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



**UNIVERSITY**

(Karunya Institute of Technology & Sciences)

(Declared as Deemed-to-be University under Sec.3 of the UGC Act, 1956)

**End Semester Examination – April/May– 2017**

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| **Code :** | **14EC3003** | **Duration :** | **3hrs** |
| **Sub. Name :** | **COMPUTATIONAL INTELLIGENCE AND OPTIMIZATION TECHNIQUES** | **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. | Illustrate the chemical process and the electrical process within the human brain with neat sketches. | CO1 | 15 |
| b. | Point out the significance of various activation functions with mathematical equations. | CO1 | 5 |
| (OR) | | | | |
| 2. | a. | Formulate the training algorithm of Back Propagation Neural network for pattern recognition applications. Support your answer with mathematical equations and neat architecture. | CO1 | 20 |
| 3. | a. | “Hopfield neural network is used to solve the stability problem of conventional neural networks”.Justify this statement with architecture and training algorithm. | CO1 | 15 |
|  | b. | Compare and contrast single layer ANN and multilayer ANN. | CO1 | 5 |
| (OR) | | | | |
| 4. | a. | Frame suitable mathematical techniques for converting a classical variable into fuzzy variable. | CO2 | 10 |
|  | b. | Let  and  Determine: (i) , (ii) , (iii) , (iv) ,  (v) | CO2 | 10 |
| 5. | a. | Outline the various properties and operations of any two fuzzy sets A and B. Use diagrams and mathematical equations wherever necessary. | CO2 | 10 |
|  | b. | Compare and contrast Sugeno model fuzzy systems, Mamdani model fuzzy systems and Tsukamoto model fuzzy systems. | CO2 | 10 |
| (OR) | | | | |
| 6. | a. | Summarize the functions of various layers of Adaptive Neuro Fuzzy Inference Systems with mathematical equations. Support your answer with neat architecture and training algorithm. | CO2 | 20 |
| 7. | a. | Demonstrate the image clustering process using k-means algorithm. | CO2 | 10 |
|  | b. | Describe the mountain clustering and subtractive clustering used for the initialization of clustering algorithms. | CO2 | 10 |
| (OR) | | | | |
| 8. | a. | With neat architecture, explain the Classification and Regression Tree (CART) algorithm for data clustering approaches. | CO2 | 20 |
|  | | **Compulsory**: |  |  |
| 9. | a. | Illustrate the functional methodology of Genertic Algorithm using a neat flow chart. | CO3 | 10 |
|  | b. | Outline the technical concepts of various cross over and mutation operators used in Genetic Algorithm. | CO3 | 10 |