

Philadelphia University Faculty of Engineering

Marking Scheme

Exam Paper

BSc CE

Neural Networks and Fuzzy Logic (630514)

Second Exam

Summer semester

Date: 16/08/2017

Section 1

Weighting 20% of the module total

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Marking Scheme Neural Networks and Fuzzy Logic (630514)

The presented exam questions are organized to overcome course material through 4 questions. The *all questions* are compulsory requested to be answered.

Marking Assignments

Question 1 This question is attributed with 8 marks if answered properly; the answers are as following:

- 1) Input units of a Neural Network can be **adjusted** during a learning process.
 - a) True b)
- 2) State whether **Hebb's law** is **supervised** learning or **unsupervised** type?
 - a) Supervised
 - b) Unsupervised
 - c) Either supervised or unsupervised
 - d) Can be both supervised and unsupervised
- 3) In Hebbian learning, the initial weights are set?
 - a) To zero b) Random
 - c) Near to target value d) None of the above
- 4) In a three layer network, **shape** of dividing surface (decision boundary) is determined by?

a)	Number of units in second layer
b)	Number of units in third layer
c)	Number of units in second and third layer
d)	None of the mentioned

5) What is the biggest difference between **Widrow & Hoff's Delta Rule** and the **Perceptron Learning Rule** for learning in a single-layer feedforward network?

a)	There is no difference.
b)	The Delta Rule is defined for step activation functions, but the Perceptron Learning Rule is defined for linear activation functions.
C)	The Delta Rule is defined for sigmoid activation functions, but the Perceptron Learning Rule is defined for linear activation functions.
d)	The Delta Rule is defined for linear activation functions, but the Perceptron Learning Rule is defined for step activation functions.

6) What is gradient descent?

a)	Method to find the absolute minimum of a function
b)	Method to find the absolute maximum of a function
c)	Maximum or minimum, depends on the situation
d)	None of the mentioned

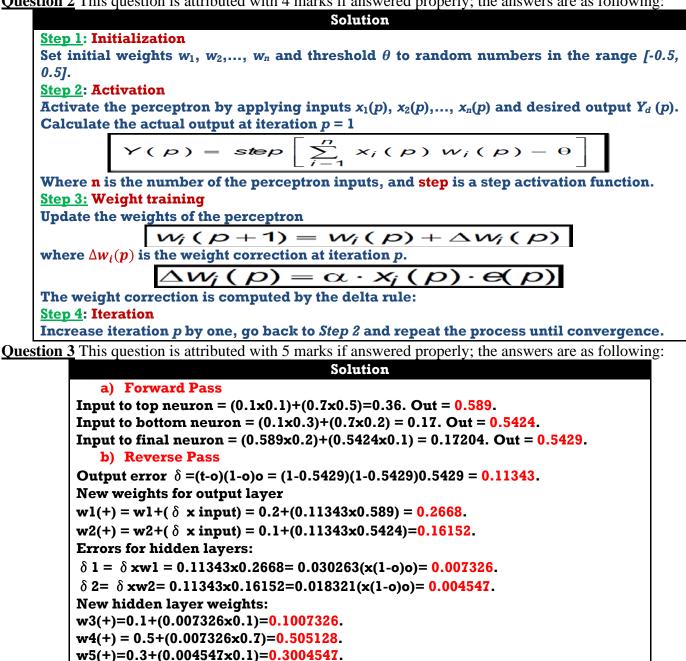
The number of fundamental memories M_{max} (Most perfectly retrieved) that can be stored in the n-neuron Hopfield network is limited by

a)	$M_{max} = 0.15 n$	b)	$M_{max}=\frac{n}{4\ln n}$
c)	$M_{max} = \frac{n}{2 \ln n}$	d)	None of above

8) What is **asynchronous** update in a network?

a)	Update to all units is done at the same time
b)	Change in state of any number of units drive the whole network
C)	Change in state of any one unit drive the whole network
d)	None of the mentioned

Question 2 This question is attributed with 4 marks if answered properly; the answers are as following:



$$w_{6}(+) = 0.2 + (0.004547 \times 0.7) = 0.20318.$$

Question 4 This question is attributed with 3 marks if answered properly; the answers are as following: