(Knowledge for Development)

KIBABII UNIVERSITY

(KIBU)

UNIVERSITY EXAMINATIONS
2021/2022 ACADEMIC YEAR

END OF SEMESTER EXAMINATIONS
YEAR FOUR SEMESTER II EXAMINATIONS

FOR THE DEGREE OF
BACHELOR OF SCIENCE
IN
COMPUTER SCIENCE

COURSE CODE : CSC 467 E

COURSE TITLE : KNOWLEDGE BASED SYSTEMS

DATE: 25/11/22   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 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]

b. 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

c. The use of modeling has a rich history in all the engineering disciplines. That experience suggests four basic principles of modeling. Explain them. [8 marks]

d. 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]

e. A queuing system is characterized by three components. State and explain them. [6 marks]

f. 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]

QUESTION TWO [20 MARKS]

a. Simulation is used in many contexts, such as simulation of technology for performance tuning or optimizing, safety engineering, testing, training, education, and video games. Explain how continuous system simulation works [4 marks]

b. Generally, the process of representing a real-world object or phenomenon as a set of mathematical equations. More specifically, the term is often used to describe the process of representing 3-dimensional objects in a computer. Differentiate between a computer-based model and a mathematical model [4 marks]

c. An expert system is an example of a knowledge-based system. Expert systems were the first commercial systems to use a knowledge-based architecture. A knowledge-based

system is essentially composed of two sub-systems: the knowledge base and the inference engine.

i. Define an Expert System.[2 marks]

ii. Briefly describe how an expert system works [6 marks]

iii. Analyze two applications of expert systems [4 marks]

QUESTION THREE [20 MARKS]

a. Differentiate the following types of systems: [10 marks]

Physical or Abstract

Open and Closed

Sub System and Super System

Permanent and Temporary System

Natural and Man Made System

b. There are three paradigms for the development of AI. These are Neural Networks, Genetic algorithms and Fuzzy Logic Systems. Explain each one of them. [6 marks]

c. Define a Network Protocol and explain what a Network Protocol Simulation software is used for [4 marks]

QUESTION FOUR [20 MARKS]

a. Simulation can be used to show the eventual real effects of alternative conditions and courses of action. Simulation is also used when the real system cannot be engaged, because it may not be accessible, or it may be dangerous or unacceptable to engage, or it is being designed but not yet built, or it may simply not exist. Define Computer Simulation and Briefly describe three examples of simulation [12 marks]

b. i. Define the term learning agent. [2 marks]

ii. Give the components of a learning agent [4 marks]

c. 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]

QUESTION FIVE [20 MARKS]

a. Simulation can be defined as the process of duplicating or reproducing of certain characteristics or conditions, as of a system or physical process, by the use of a model or representation, for study, training, etc. Cite three advantages and three disadvantages of simulation   [6 marks]

b. Systems are the subjects of study of systems theory. State the elements of a system

                                                                                   [8 marks].

c. A queuing system consists of one or more servers that provide service of some sort to arriving customers. Customers who arrive to find all servers busy generally join one or more queues (lines) in front of the servers. Explain the following Commonly used queue disciplines: FIFO, LIFO and Priority   [6 marks]