

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

M.Tech. (Second Semester - Regular) Examinations, May – 2026

24MSCPC12002 – Soft Computing



Time: 3 hrs

Maximum: 60 Marks

Answer ALL questions

(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. Define Soft Computing. List the components of Soft Computing. | CO1 | K1 |
| b. What is defuzzification? Name any two defuzzification methods. | CO2 | K2 |
| c. Define α -cut of a fuzzy set with example. | CO2 | K2 |
| d. What is activation function? Name any four activation functions used in ANN. | CO3 | K1 |
| e. Mention four real life application of genetic algorithm. | CO4 | K2 |

PART – B

(10 x 5 = 50 Marks)

Answer **ALL** the questions

- | | Marks | CO # | Blooms Level |
|--|-------|------|--------------|
| 2. a. Differentiate between Hard Computing and Soft Computing with suitable examples. | 5 | CO1 | K2 |
| b. Write the real life applications of soft computing. | 5 | CO6 | K2 |
| (OR) | | | |
| c. Analyse the role of uncertainty and imprecision in real-world problems and explain how Soft Computing handles them effectively? | 5 | CO6 | K3 |
| d. Explain with suitable example supervised and unsupervised learning. | 5 | CO1 | K1 |
| 3.a. Construct fuzzy IF–THEN rules for a temperature control system having linguistic variables Low, Medium and High. | 5 | CO2 | K4 |
| b. Two fuzzy sets are given as:
$A = \{0.4/2, 0.7/3, 0.8/4, .8/5, 0.8/6, 0.6/7, 0.5/8\}$
$B = \{0.5/2, 0.7/4, 1/5, 0.4/7\}$ | 5 | CO2 | K3 |
| Find the following operation on the given 2 fuzzy sets. | | | |
| (i) Intersection (ii) Union (iii) Difference | | | |

(OR)

c. Two fuzzy relations are given as

$$R_1 = \begin{bmatrix} 0.3 & 0.1 & 0.7 & 0.3 \\ 0.0 & 1.0 & 0.3 & 0.2 \end{bmatrix} \quad R_2 = \begin{bmatrix} 1.0 & 0.0 & 1.0 \\ 0.0 & 0.6 & 0.4 \\ 0.7 & 0.9 & 0.6 \\ 0.1 & 0.0 & 0.2 \end{bmatrix}$$

Find Max-min Composition.

- | | | | |
|--|---|-----|----|
| d. Explain the architecture of a Fuzzy Inference System with neat diagram. | 5 | CO2 | K1 |
| 4.a. Describe different ANN architectures with neat sketches. | 5 | CO3 | K2 |
| b. Briefly explain Radial Basis Function Networks. | 5 | CO3 | K1 |

(OR)

c.	A neuron has inputs $x_1 = 1$, $x_2 = 0$, $x_3 = 1$ with corresponding weights $w_1 = 0.4$, $w_2 = -0.2$, $w_3 = 0.6$ and bias $= 0.1$. Calculate the net input and output using binary step activation function.	5	CO3	K3
d.	Design a simple ANN model for pattern recognition and explain its working	5	CO3	K2
5.a.	Explain the basic structure and working procedure of Genetic Algorithm.	5	CO4	K1
b.	What are the different types of crossover operation used in Genetic Algorithm?	5	CO4	K1
(OR)				
c.	Given the fitness values of chromosomes as 10, 20, 30 and 40, calculate the selection probability of each chromosome using roulette wheel selection.	5	CO4	K4
d.	Differentiate between GA and traditional optimization methods.	5	CO4	K2
6.a.	Explain Simulated Annealing with an example	5	CO5	K1
b.	What is a Hybrid Soft Computing System? Explain with examples.	5	CO6	K2
(OR)				
c.	Evaluate the advantages of hybrid soft computing over standalone soft computing techniques.	5	CO5	K3
d.	Write short notes on evolutionary computing.	5	CO6	K1

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