(Knowledge for Development)

KIBABII UNIVERSITY

(KIBU)

UNIVERSITY EXAMINATIONS

2021/2022 ACADEMIC YEAR

END OF SEMESTER EXAMINATIONS

YEAR FOUR SEMESTER ONE EXAMINATIONS

FOR THE DEGREE OF (COMPUTER SCIENCE)

COURSE CODE: CSC 464E

COURSE TITLE: EXPERT SYSTEMS

DATE: 19/05/2022 **TIME:** 02.00 P.M – 04.00 P.M

INSTRUCTIONS TO CANDIDATES

ANSWER QUESTION ONE AND ANY OTHER TWO (2) QUESTIONS
QUESTION ONE (COMPULSORY) **[30 MARKS]**

a) i. Describe the main parts of an expert system. [2 marks]

ii. Show how the parts in (a) (i) above interact with one another. [2 marks]

b) Outline two problems that make natural language processing difficult and cause different techniques to be used than those associated with the construction of compilers. [2 marks]

c) Using two brief examples of knowledge representation, explain how knowledge may be represented in the knowledge base. [4 marks]

d) What is the role of a knowledge engineer? [2 marks]

e) Describe how expert systems perform inference. [2 marks]

f) Discuss three parameters of classifying Speech Recognition Systems [3 marks]

g) What is the main difference between conventional computer programs and production systems (rule–based systems)? [3 marks]

h) What is a real-time Expert System? [2 marks]

i) Describe any two advantages and two disadvantages of an expert system. [4 marks]

j) List the types of knowledge that constitute expertise. [4 marks]

QUESTION TWO [20 MARKS]

a) Explain the common use of natural language generation technology [3 marks]

b) What are the major difficulties in developing these systems? [3 marks]

c) Outline four uses of natural language generation technique [4 marks]

d) Discuss speech recognition and understanding. Why is it useful? [6 marks]

e) The groups of sentences below illustrate different issues faced by language processors.

1. The old man the boats.
2. Cats play with string.

   * Cat play with string.
3. I saw the racing pigeons flying to Paris.

I saw the Eiffel Tower flying to Paris.

4. The boy kicked the ball under the tree.

   The boy kicked the wall under the tree.

i. What kind of mistakes might Expert System make and why? [2 marks]

ii. Why is it easier to correct mistakes in ES than in conventional programs? [2 marks]

QUESTION THREE [20 MARKS]

a) What types of knowledge are used by neural networks and by rule–based systems? What kinds of systems are they with respect to the type of knowledge they use? [3 marks]

b) Describe generic categories of Expert System applications. [4 marks]

c) Why is MYCIN considered important in the development of expert systems. How did it lead to EMYCIN? [4 marks]

d) Describe the phases of designing an expert system? What term is used to call the whole process? [3 marks]

e) Briefly explain the following image processing

i) Low level processing [2 marks]

ii) Medium level image processing [2 marks]

iii) High level image processing [2 marks]

QUESTIONFOUR [20 MARKS]

a) i.Describe an inference engine. [3 marks]

ii. What is meant by rule-based, backward chaining and confidence factors? [2 marks]

b) Describe some of the limitations of ES. [5 marks]

c) Describe the success factors of ES. [3 marks]

d) i.Why was a production system model used to implement the first rule–based expert systems? [4 marks]

ii. What is semantic analysis in natural language processing? [3 marks]

QUESTION FIVE [20 MARKS]

a) What is an Expert Systems? [3 marks]

b) What is the main purpose of Expert Systems? [3 marks]

c) i. What is a knowledge base? [2 marks]

ii. How a knowledge base generated? [2 marks]

d) Discuss three applications of backward chaining in a rule-based expert system [3 marks]

e) State and explain the role of participants in expert system development [4 marks]

f) Outline the components of a rule-based generator [6 marks]