Dr. A.P.J. Abdul Kalam Technical University (AKTU) · B.Tech Theory Examination

Application of Soft Computing

KCS056 · 2021

Time: 3 Hours **Max. Marks: 100**

Attempt all Sections.
If require any missing data; then choose suitably.

SECTION A

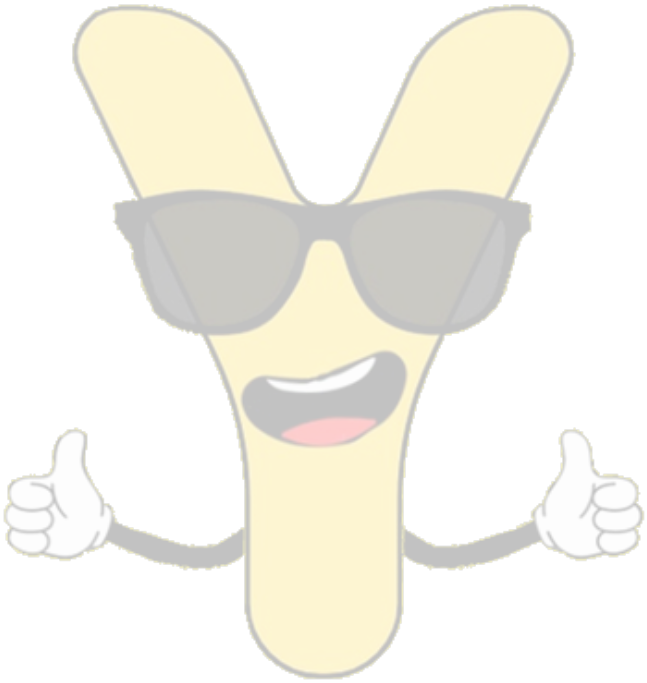
1(a)	Show the importance of fuzzy sets over classical sets.	2	U3
1(b)	Identify the necessity of bias in neural network.	2	U1
1(c)	Consider set X = {2, 4, 6, 8, 10}. Find its power set, cardinality, and cardinality of power set.	2	U3
1(d)	Define time dependent fuzzy logic.	2	U3
1(e)	Differentiate between soft computing and hard computing.	2	U1
1(f)	Justify how rank selection method is different from roulette wheel selection method?	2	U5
1(g)	Discuss the impact of weight in ANN.	2	U2
1(h)	Differentiate between supervised and unsupervised learning.	2	U1
1(i)	Differentiate between absolute and relative Quantifier.	2	U4
1(j)	Analyze how convergence of GA is achieved.	2	U5

SECTION B

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2(a)	Describe multilayer perceptron model. Does perceptron require supervised learning? If no, what does is require? Support your answer.	10	U1
2(b)	Explain Generation cycle. What are the different applications of Genetic Algorithm?	10	U5
2(c)	Draw the architecture of back propagation algorithm. State the importance of Back propagation algorithm.	10	U2
2(d)	Illustrate various defuzzification methods in details.	10	U4
2(e)	Discuss in detail how crisp logic is different from fuzzy logic.	10	U3

SECTION C



3(a)	Apply Hebb rule method to develop logical AND function (take bipolar inputs and targets).	10	U1
3(b)	Differentiate between recurrent network and multilayer feed forward network.	10	U1
4(a)	Illustrate Multilayer perceptron model in detail. Compare feed-forward and feedback networks.	10	U2
4(b)	Draw the architecture of back propagation algorithm. State the importance of Back propagation algorithm.	10	U2
5(a)	Consider fuzzy relations: R= Y1 Y2 X1 0.3 0.2 X2 0.5 0.8 X3 0.7 0.4 S= Z1 Z2 Y1 0.6 0.1 Y2 0.3 0.5 Find T=RoS a. Using max-min composition b. Using max-product composition Using max-average composition	10	U3
5(b)	Discuss Fuzzification? Explain any three methods of fuzzification in detail.	10	U3
6(a)	We want to compare two liquid level controllers for their control levels and flow Speed. The following values of flow speed and liquid control levels were recorded. Flow speed(X): 0 20 40 60 80 100 Level1 (L1): 0 0.5 0.35 0.75 0.95 1.0 Level (L2): 0 0.45 0.55 0.65 0.9 1.0 Show the output of the following: (a) μL1 U L2(x) (b) μL1 ∩ L2(x) (c) μL1^c (x) (d) μ L2^c(x) (e) μL1^c U L2^c(x) (f) μL1^c ∩ L2^c(x) (g) μL1^c ∩ L2(x) (h) μL1 U L2^c(x) (i) μL1 U L1^c(x)	10	U4

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6(b)	With a neat block diagram explain the architecture of a fuzzy logic controller.	10	U4
7(a)	Explain various operators involved in Genetic Algorithm. What are the various types of crossover and mutation techniques? Create an example to show these operators.	10	U5
7(b)	Design and discuss the flowchart of GA. How Genetic algorithms are very different from most of the traditional optimization methods?	10	U5

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