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



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

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| **Code :** | **18EC3011** | **Duration :** | **3hrs** |
| **Sub. Name :** | **COMPUTATIONAL INTELLIGENCE AND OPTIMIZATION TECHNIQUES** | **Max. marks :** | **100** |

**ANSWER ANY FIVE QUESTIONS (5 x 16 = 80 Marks)**

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| **Q. No.** | **Sub Div.** | **Questions** | **Course**  **Outcome** | **Marks** |
| 1. | a. | With neat diagrams, illustrate the electrical operations and chemical operations within the human brain. Also, outline the significances of human brain in comparison to the computer. | CO1 | 8 |
| b. | Distinguish between supervised and unsupervised training algorithms. | CO1 | 8 |
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| 2. | a. | Formulate the training algorithm of Back Propagation neural network with neat architecture. Support your answer with necessary mathematical equations. | CO1 | 8 |
| b. | “Hopfield neural networks are more stable than other conventional neurla networks”. Justify this statement with necessary mathematical equations. | CO1 | 8 |
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| 3. | a. | How will you convert classical values into fuzzy values? Validate your methods with necessary graphical illustrations and mathematical expressions. | CO3 | 8 |
| b. | Using the concepts of fuzzy logic, develop a framework for the fuzzy logic controller for any industrial application. | CO3 | 8 |
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| 4. |  | With neat architecture, explain the functions of different layers of Adaptive Neuro Fuzzy Inference Systems (ANFIS). How will you train the premise parameters and consequent parameters in the ANFIS system. | CO4 | 16 |
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| 5. | a. | With a neat flowchart, illustrate the methodology of optimization using Particle Swarm Optimization technique. Use mathematical equations wherever necessary. | CO5 | 8 |
| b. | With neat diagrams, outline the significances of various reproduction operators used in genetic algorithm for data optimization. | CO5 | 8 |
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| 6. | a. | How will you solve the “plasticity-stability” problem of conventional neural networks using Adaptive Resonance Theory neural networks? | CO2 | 8 |
| b. | Distinguish between Fuzzy C-means algorithm and k-means algorithm used for data clustering applications. | CO4 | 8 |
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| 7. |  | With neat diagrams, illustrate the operation of CART algorithm used for solving the classification and regression problems in data analysis. Use mathematical equations wherever necessary. | CO4 | 16 |
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| **COMPULSORY QUESTION (1 x 20 = 20 Marks)** | | | | |
| 8. | a. | How will you use the concept of artificial neural networks for improving the accuracy of classification process in medical image analysis? | CO6 | 10 |
| b. | With an example, illustrate the application of fuzzy logic concepts in any pattern recognition fields. | CO6 | 10 |