PAN AFRICA CHRISTIAN UNIVERSITY
Where Leaders are Made

UNIVERSITY EXAMINATIONS: 2025/2026

EXAMINATION FOR THE DEGREE OF BACHELOR OF SCIENCE IN INFORMATION TECHNOLOGY

BSIT310

KNOWLEDGE BASED SYSTEMS

DATE: 2.00PM-5.00PM,FRIDAY,APRIL, 2026 **TIME: 2 HOURS**

INSTRUCTIONS: Question One is Compulsory, Choose Three Other Questions

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SECTION A (COMPULSORY)

QUESTION ONE (15 MARKS)

a) Explain the evolution of Artificial Intelligence and discuss four major application areas relevant to Knowledge-Based Systems. (3 Marks)

b) Differentiate between data, information, and knowledge. Illustrate your answer using a Knowledge-Based System example. (3 Marks)

c) Compare any three knowledge representation techniques studied in this course (e.g., rules, frames, semantic networks, predicate logic). (3 Marks)

d) Describe forward chaining and backward chaining inference mechanisms. Illustrate each with a simple rule-based example. (3 Marks)

e) Outline the Knowledge-Based Systems software lifecycle and explain why KBS projects differ from traditional software development. (3 Marks)

SECTION B

(ANSWER ANY THREE (3) QUESTIONS IN THIS SECTION)

QUESTION TWO (15 MARKS)

a) Define Knowledge Representation. (3 Marks)

b) Explain propositional logic and predicate logic with examples. (6 Marks)

c) Discuss the advantages and limitations of logic-based knowledge representation in expert systems. (6 Marks)

QUESTION THREE (15 MARKS)

a) Explain the architecture of a Production (Rule-Based) System. (5 Marks)

b) Describe the execution cycle of a production system. (5 Marks)

c) Compare rule-based systems with case-based reasoning systems. (5 Marks)

QUESTION FOUR (15 MARKS)

a) Define Knowledge Acquisition and explain its importance in KBS development. (5 Marks)
b) Compare Top-Down and Bottom-Up knowledge acquisition approaches. (5 Marks)
c) Discuss three major challenges encountered during knowledge acquisition. (5 Marks)

QUESTION FIVE (15 MARKS)

a) Define inference in Artificial Intelligence. (3 Marks)

b) Discuss rule-based inference control strategies. (6 Marks)

c) Explain how uncertainty can be handled in Knowledge-Based Systems (e.g., Bayesian methods, fuzzy logic, certainty factors). (6 Marks)

QUESTION SIX (15 MARKS)

a) Define Expert Systems and explain their structure. (5 Marks)

b) Describe the methodology for developing an expert system. (5 Marks)

c) Explain the role of expert system shells and development tools such as PROLOG or CLIPS. (5 Marks)