

**GANDHI INSTITUTE OF ENGINEERING AND TECHNOLOGY UNIVERSITY, ODISHA, GUNUPUR
(GIET UNIVERSITY)**

M.Tech. (Second Semester) Regular Examinations, July – 2025

24MCSPC12002 – Soft Computing

(CSE)



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. What is uncertainty and why is it important to handle in soft computing?	CO1	K1
b. What are the main applications of ANN in real-world problems?	CO2	K1
c. What is a fuzzy relation? How does it differ from a crisp relation?	CO3	K2
d. Differentiate between derivative-based and derivative-free optimization?	CO4	K1
e. What are the components of a Genetic Programming system?	CO5	K2

PART – B

(10 x 5=50 Marks)

Answer **ALL** the questions

	Marks	CO #	Blooms Level
2. a. What is machine learning? Explain its role in the context of soft computing?	5	CO1	K1
b. Describe the structure and working of a Bayesian network with an example?	5	CO1	K1
(OR)			
c. What is probabilistic reasoning? Explain it with the help of Pearl's evidential reasoning scheme?	5	CO1	K2
d. Explain the Dempster-Shafer Theory of uncertainty. How is it different from Bayesian reasoning?	5	CO2	K1
3.a. Explain the structure and function of a biological and an artificial neuron with diagrams.	5	CO3	K2
b. Explain the McCulloch-Pitts model in detail. How is it used to implement logical operations?	5	CO3	K3
(OR)			
c. Explain the ADALINE and MADALINE models with architecture and learning principles.	5	CO4	K3
d. What is the Backpropagation algorithm? Describe its steps and mathematical formulation?	5	CO3	K1
4.a. How are fuzzy sets used in approximate reasoning? Explain with a suitable example?	5	CO4	K1
b. Explain Sugeno fuzzy model. Compare it with the Mamdani model based on inference, complexity, and application?	5	CO5	K2
(OR)			
c. What is a fuzzy rule base system? Explain the formation, decomposition, and aggregation of fuzzy rules.	5	CO4	K1
d. Describe the role of membership functions in fuzzy systems. Explain various types of membership functions?	5	CO5	K2
5.a. Explain the components of GA: fitness function, selection, crossover, and mutation in detail?	5	CO5	K2

b.	Compare genetic algorithms with traditional optimization techniques in terms of approach, convergence, and efficiency?	5	CO5	K3
(OR)				
c.	Describe Newton's optimization method in detail. How is it different from the steepest descent?	5	CO4	K2
d.	Explain the working of Genetic Programming with an example?	5	CO6	K1
6.a.	Write a detailed note on the use of soft computing in predictive financial modelling?	5	CO4	K1
b.	Discuss the application of soft computing in smart cities and urban planning?	5	CO4	K3
(OR)				
c.	Discuss a real-time industrial application of ANFIS?	5	CO5	K3
d.	Discuss the integration of fuzzy systems with IoT for smart home applications?	5	CO6	K3

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