

PSG COLLEGE OF ARTS & SCIENCE
(AUTONOMOUS)

MSc DEGREE EXAMINATION DECEMBER 2023
(First Semester)

Branch – COMPUTER SCIENCE

SOFT COMPUTING

Time: Three Hours

Maximum: 75 Marks

SECTION-A (10 Marks)

Answer ALL questions
ALL questions carry EQUAL marks

(10 × 1 = 10)

Module No.	Question No.	Question	K Level	CO
1	1	Artificial neural network used for a) Pattern Recognition b) Classification c) Clustering d) All of these	K1	CO1
	2	A Neural Network can answer a) For Loop questions b) What-if questions c) IF-The-Else Analysis questions d) None of these	K2	CO2
2	3	In artificial Neural Network interconnected processing elements are called a) Nodes or neurons b) Weights c) Axons d) Soma	K1	CO1
	4	Neuron can send _____ signal at a time. a) Multiple b) One c) None d) Any number of	K2	CO2
3	5	Genetic algorithm belong to the family of method in the a) Artificial intelligence area b) Optimization area c) Complete enumeration family of methods d) Non-computer based isolation area	K1	CO1
	6	A crossover operator proceeds in how many steps? a) 5 b) 4 c) 3 d) 2	K2	CO2
4	7	What would be the name of a network that includes backward links from a given output to its inputs along with the hidden layers? a) Recurrent neural network b) Multi-layered perceptron c) Self-organising maps d) Perceptron	K1	CO1
	8	_____ represents the fuzzy logic. a) IF-THEN rules b) IF-THEN-ELSE rules c) Both a & b d) None of the above	K2	CO2
5	9	When we say that the boundary is crisp? a) Distinguish two regions clearly b) Cannot Distinguish two regions clearly c) Collection of ordered pairs d) None of these	K1	CO1
	10	Fuzzy Computing a) mimics human behavior b) deals with imprecise, probabilistic c) exact information d) both a and b	K2	CO2

Cont...

SECTION - B (35 Marks)

Answer ALL questions

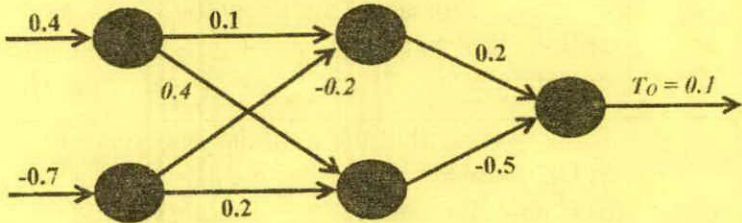
ALL questions carry EQUAL Marks (5 × 7 = 35)

Module No.	Question No.	Question	K Level	CO
1	11.a.	Write short notes on basic elements of artificial neuron.	K3	CO3
		(OR)		
	11.b.	Explicate the Crisp operations with example.		
2	12.a.	Discuss the basic concepts of Genetic Algorithm.	K3	CO3
		(OR)		
	12.b.	Explicate the Back Propagation Algorithm with suitable example.		
3	13.a.	Discuss various types of Cross Over with example.	K2	CO2
		(OR)		
	13.b.	Give a brief note on various Learning Methods in Back Propagation.		
4	14.a.	Discuss the Crisp operations with example.	K3	CO2
		(OR)		
	14.b.	Explicate different types of Encoding with example.		
5	15.a.	Write short note on Neural Network Architecture and its characteristics.	K3	CO3
		(OR)		
	15.b.	Mention the Fuzzy Operations with example.		

SECTION - C (30 Marks)

Answer ANY THREE questions

ALL questions carry EQUAL Marks (3 × 10 = 30)

Module No.	Question No.	Question	K Level	CO																											
1	16	Discuss the following: (i) Single Layer (ii) Multi Layer (iii) Recurrent Network.	K4	CO4																											
2	17	<p>Consider a typical problem where there are 5 training sets. Apply Back Propagation Algorithm.</p> <p>Table: Training sets</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th rowspan="2">S. No.</th> <th colspan="2">Input</th> <th>Output</th> </tr> <tr> <th>I₁</th> <th>I₂</th> <th>O</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>0.4</td> <td>-0.7</td> <td>0.1</td> </tr> <tr> <td>2</td> <td>0.3</td> <td>-0.5</td> <td>0.05</td> </tr> <tr> <td>3</td> <td>0.6</td> <td>0.1</td> <td>0.3</td> </tr> <tr> <td>4</td> <td>0.2</td> <td>0.4</td> <td>0.25</td> </tr> <tr> <td>5</td> <td>0.1</td> <td>-0.2</td> <td>0.12</td> </tr> </tbody> </table> <p>In this problem, there are two inputs and one output.</p> <ul style="list-style-type: none"> The values lie between -1 and +1 i.e., no need to normalize the values. Assume two neurons in the hidden layers. The NN architecture is shown in the Fig. below.  <p>Input the first training set data</p>	S. No.	Input		Output	I ₁	I ₂	O	1	0.4	-0.7	0.1	2	0.3	-0.5	0.05	3	0.6	0.1	0.3	4	0.2	0.4	0.25	5	0.1	-0.2	0.12	K3	CO2
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	I ₁	I ₂	O																												
1	0.4	-0.7	0.1																												
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3	0.6	0.1	0.3																												
4	0.2	0.4	0.25																												
5	0.1	-0.2	0.12																												
3	18	Explain Max-Min Composition with Example.	K3	CO4																											
4	19	Explain the algorithmic steps involved to solve any one of the optimization problem using Hopfield neural network . State the problem clearly and explain the mapping of the same to the Hopfield network.	K3	CO3																											
5	20	With neat diagram, enumerate the concept of McCulloch-Pitts Model.	K3	CO5																											