PAN AFRICA CHRISTIAN UNIVERSITY
EXAMINATIONS PAPER

PAN AFRICA CHRISTIAN UNIVERSITY

BACHELOR OF BUSINESS INFORMATION TECHNOLOGY AND BACHELOR OF SCIENCE IN INFORMATION TECHNOLOGY

END OF TERM EXAMINATION

DEPARTMENT: **COMPUTING & INFORMATION TECHNOLOGY**

COURSE CODE: **BSIT 211**

CAMPUS: **ROYSAMBU**

COURSE TITLE: **INTRODUCTION TO ARTIFICIAL INTELLIGENCE**

EXAM DATE: **MONDAY,XXXX,AUGUST ,2026**

TIME: **11:00PM -1:00PM**

INSTRUCTIONS

- This exam script has **TWO (2)** sections.
- Read all questions carefully before attempting.
- Answer All questions in Section **A** and any other THREE questions in Section **B.**
- Write only your **student number** on the answer booklet provided.

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SECTION A (Answer ALL questions)

QUESTION ONE (15 Marks) Compulsory

A technology company is developing a virtual AI academic advising system that interacts with students through a chatbot, analyzes academic records, and recommends course units.

a)During system testing, developers observe that the chatbot learns from past student interactions and improves its responses over time.

i. Describe what Artificial Intelligence means in the context of this system. (2 Marks)
ii. Explain three characteristics that make the system "intelligent" compared to a normal rule-based program. (3 Marks)

b) Differentiate between human intelligence and artificial intelligence with two practical examples. (6 Marks)

c)The university plans to deploy the AI advising system across all campuses. From a deployment perspective, explain two practical benefits students and staff will experience. (4 Marks)

SECTION B
(ANSWER ANY THREE (3) QUESTIONS IN THIS SECTION)
QUESTION TWO (15 marks)

QUESTION TWO (15 Marks)

A logistics company has developed an AI-powered navigation system used by delivery drivers in Nairobi. The system dynamically updates routes based on traffic, accidents, and road closures.A developer is tasked with modeling the delivery routing problem in AI terms.

a) Describe what a search problem means using the navigation system scenario. (2 Marks)
b) Using the logistics system, explain four components of problem formulation (4 Marks)

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c) During system testing, engineers compare two routing strategies: one that explores all possible roads and another that uses traffic predictions. Distinguish between uninformed search and informed search using this system. (4 Marks)

d)The system improves route decisions using live traffic predictions. Explain how heuristics influence route selection in this navigation system. (3 Marks)

e) During peak hours, the system becomes slow when analyzing too many possible routes. Explain two limitations of search-based problem solving in this scenario. (2 Marks)

QUESTION THREE (15 Marks)

a) An AI game simulation platform is being developed to train students in decision-making using virtual opponents. In the game simulation system:

i. A scoring strategy is used to evaluate moves. Explain the concept of heuristics in this context. (2 Marks)

ii. The game engine stores different positions of players during play. Explain the concept of state in AI using this system. (2 Marks)

b) Distinguish between deductive and inductive reasoning using game examples. (4 Marks)

c) Explain three reasons why games are important in artificial intelligence development. (3 Marks)

d) Identify and explain four disciplines that contribute to AI development in this system. (4 Marks)

QUESTION FOUR (15 Marks)

a) Explain what is meant by knowledge representation with an example.(2 Marks)
b) Differentiate between propositional logic and predicate logic using legal case examples. (4 Marks)
c) system models relationships between professionals:

Given:

- Lawyer is a person

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- Lawyer works in a law firm
- John is a lawyer
- John specializes in criminal law

Construct a semantic network representation for this scenario. (4 Marks)

d) The system uses structured rules and templates for storing knowledge. Explain the roles of rules and frames in this system. (3 Marks)

e) Describe two benefits of knowledge representation in this AI system. (2 Marks)

QUESTION FIVE (15 Marks)

a) Define what an Expert System is using the hospital scenario.(2 Marks)

b) Describe the roles of the knowledge base in a hospital system. (4 Marks)

c) When a patient enters symptoms, the system generates possible diagnoses. Explain the functions of the inference engine and how it works in this scenario. (6 Marks)

d) Explain the importance of the user interface in this expert system.(3 Marks)

QUESTION SIX (15 Marks)

a) Explain how Natural Language Processing (NLP) is used in citizen complaint chatbots. (2 Marks)

b) Explain how speech recognition is used in emergency response systems (2 Marks)

c) Explain how computer vision is used in traffic monitoring systems. (2 Marks)

d) Describe three real-world applications of robotics in modern urban environments. (3 Marks)

e) Explain four characteristics of intelligent agents in this smart city system. (4 Marks)

f) Discuss two advantages of multi-agent systems in this distributed environment. (2 Marks)

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