Register No.:   ………………………………   Name: …………………………………………………………..

SAINTGITS COLLEGE OF ENGINEERING (AUTONOMOUS)
(AFFILIATED TO APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY, THIRUVANANTHAPURAM)
SECOND SEMESTER M.C.A DEGREE EXAMINATION (Regular), JULY 2022
(2021 SCHEME)

Course Code: **21CA203-D**

Course Name: **Computational Intelligence**

Max. Marks: **60**   Duration: 3 Hours

PART A
(Answer all questions. Each question carries 3 marks)

1. What is computational intelligence?
2. Compare statistical uncertainty and non-statistical uncertainty.
3. Write short notes on cross over and mutation.
4. What is evolutionary computation implementation?
5. Compare autoassociative neural networks with heteroassociative neural networks.
6. Draw the diagram of a two-layer fully connected feed-forward neural network and present its weight matrix.
7. What is fuzziness? Write any two examples.
8. What are the advantages of using fuzzy controllers?
9. Establish the relationship between the fuzzy system and the genetic algorithm in the evolutionary fuzzy rule system.
10. Compare and contrast fuzzy systems and neural networks.

PART B
(Answer one full question from each module, each question carries 6 marks)

MODULE I

11. What are the key elements of computational intelligence? Explain.   (6)

OR

12. Write a note on computational intelligence application areas.   (6)

MODULE II

13. Explain the steps involved in genetic programming (GP) implementation.   (6)

OR

14. What is particle swarm optimization? Write the process for implementing its global version.   (6)

MODULE III

15. What are activation functions? Explain five activation functions with proper definitions and graphs.   (6)

OR

16. Differentiate two-layer and multilayer neural network topologies. Draw supporting diagrams.   (6)

MODULE IV

17. Fuzzy sets V and W are defined on the same universe of five individuals as follows:

$$V = \{\frac{1.0}{q} + \frac{0.8}{r} + \frac{0.6}{s} + \frac{0.20}{t} + \frac{0}{u}\}$$
$$W = \{\frac{1.0}{q} + \frac{0.6}{r} + \frac{0.45}{s} + \frac{0.15}{t} + \frac{0}{u}\}$$

For V and W, find *a)* $V \cap W$ *b)* $V \cup W$ *c)* $\tilde{V}$ *d)* $\tilde{W}$ *e)* $\tilde{V} \cap W$ *f)* $V \cup \tilde{W}$ (6)

OR

18. What are the commonly used defuzzification methods? Explain.   (6)

MODULE V

19. Explain the ga() routine in the fuzzy evolutionary fuzzy rule system implementation.   (6)

OR

20. Draw and explain computational intelligence data mining system.   (6)

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