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(Knowledge for Development)
KIBABII UNIVERSITY

**UNIVERSITY EXAMINATIONS
2019/2020 ACADEMIC YEAR**

**YEAR FOUR SEMESTER TWO EXAMINATIONS
FOR THE DEGREE OF BACHELOR OF SCIENCE
COMPUTER SCIENCE**

**COURSE CODE : CSC 468E [B]
COURSE TITLE : NEURAL NETWORKS**

DATE: 12/02/2021 TIME: 2:00 P.M – 4:00 P.M

INSTRUCTIONS TO CANDIDATES

ANSWER QUESTIONS ONE AND ANY OTHER TWO.

QUESTION ONE (COMPULSORY) [30 MARKS]

- a) Describe the application area of convolutional neural network. **[4 Marks]**
- b) Explain the following terms used in biological neurons
- I. Backpropagation
 - II. Perceptron
 - III. Refractory period
 - IV. Nodes of Ranvier
 - V. Axon hillock **[10 Marks]**
- c) Describe the multilayer neural network and draw a well labelled diagram of the same. **[6 Marks]**
- d) With the aid of diagram describe the action potential on an axon **[6Marks]**
- e) Describe a Kohonen self organizing map
- I. How can it be applied in GIS
 - II. Draw relevant diagram **[4 Marks]**

QUESTION TWO [20 MARKS]

- a) Is learning vector quantization a supervised learning process or unsupervised process or both. Explain your answer? **[4 Marks]**
- b) Explain an example of dynamic structures **[4 Marks]**
- c) Explain SIX practical consideration/ implementation that must be taken into account when training neural networks **[6 Marks]**
- d) Using a diagram draw and explain a biological neural network. **[6 Marks]**

QUESTION THREE [20 MARKS]

- a) Describe the two phases of back propagation. [5 Marks]
- b) Explain the learning and generalisation aspects of neural network systems. [6 Marks]
- c) State and describe THREE types of Neural Networks architectures [9Marks]

QUESTION FOUR [20 MARKS]

- a) Describe how neural network can be applied natural language processing like speech recognition and machine translation. [6 Marks]
- b) Describe reinforcement [4 Marks]
- c) Differentiate among supervised and unsupervised learning. [6Marks]
- d) With the aid of diagram describe the relation between machine learning, neural network , deep learning and artificial intelligence. [4 Marks]

QUESTION FIVE [20 MARKS]

- a) Explain the following terms used in neural networks
 - I. Bias
 - II. Variance
 - III. Threshold[6 Marks]
- b) Describe the stability liaponov's Theorem [4 Marks]
- c) Draw the relevant artificial neuron for
 - I. NOT
 - II. OR
 - III. AND gate.[6 Marks]
- d) Using a diagram explain the sigmoid function [4 Marks]