PRN:		Course Code :	CST27072

Final Year **B. Tech** End Semester Examination Winter 2023

Soft Computing

Day and Date: Tuesday, 05/12/2023 Max Marks: **100**

Time : 2-00 to 5-00 PM Duration: **03** hrs

		Marks	Bloom's Level	CO
Q.1	**Attempt the following**			
a)	How is soft computing different from hard computing? Explain	08	L4	1
b)	How to Represent classical sets and fuzzy sets? Explain	08	L4	1
	OR			
b)	Determine the characteristics of soft computing and fundamental paradigms.	08	L3	1
Q.2				
a)	Consider the two fuzzy sets and execute the operations $A = \{0.7, 0.4, 0.3, 0.8, 0.9, 0.6\}$ $B = \{0.4, 0.2, 0.3, 0.8, 0.8, 0.3\}$ i) $A \cup B$ ii) $A \cap B$ iii) $\bar{A} \cup \bar{B}$ iv) $\bar{A} \cap \bar{B}$	08	L3	2
b)	Determine the various Fuzzy set operations and try to illustrate with an example by using union operation of fuzzy sets	08	L3	2
	OR			
b)	Determine the various Fuzzy set operations and try to illustrate with an example by using intersection operation of fuzzy sets	08	L3	2
Q.3	**Attempt any two from the following**			
a)	Explain the Block diagram of Fuzzy Inference System	08	L4	2
b)	Explain the Fuzzy Inference Algorithms and different cases of Fuzzy inference algorithms.	08	L4	2
c)	How to convert fuzzy sets to crisp sets? Solve the following with Lambda cut method	08	L6	2
Q.4	**Attempt any two from the following**			
a)	Explain various types of cross over operations and Apply single-point crossover on the following binary strings and generate two offspring A --- 0110100101 B --- 0100110010	08	L6	4
b)	Solve the following Knapsack problem by using Genetic Algorithm	08	L6	4

Items	Weight	Value
A	8kg	16
B	9kg	7
C	10kg	14
D	6kg	9

c)	Explain the various steps involved in Genetic algorithm and solve the following problem by applying the function maximize $F(x) = X^3$ Genotype – 0-31 Population N = 4	08	L6	4

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Q.5 **Attempt any Two of the following**

a) What is pareto optimality? Solve the following problem There are 9 types of Air Tickets with different time and cost details. Choose from them with minimum cost and minimum duration. 09 L6 4

Ticket Type	Time(in Hours)	Cost(in rupees 000)
A	2	7.5
B	3	6
C	3	7.5
D	4	5
E	5	6.5
F	5	4.5
G	5	6
H	5	7
I	6	6.5

b) Solve Travelling sales man problem by using Ant Colony Optimization. 09 L4 4

c) Generate Two Off Springs by using Genetic Alogirhm Take the range (0, 30) fitness function $F(x) = X^2+2x$ 09 L4 4

Q.6 **Attempt any Two of the following**

a) What is deep learning, Explain its uses and applications. 09 L4 4

b) What is semi – supervised learning? Explain 09 L4 4

c) What is PCA (Principle Component Analysis) and RNN? Explain. 09 L4 4

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