(*Knowledge for Development*)

KIBABII UNIVERSITY

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UNIVERSITY EXAMINATIONS
2020/2021 ACADEMIC YEAR

END OF SEMESTER EXAMINATIONS
YEAR FOUR SEMESTER ONE EXAMINATIONS

FOR THE DEGREE OF
BACHELOR OF SCIENCE
IN
COMPUTER SCIENCE

COURSE CODE : CSC 464 E

COURSE TITLE : EXPERT SYSTEMS

DATE: 17/06/2021 TIME: 02.00 P.M – 04.00 P.M

INSTRUCTIONS TO CANDIDATES

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

QUESTION ONE [COMPULSORY] [30 MARKS]

a. An expert system (ES) is a knowledge-based system that employs knowledge about its application domain and uses an inference (reason) procedure to solve problems that would otherwise require human competence or expertise. Using a suitable diagram, explain the nature of an Expert System. **[7 marks]**

b. Artificial intelligence is a science and technology based on disciplines such as computer science, biology, psychology, linguistics and others. Define what Artificial Intelligence is. **[2 Marks]**

c. Several methods of knowledge representation can be drawn upon. Explain Two of these methods **[6 marks]**

d. Inference engines for rule-based systems generally work by either forward or backward chaining of rules. Differentiate between forward chaining and Backward chaining **[4 marks]**

e. What are some of the reasons you would advice an organization to employ the use of an Expert system **[5 marks]**

f. Define the activity of Knowledge Engineering (KE). **[4 marks]**

g. Discuss any example of a simple expert system available in the market. **[2 marks]**

QUESTION TWO [20 MARKS]

a. As expert systems evolved, many new techniques were incorporated into various types of inference engines. Some of the most important of these were

i. Truth maintenance

ii. Hypothetical reasoning

iii. Uncertainty systems

iv. Ontology classification

Explain the above-mentioned techniques **[8 marks]**

b. It is important to communicate and follow progress in any project, not only for funding agencies and supervisors, but also for the domain expert who is interested in making best use of valuable time. Several general approaches for developing ES have been proposed Waterman (1986) has provided the most widely accepted approach consisting of six stages in the Development and Maintenance of Expert Systems Explain them. **[12 marks]**

QUESTION THREE [20 MARKS]

a. Expert systems are only one area of AI. There are many other areas of artificial intelligence. Discuss five other areas of Applied Artificial Intelligence **[10 marks]**

b. Before one comes up with an expert system, they must have knowledge of what it is in terms of characteristics. State and explain some characteristics of an Expert **[5 marks]**

c. While comparing humans and expert systems, human beings are unpredictable while expert systems are consistent. Explain five other comparisons between a human expert and an Expert System **[5 marks]**

QUESTION FOUR [20 MARKS]

You have just been recruited in an AI firm and your first project is to come up with an Expert system that would be able to forecast weather. The manager would like to know a few things about Expert systems. Discuss:

i) Some of the methodologies you are going to employ while building expert systems. **[10 marks]**

ii) Three fundamental roles in building expert systems **[6 marks]**

iii) State to him four possible organizational benefits of expert systems **[4 marks]**

QUESTION FIVE [20 MARKS]

a. Knowledge based expert system is part of AI, explain? **[3 marks]**

b. Expert System differ from other main stream AI systems in many ways. Discuss the three main differences they exhibit. **[3 marks]**

c. Outline any four factors that clearly separates ES from conventional computer programs. **[4 marks]**

d. State any four characteristics of a good Expert System. **[4 marks]**

e. An Expert postulates that ES are specific to one problem domain. However, they are not meant for domain modelling but problem solving. Validate the above statement. **[4 marks]**

f. Distinguish between priori and posteriori knowledge **[2 marks]**