UNIVERSITY EXAMINATIONS
2022/2023 ACADEMIC YEAR

END OF SEMESTER EXAMINATIONS
YEAR FOUR SEMESTER III EXAMINATIONS

FOR THE DEGREE OF
BACHELOR OF SCIENCE
IN
COMPUTER SCIENCE

COURSE CODE : CSC 467

COURSE TITLE : KNOWLEDGE BASED SYSTEMS

DATE: 08/08/2023   **TIME: 8.00AM-10.00AM**

INSTRUCTIONS TO CANDIDATES

Answer Question ONE and ANY OTHER TWO Questions

QUESTION ONE (30 MARKS) - COMPULSORY

a. A knowledge-based system may vary with respect to its problem-solving method or approach. Some systems encode expert knowledge as rules and are therefore referred to as rule-based systems. Another approach, case-based reasoning, substitutes cases for rules. What is knowledge based system? [2marks]

b. An example of a system are the laws and procedures of a democratic government and the way someone organizes their closet. Define a system [2 marks]

c. Systems analysts need to know several other important systems concepts. Briefly describe the following Information System Concepts: [8 marks]
   i. Decomposition
   ii. Modularity
   iii. Coupling
   iv. Cohesion

d. Give six capabilities that a computer system must possess to pass the Total Turing Test. [6 marks]

e. Explain why it would be difficult to develop a KBS for a domain in which there were a considerable reliance on tacit and implicit knowledge. [6 marks]

f.
   i. Define the term learning agent. [2 marks]
   ii. Give the components of a learning agent [4marks]

QUESTION TWO (20 MARKS)

a. Explain the real world application of knowledge based systems in agriculture. Give examples of applications currently available in the market. [6 marks]

b. Systems development is systematic process which includes phases such as planning, analysis, design, deployment, and maintenance. Differentiate between Systems Analysis and Systems Design [4 marks]

c. An expert system shell is a tool that has been specifically designed to enable speedy development of expert systems. Give at least **one** example of a shell and state **four** features associated with it an expert system shell. [6 marks]

d. Explain the **four** features associated with it an expert system shell, mentioned above [4 marks]

QUESTION THREE (20 MARKS)

a. Give some of the real world examples of knowledge based system. [4 marks]

b. Explain the knowledge based system architecture in detail. [6 marks]

c. Discuss the at least four knowledge representation formalisms and their associated inference. [10 marks]

QUESTION FOUR (20 MARKS)

a. A knowledge-based system (KBS) is a form of artificial intelligence (AI) that aims to capture the knowledge of human experts to support decision-making. Define the term Artificial Intelligence. [2 marks]

b. List four disadvantages of expert system. [4 marks]

c. List six abilities that are considered signs of intelligence. [6 marks]

d. Define the following terms

> i.   Fuzzy Logic   [2 marks]
> ii. Search   [2 marks]
> e.   Give the rationality properties.   [4 marks]

QUESTION FIVE (20 MARKS)

a. Explain the following and state when they are used
>   i.   Scripts   [2 marks]
>   ii. Lists   [2 marks]
>   iii. Decision tables   [2 marks]
>   iv. O-A-V triplet   [2 marks]

b. For each of the following agents, develop a PEAS description of the task environment   [12marks]

>   i.   agent: automated taxi driver
>   ii. Agent: Part-picking robot