(K*nowledge for Development)*

KIBABII UNIVERSITY COLLEGE

A CONSTITUENT COLLEGE OF
MASINDE MULIRO UNIVERSITY OF
SCIENCE AND TECHNOLOGY

UNIVERSITY EXAMINATIONS

2014/2015 ACADEMIC YEAR

FOURTH YEAR SECOND SEMESTER

MAIN EXAMINATION

FOR THE DEGREE OF BSC INFORMATION TECHNOLOGY

COURSE CODE: CSC 466E

COURSE TITLE: NEURAL NETWORKS

DATE: 29TH APRIL, 2015 **TIME:** 3.00PM-5.00PM

INSTRUCTIONS TO CANDIDATES

Answer Question One in Section A and Any other TWO (2) Questions in Section B

TIME: 2 Hours

This Paper Consists of 3 Printed Pages Please Turn Over.

SECTION A

ANSWER ALL QUESTIONS FROM THIS SECTION (30 MARKS)

Question One

a) List the main differences between the perceptron and the McCullough-Pitts neuron?

(5 Marks)

b) Define the following terminologies

i. Neural Networks

ii. Artificial Neural Networks

(2 Marks)

c) Formulating neural network solutions for particular problems is a multi-stage process. Outline general Procedure for Building Neural Networks

(6 Marks)

d) How does Delta rule (DR) differ from the Perceptron Learning Rule (PLR)

(2 Marks)

e) An ADALINE is similar to a linear neuron with an extra feedback loop. Outline THREE main uses of ADALINE

(3 Marks)

f) Define the features of reinforcement learning?

(4 Marks)

g) A network as a whole will usually learn most efficiently if all its neurons are learning at roughly the same speed. So maybe different parts of the network should have different learning rates η. Outline FOUR factors that may affect the choices?

(4 Marks)

h) Explain the two basic goals for neural networks research?

(4 Marks)

SECTION B
ANSWER ANY TWO QUESTIONS FROM THIS SECTION (40 MARKS)

Question Two

a) Describe the basic structure and components of a simple biological neuron. What is the role of each component

(12 Marks)

b) Illustrate step-by-step Perceptron Learning Algorithm.

(8 Marks)

Question Three:

a) Learning methods in neural networks can further be categorized based on the rules used. Write short notes on the following learning methods in neural networks.

i. Hebbian,
ii. Gradient descent,
iii. Competitive and
iv. Stochastic learning

(12 Marks)

b) Explain FOUR major applications of neural networks.

(8 Marks)

Question Four:

a) Describe how McCulloch-Pitts neuron works.

(8 Marks)

b) Briefly explain THREE fundamentally different classes of networks architectures.

(12 Marks)

Question Five:

a) Briefly explain the following forms of learning:

i) Supervised Learning
ii) Unsupervised Learning
iii) Reinforced Learning

(6 Marks)

b) Describe the basic components of a neuron.

(14 Marks)