(KNOWLEDGE FOR DEVELOPMENT)

KIBABII UNIVERSITY
(KIBU)

UNIVERSITY EXAMINATIONS
2020/2021 ACADEMIC YEAR

END OF SEMESTER EXAMINATIONS
FOURTH YEAR SECOND SEMESTER

FOR THE DEGREE IN

(INFORMATION TECHNOLOGY)

COURSE CODE: **BIT 425**

COURSE TITLE: **INTELLIGENT SYSTEMS**

DATE: 30/09/2021   **TIME: 9.00 A.M-11.00 A.M**

INSTRUCTIONS

ANSWER QUESTIONS ONE AND ANY OTHER TWO.

QUESTION ONE (COMPULSORY) [30 MARKS]

a. Distinguish between the following terms and concepts as used in the study of Intelligent Systems.

  i. Rational Agent and Intelligent Agents [2 marks]

  ii. Supervised and Unsupervised learning [2 marks]

  iii. Fuzzy Systems and Genetic Algorithms [2 marks]

b. Explain various features that differentiate "an *Agent* "from "an *Expert System*". [3 marks]

c. For an intelligent system to justify the course of its actions, it always engage in reasoning discus any two types of these reasoning? [4 marks]

d. Discuss the capabilities a computer need to possess in order to regard as intelligent.

[4 marks]

e. Innovation Computing students are in the process of automating an Exam Surveillance Agent (ESA), an agent that will be in charge of monitoring and controlling both physical and electronic exam movement and administration at the Campus.

  i. Discuss with justification the characteristic of the environment the agent will operate in. [4 marks]

  ii. What is meant by the acronym *PEAS*? Give a detailed explanation on how the agent will be designed to achieve or realize the **PEAS** of the SCA. [6 marks]

  iii. Explain the elements that that will make this Agent considered rational. [3 marks]

QUESTION TWO [20 MARKS]

a. Discuss briefly the following Intelligent Systems concepts:

  i. Artificial neural networks [2 marks]

  ii. Artificial intelligence [2 marks]

  iii. Genetic algorithms [2 marks]

b. Processing of Natural Language is required when one want an intelligent system like robot to perform as per the instructions issued. It involves the extraction of meaning from human languages and examines the kind of activities performed by NLP systems. Discuss

  i. Explain TWO main areas that is concerned with Natural Language Processing [3 marks]

  ii. Explain briefly context-free grammar and top-down passing as used in Natural language processing. [3 marks]

iii. Discuss with relevant example the main stages followed in Natural Language Processing [NLP].   [8 marks]

QUESTION THREE   [20 MARKS]

a. Discuss how Intelligent Systems are applied in the following areas:

   i.   Security   [2 marks]

   ii. Business world   [2 marks]

b. Different between :

   i.   Knowledge and Intelligence.   [2 marks]

   ii. Facts and Rules   [2 marks]

c. Using a well labeled diagram discuss the components of a fuzzy logic system.
                                                                                 [6 marks]

d. Discuss the THREE stages of knowledge engineering as used in Expert System construction.   [6 marks]

QUESTION FOUR   [20 MARKS]

a. Explain briefly why we need genetic algorithms in Intelligent Systems.   [2 marks]

b. Differentiate between weak AI and strong AI. From your own assessment do you thing technology will ever achieve strong AI?   [3 marks]

c. i. Discuss at least **THREE** types of Intelligence as described by Howard Gardner and an American developmental psychologist.   [6 marks]

   ii. You can say a machine or a system is **artificially intelligent** when it is equipped with at least one and at most all intelligences in it. Explain what is Intelligence Composed of?
                                                                                 [5 marks]

d. Differentiate between Forward *Chaining* and *Backward Chaining* as forms of reason techniques in Intelligent Systems.   [4 marks]

QUESTION FIVE   [20 MARKS]

a. Explain the roles of Neural Networks and robotics in intelligent systems.   [3 marks]

b. With regard to ANN explain Back Propagation Algorithm and Bayesian Networks (BN)
                                                                                 [4 marks]

c. What is ontology? Discuss different types of ontologies in relation to Artificial Intelligence. **[4 marks]**

d. Explain conditions that will warrant and organization to apply Multi-Agent Systems and machine learning techniques in their operations. **[4 marks]**

e. Write a prolog program to compute the factorial of positive integer N. used the program to simulated how the prolog compiler will evaluate the factorial of 6 (i.e. 6!). **[5 marks]**