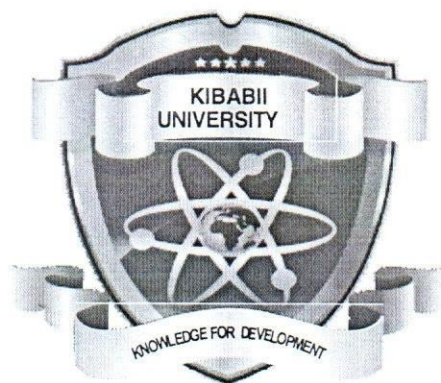


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*(Knowledge for Development)*

## **KIBABII UNIVERSITY**

### **UNIVERSITY EXAMINATIONS 2019/2020 ACADEMIC YEAR**

#### **SPECIAL/SUPLIMENTARY EXAMINATIONS**

#### **FOR THE DEGREE OF BACHELOR OF SCIENCE (COMPUTER SCIENCE)**

**COURSE CODE : CSC 460E**  
**COURSE TITLE : EXPERT SYSTEMS**

**DATE: 11/02/2021 TIME: 08.00 A.M -10.00 A.M**

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#### **INSTRUCTIONS TO CANDIDATES**

**ANSWER QUESTIONS ONE AND ANY OTHER TWO.**

### QUESTION ONE [COMPULSORY] [30 MARKS]

I. a) What do you understand by the following terms:

- i. Semantics [2 marks]
  - ii. Pragmatic analysis [2 marks]
  - iii. Discourse analysis [2 marks]
  - iv. Morphological analysis [2 marks]
- b) Disambiguate the sentence: “*He saw the man on the hill with a telescope*” [3 marks]
- c) Outline three syntax parsing techniques. [3 marks]
- d) Discuss the two pattern recognition schools of thought. [6 marks]
- e) Explain classification and give any two typical application of classification. [4 marks]
- f) Explain three areas in Kibabii University where an Expert System can be applied. [6 marks]

### QUESTION TWO [20 MARKS]

a) Define the following terminologies:

- i. Class [2 marks]
  - ii. Reject class [2 marks]
  - iii. Classifier [2 marks]
- b) Describe briefly the nearest neighbor classification. [4 marks]
- c) Decision Trees can be used as Classifiers. Explain the characteristics of the Decision Tree. [6 marks]
- e) Discuss briefly artificial neural networks (ANN). [4 marks]

### QUESTION THREE [20 MARKS]

- a) With the help of a diagram, describe in details the global Expert System architecture. [8 marks]
- b) Discuss in details the process involved in the development of an Expert Systems. [12 marks]

### QUESTION FOUR [20 MARKS]

- a) Explain the main advantages in keeping the knowledge base separate from the control module in knowledge-based systems [3 marks]
- c) Differentiate between Domain knowledge and Case knowledge [4 marks]
- d) i. With the help of diagrams, explain the difference between forward chaining and backward chaining. [4 marks]
- ii. Under what conditions would each be best to use for a given set of problems. [3 marks]
- e) Distinguish between "Rule based systems and Non-production systems". [6 marks]

### QUESTION FIVE [20 MARKS]

- a) State and explain briefly any three applications of NLG. [6 marks]
- b) Study the natural language processor below:

```
{:SENTENCE
```

```
{:NP
```

```
{:DETP {#$Determiner [the]}
```

```
{:N-BAR {##SimpleNoun [man]}]}
```

```
{:VP
```

```
{#$Verb [saw]}
```

```
{:NP {:DETP {#$Determiner [the]}
```

```
{:N-BAR {##SimpleNoun [light]}
```

```
{:PP {##Preposition [with]}
```

```
{:NP {:DETP {#$Determiner [the]}
```

```
{:N-BAR {##SimpleNoun [telescope]}]}]}]}]}
```

- i. Which language parse is being used in the NLP above? [2 marks]
- ii. Identify the ambiguities in the sentence being processed above. [2 marks]
- c) You are faced with the problem of sorting incoming fish on a conveyor belt according to species. The fish are to be sorted as either Salmon or Sea bass. Required:
- i. Outline kinds of information that may be used to distinguish one species of fish to the other? [6 marks]
- ii. What are some of the factors that may cause problems during sensing? [2 marks]
- iii. What are the steps in the sorting process? [2 marks]