish between supervised and unsupervised training. | CO1 | 5 |
| **(OR)** | | | | |
| 2. | a. | Explain the several steps of perceptron training algorithm and develop a perceptron network to implement an AND function: binary inputs and bipolar targets. | CO1 | 15 |
| b. | List the merits and demerits of BPN. | CO1 | 5 |
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| 3. |  | Develop a neuron model with Back Propagation neural network for pattern classification applications. Include training algorithm with mathematical equations. | CO1 | 20 |
| **(OR)** | | | | |
| 4. | a. | Four steps of Hebbian learning of a single networks have been implemented starting with W1 = [1 -1]t for learning constant C=1 using input as follows:  Find final weights for   1. Bipolar binary f(net)= sgn(net) 2. Bipolar binary continuous f(net), λ=1. | CO1 | 15 |
| b. | Exhibit the architecture of an ADALINE. | CO1 | 5 |
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| 5. |  | A railroad company intends to lay a new rail line in a particular part of a county. The whole area through which the new line is passing must be purchased for right-of-way considerations. It is surveyed in three stretches, and the data are collected for analysis. The surveyed data for the road are given by the sets, B1 , B2, and B3, where the sets are defined on the universe of right-of-way widths, in meters. For the railroad to purchase the land, it must have an assessment of the amount of land to be bought. The three surveys on right-of-way width are ambiguous, however, because some of the land along the proposed railway route is already public domain and will not need to be purchased. Additionally, the original surveys are so old (circa 1860) that some ambiguity exists on boundaries and public right-of-way for old utility lines and old roads. The three fuzzy sets B1 , B2, and B3, shown in Figure, respectively, represent the uncertainty in each survey as to the membership of right-of-way width, in meters, in privately owned land. Determine the defuzzified value z\* by using Centroid method, weighted average method and mean-max membership method | CO2 | 20 |
| **(OR)** | | | | |
| 6. | a. | Given three sets A,B and C. Prove DeMorgan’s laws using Venn diagrams. | CO2 | 10 |
| b. | Categorize the properties of crisp sets. | CO2 | 5 |
| c. | State the law of contradiction and law of Excluded Middle for crisp set. | CO2 | 5 |
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| 7. |  | Examine the K-means clustering algorithm for image and speech data compression application. | CO3 | 20 |
| **(OR)** | | | | |
| 8. | a. | Construct an ANFIS architecture that is equiavelent to a two-input two-rule by using first-order Sugeno fuzzy model. | CO3 | 10 |
| b. | Generalize the major components of genetic algorithm in detail. | CO3 | 10 |
|  | | **Compulsory**: |  |  |
| 9. | a. | Explain the concept of CART Algorithm for tree induction in detail. | CO3 | 15 |
| b. | Compute the hybrid learning algorithm using ANFIS. | CO3 | 5 |