

Gandhi Institute of Engineering and Technology University, Odisha, Gunupur (GIET University)

M.C.A. (Fourth Semester - Regular) Examinations, April - 2026

MCA23431 – Soft Computing



Time: 3 hrs

Maximum: 60 Marks

(The figures in the right-hand margin indicate marks)

PART – A

(2 x 5 = 10 Marks)

Q.1. Answer **ALL** questions

	CO #	Blooms Level
a. Why sigmoid activation function is one of the most widely used function?	CO1	K2
b. How does ART handle the stability-plasticity trade-off?	CO2	K2
c. What is role of membership function in fuzzy sets?	CO3	K2
d. Explain the role of fitness function in genetic algorithm.	CO4	K2
e. How do neural network contribute to hybrid systems?	CO5	K2

PART – B

(10 x5=50 Marks)

Answer **ALL** questions

	Marks	CO #	Blooms Level
2. a. Explain supervised, unsupervised & reinforcement learning.	5	CO1	K2
b. Describe briefly about the classification of different types of activation function used.	5	CO1	K2
(OR)			
c. Differentiate between linearly separable & linearly non-separable problems.	5	CO1	K2
d. What are the different types of neural networks? Explain briefly.	5	CO1	K2
3.a. Write a short note on general ART architecture.	5	CO2	K2
b. Explain how Autocorrelators (HAM) & Heterocorrelators (BAM) differs from each other.	5	CO2	K2
(OR)			
c. Compare & contrast between neural network, fuzzy logic & genetic algorithm.	5	CO1	K2
d. Explain the working principle of an artificial neuron with help of a diagram.	5	CO1	K2
4.a. Differentiate between fuzzification & defuzzification.	5	CO3	K2
b. Compare & contrast crisp logic, fuzzy logic & predicate logic.	5	CO3	K2
(OR)			
c. Discuss role of membership function in fuzzy set theory & how they affect system behaviour.	5	CO3	K2
d. Differentiate between Mamdani FIS & Sugeno FIS. Which one is better for real-time applications?	5	CO3	K5
5.a. Compare genetic algorithm & traditional optimization method. What is the importance of maintaining genetic diversity in GA?	5	CO4	K4
b. With a neat flowchart, explain the working principle of genetic algorithm.	5	CO4	K2
(OR)			
c. Explain the importance of parameter tuning (mutation rate, crossover rate, population size) in genetic algorithm.	5	CO4	K2
d. Discuss mutation operator & their impact on the performance of genetic algorithm.	5	CO4	K2

6.a.	Differentiate between traditional AI-based approaches & soft computing-based approaches. In which applications is soft computing preferred?	5	CO5	K2
b.	Explain how neural network, fuzzy logic & genetic algorithm work together in hybrid computing?	5	CO5	K2
(OR)				
c.	Discuss some real-world applications of soft computing. How do hybrid model improve decision making & optimization?	5	CO5	K4
d.	What are the major challenges in implementing a hybrid NN-FL-GA system? How hybrid computing address these challenges?	5	CO5	K2

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