



(KNOWLEDGE FOR DEVELOPMENT)

KIBABII UNIVERSITY
(KIBU)

UNIVERSITY EXAMINATIONS
2021/2022 ACADEMIC YEAR

END OF SEMESTER EXAMINATIONS
FOURTH YEAR SECOND SEMESTER

FOR THE DEGREE OF BACHELORS OF SCIENCE
(INFORMATION TECHNOLOGY)

COURSE CODE: BIT 425

COURSE TITLE: INTELLIGENT SYSTEMS

DATE: 05/09/2022

TIME: 09.00 A.M- 11.00 A.M

INSTRUCTIONS

ANSWER QUESTIONS ONE AND ANY OTHER TWO.

QUESTION ONE (COMPULSORY) [30 MARKS]

- a. Discuss briefly the following Intelligent Systems concepts: [2 Marks]
- i. Artificial neural networks [2 Marks]
 - ii. Genetic algorithms
- b. What are the TWO main reasons why logic functions has rapidly become one of the most successful technology for developing sophisticated control system? [2 Marks]
- c. Explain various features that differentiate “an intelligent *Agent* “from “a robot”. [2 Marks]
- d. Using relevant illustration explain the meaning of Artificial Intelligent (AI). [2 Marks]
- e. Discuss the capabilities a computer needs to possess in order to pass Turing test. [4 Marks]
- f. Using a well labeled diagram discuss the components of a fuzzy logic system. [6 Marks]
- g. Discuss how Intelligent Systems are applied in the following areas: [2 Marks]
- i. Security [2 Marks]
 - ii. Business world
- h. Different between : [2 Marks]
- i. Knowledge and Intelligence. [2 Marks]
 - ii. Facts and Rules
- i. Explain briefly context-free grammar and top-down passing as used in Natural language processing. [4 Marks]

QUESTION TWO [20 MARKS]

- a. For an intelligent system to justify the course of its actions, it always engage in reasoning process. Discus any two types of these reasoning? [4 Marks]
- b. Distinguish between the following terms and concepts as used in the study of Intelligent Systems. [2 Marks]
- i. Rational Agent and Intelligent Agents [2 Marks]
 - ii. Supervised and Unsupervised learning [2 Marks]
 - iii. Fuzzy Systems and Genetic Algorithms [2 Marks]
- c. 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. Based on this statement:
- i. Explain TWO main areas that is concerned or components of Natural Language Processing [2 Marks]
 - ii. Discuss with relevant example the main stages followed in Natural Language Processing [NLP]. [8 Marks]

QUESTION THREE [20 MARKS]

- a. Explain various techniques of knowledge representation as used in intelligent Systems construction. [4 Marks]
- b. Using relevant illustration, explain the architecture of a rule-based Expert System. [6 Marks]
- c. Innovative Computing Club 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 online exams including movement and administration at the Campus. [2 Marks]
- i. Justify the characteristic of the environment the agent will operate in. [2 Marks]
 - ii. By explaining the meaning of PEAS? Give a detailed explanation on how the (ESA) agent will be designed to realize the *PEAS* of the. [6 Marks]

- iii. Explain the elements that that will make ESA Agent considered rational. [2 Marks]

QUESTION FOUR [20 MARKS]

- a. Explain briefly why we need genetic algorithms in Intelligent Systems. [2 Marks]
- b. Explain the roles of Neural Networks and robotics in intelligent systems. [3 Marks]
- c. Differentiate between weak AI and strong AI. From your own assessment do you think technology will ever achieve strong AI? [4 Marks]
- d. 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]

QUESTION FIVE [20 MARKS]

- a. Explain briefly various sub systems that defines an intelligent system. [4 Marks]
- b. With regard to Artificial Neural Network (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. First Order Predicate Calculus is the basis of almost all knowledge representation and reasoning in every area of symbolic Artificial Intelligence (AI). Give at least four area of AI where this can be applied. [4 Marks]