MACHAKOS UNIVERSITY

University Examinations for 2018/2019

SCHOOL OF ENGINEERING AND TECHNOLOGY

DEPARTMENT OF COMPUTING AND INFORMATION TECHNOLOGY

FOURTH YEAR SPECIAL/SUPPLEMENTARY EXAMINATION FOR

BACHELOR OF SCIENCE (COMPUTER SCIENCE)

SCO411: NEURAL NETWORKS

DATE: 23/9/2019 **TIME: 11:00 – 1:00 PM**

INSTRUCTIONS:

Answer question **ONE** and Any other **Two** among the four selective questions

QUESTION ONE (COMPULSORY) (30 MARKS)

a) Differentiate between neural networks (NN) and Artificial Neural Networks (ANN) (4 marks)

b) Identify and explain three broad types of learning in ANN (9 marks)

c) Discuss the components of Artificial Neural Network including the model of *McCulloch-Pitts Neuron* (10 marks)

d) Using a typical example, explain the application of ANN in Computer Games (7 marks)

QUESTION TWO (20 MARKS)

a) State any five reasons for studying ANN (5 marks)

b) Explain the following neural network tasks (6 marks)

i. Control

ii. Classification

iii. Prediction

c) A student would like to decide whether to attend a wedding party or not. The decision variables are weather condition, availability of transport, and completion of assignment. Model the decision with respect to Artificial Neural Network. (9 marks)

QUESTION THREE (20 MARKS)

a) Explain the following parts of the human Nervous System (6 marks)

i. receptors

ii. effectors

iii. neural net (brain)

b) State any five properties and capabilities of Neural Networks (5 marks)

c) Use the equation $Y_1(t) = [\ X_1(t-1)\ ]$ XOR $[\ X_2(t-3)$ AND NOT $X_2(t-2)\ ]$ to fill the table below. (6 marks)

X2(t – 3)	X2(t – 2)	AND NOT	X1(t – 1)	XOR

d) Identify any three tools for modeling neural networks (3 marks)

QUESTION FOUR (20 MARKS)

a) Discuss ANN topologies (9 marks)

b) Explain Hopfield learning algorithm (8 marks)

c) Explain the equation $Dis\tan ce(LMS) = \frac{1}{2}\sum_{P}(T_P - O_P)^2$ (3 marks)

QUESTION FIVE (20 MARKS)

a) Using diagrams, demonstrate the implementation of the logic gates below using McCulloch-Pitts neurons (9 marks)

i. AND

ii. OR

iii. NOT

b) Explain the applications of Neural Networks in Pattern recognition (5 marks)

c) Explain the three phases of training ANN by back propagation (6 marks)