



*(KNOWLEDGE FOR DEVELOPMENT)*

**KIBABII UNIVERSITY  
(KIBU)**

**UNIVERSITY EXAMINATIONS  
2019/2020 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: 09/11/2020**

**TIME: 9.00A.M. – 12.00 NOON**

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**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. Intelligent Systems and Intelligent Agents
  - ii. Supervised and Unsupervised learning
  - iii. Fuzzy Systems and Expert Systems **[6 marks]**
- b. Is an antivirus an “*Intelligent Agent*” or an “*Expert System*”. Discuss. **[3 marks]**
- c. For an intelligent system to justify the course of its actions, it engages in reasoning discuss any two types of these reasoning. **[4 marks]**
- d. Discuss the capabilities a computer needs to possess in order to pass Turing test. **[4 marks]**
- e. Kibabii University computing students are in the process of automating a Security Control Agent (SCA), an agent that will be in charge of monitoring and controlling incoming traffics at the University’s main gate.
- 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 will make this Agent considered rational. **[3 marks]**

**QUESTION TWO****[20 MARKS]**

- a. Discuss briefly the following Intelligent Systems concepts: **[6 marks]**
- i. Artificial neural networks
  - ii. Artificial intelligence
  - iii. Genetic algorithms
- b. Processing of Natural Language is required when an intelligent system like robot is required 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.
- c. Explain two main areas that require the use of Natural Language Processing **[4 marks]**
- d. Discuss the FIVE main stages followed in Natural Language Processing [NLP]. **[10 marks]**

**QUESTION THREE****[20 MARKS]**

- a. Discuss how Intelligent Systems are applied in the following areas: **[4 marks]**
- i. Security
  - ii. Business world
- b. Differentiate between the following concepts :
- i. Knowledge and Intelligence. **[2 marks]**
  - ii. Facts and Rules **[2 marks]**
- c. Using a well labeled diagram discuss the components of a rule based Expert System. **[6 marks]**
- a. Discuss the THREE stages of knowledge engineering as used in the construction of an Expert System. **[6 marks]**

**QUESTION FOUR****[20 MARKS]**

- a. Explain briefly why we need Intelligent Systems. **[2 marks]**
- b. Differentiate between weak AI and strong AI. **[2 marks]**
- c. i. Discuss at least three types of Intelligence as described by Howard Gardner 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 Intelligence Composed is of. **[6 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. **[4 marks]**
- b. With regard to ANN explain Back Propagation Algorithm and Bayesian Networks (BN) **[6 marks]**
- c. What is ontology? Discuss different types of ontologies in relation to Artificial Intelligence. **[6 marks]**
- d. Explain conditions that will warrant organization to apply Multi-Agent Systems and machine learning techniques in their operations. **[4 marks]**