CLASS: BTECH   SEMESTER : VII
BRANCH: ECE   SESSION : MO/2023

SUBJECT: EC415 NEURAL NETWORK AND FUZZY SYSTEM
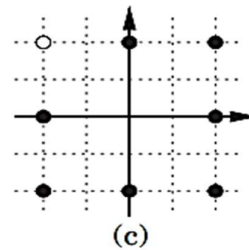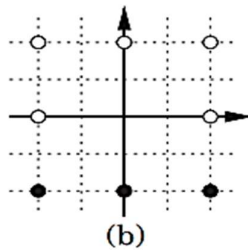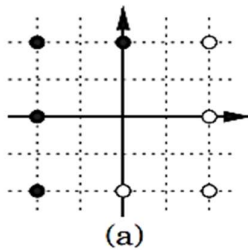TIME: 02 HOURS   FULL MARKS: 25

INSTRUCTIONS:
1. The question paper contains 5 questions each of 5 marks and total 25 marks.
2. Attempt all questions.
3. The missing data, if any, may be assumed suitably.
4. Tables/Data handbook/Graph paper etc., if applicable, will be supplied to the candidates

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			CO	BL
Q.1(a)	What is the basic structure of a biological neuron, and what are its main components? Give the analogies between biological and artificial neuron.	[2]	CO1	LOW
Q.1(b)	List out the capabilities of Artificial neural network.	[3]	CO1	LOW
Q.2(a)	What are the different learning strategies used in artificial Neural networks? Explain briefly.	[2]	CO1	LOW
Q.2(b)	Solve the following classification problems shown in following figures by drawing decision boundaries. Find weight and bias values that result in single neuron perceptron with the chosen decision boundaries.	[3]	CO2	HIGH

(a)   (b)   (c)

			CO	BL
Q.3(a)	How the McCulloch-Pitts Neuron is different from Perceptron? What is its limitation?	[2]	CO1	MEDIUM
Q.3(b)	A produce dealer has a warehouse that stores apples and oranges. When fruit is brought to the warehouse, fruits may be mixed. The dealer wants a machine that will sort the fruit according to type. There is a conveyer belt on which the fruit is loaded. This conveyer passes through a set of sensors, which measure three properties of the fruit: shape, texture, and weight. The three sensor outputs will then be input to a neural network. The purpose of the network is to decide which kind of fruit is on the conveyor, so that the fruit can be directed to the correct storage bin. Prepare a machine learning setup to solve this using the Perceptron network. Consider sigmoid function as the activation function.	[3]	CO2	HIGH
Q.4(a)	Obtain the output of the neuron Y connected to a set of input neurons with input x=[0.8 0.6 0.4] and corresponding weights w=[0.1 0.3 -0.2]. Use binary sigmoid as the activation function.	[2]	CO2	MEDIUM
Q.4(b)	Derive the Gradient descent algorithm for updating the weights and bias of a Neural Network.	[3]	CO2	MEDIUM
Q.5(a)	Explain how the Radial Basis Functional network can convert the nonlinearly separable problem into linearly separable problem.	[2]	CO3	MEDIUM
Q.5(b)	Justify the above answer by solving a XOR problem using RBF.	[3]	CO3	HIGH