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

G:\logo and QP Template\logo 3 Feb 2018 final.tif

**End Semester Examination – Nov/Dec – 2018**

|  |  |  |  |
| --- | --- | --- | --- |
|  |  |  |  |
| **Code :** | **14EC2058** | **Duration :** | **3hrs** |
| **Sub. Name :** | **NEURAL NETWORKS AND FUZZY SYSTEMS** | **Max. marks :** | **100** |

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

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Q. No.** | **Sub Div.** | **Questions** | **Course**  **Outcome** | **Marks** |
| 1. | a. | With suitable diagrams explain how the information is processed in a biological neural network. | CO1 | 15 |
| b. | Discuss the application of artificial neural networks in medical field. | CO2 | 5 |
| (OR) | | | | |
| 2. | a. | Show a two layer Back propagation neural network and give the procedure to adjust the weights of its output layer. | CO1 | 10 |
| b. | Illustrate the pattern classification application of Hebb net for AND function using bipolar input and target vectors. | CO1 | 10 |
|  |  |  |  |  |
| 3. | a. | Describe the training algorithm of Perceptron network for pattern classification applications. | CO1 | 10 |
| b. | Consider a Maxnet with following four nodes with initial activations a1(0) = 0.2, a2(0) = 0.4, a3(0) = 0.6, a4(0) = 0.8; inhibitory weights ε = 0.2. Show the node which is selected by Maxnet. | CO1 | 10 |
| (OR) | | | | |
| 4. | a. | Given the exemplar vectors e(1) = (1,-1,-1,-1) and e(2) = (-1,-1,-1,1), find the exemplar vector closest to the input patterns (1,1,-1,-1), (1,-1,-1,-1), (-1,-1,-1,1) and (-1,-1,1,1) using Hamming network | CO1 | 16 |
| b. | Compare and contrast various competitive networks. | CO1 | 4 |
|  |  |  |  |  |
| 5. | a. | Describe the neighborhood topology and training algorithm of Kohonen’s Self-organizing Map with necessary diagram. | CO1 | 15 |
| b. | Discuss the types of Counter propagation network. | CO1 | 5 |
| (OR) | | | | |
| 6. |  | With necessary diagram illustrate how full counter propagation network can be used to approximate the function y = 1/x. | CO1 | 20 |
|  |  |  |  |  |
| 7. | a. | Define the following with respect to fuzzy sets (i) union (ii) intersection (iii) complement (iv) difference and (v) DeMorgan’s Law. | CO1 | 15 |
| b. | For the given fuzzy sets A = {0.2/x1 + 0.5/x2 + 1/x3}, B = {0.3/y1 + 0.9/y2}, determine the fuzzy relation. | CO1 | 5 |
| (OR) | | | | |
| 8. | a. | With suitable diagram describe the various defuzzification methods | CO3 | 14 |
| b. | Illustrate the graphical approach of inferencing fuzzy if-then rules. | CO1 | 6 |
|  | |  |  |  |
|  | | **Compulsory**: |  |  |
| 9. | a. | Summarize the steps involved in the design of sample fuzzy logic controller. | C03 | 10 |
| b. | Discuss the state variables, control output and fuzzy associative memories for aircraft landing control problem. | CO3 | 10 |