



"Investing in Africa's Future"

COLLEGE OF BUSINESS PEACE LEADERSHIP AND GOVERNANCE

NCSC 301: ARTIFICIAL INTELLIGENCE

END OF SECOND SEMESTER EXAMINATION

APRIL/MAY 2022

LECTURER: Mr. Timothy Makambwa

DURATION: 3 HOURS

INSTRUCTIONS

Answer **ALL** the questions in **Section A** and any Three questions from Section B and each question has **20** marks. Total possible mark is **100**.

Start **each** question on a new page on your answer sheet.

The marks allocated to **each** question are shown at the end of the section.

Section A – (Compulsory 40 Marks)

Question one

a)

An intelligent agent is a combination of Agent Program and Architecture.

Intelligent Agent = Agent Program + Architecture

Agent Program is a function that implements the agent mapping from percepts to actions. There exists a variety of basic agent program designs, reflecting the kind of information made explicit and used in the decision process. The designs vary in efficiency, compactness, and flexibility. The appropriate design of the agent program depends on the nature of the environment.

Architecture is a computing device used to run the agent program.

To perform the mapping task four types of agent programs are there. These are:

1. Simple reflex agents
2. Model-based reflex agents
3. Goal-based agents
4. Utility-based agents

Explain in general terms **how to convert** all these into **learning agents**. (20 marks)

- b) Explain the main steps in Hill Climbing Algorithm (10 marks)
- c) Discuss the different forms of learning (10 marks)

Section B (60 Marks)

Answer any three questions from this Section

Question Two

Explain the following search strategies.

- a) Best-first search (10 marks)
- b) A* search (10 marks)

Question Three

- a) Describe Alpha-Beta pruning, highlighting its effectiveness (10 marks)
- b) Write in detail about any two informed search strategies (10 marks)

Question Four

- a) Elaborate on forward and Backward chaining (10 marks)
- b) Discuss the general-purpose ontology with the following elements:

- i. categories
- ii. Measures
- iii. composite objects
- iv. Mental events and Mental objects (10 marks)

Question Five

- a) With the aid of an example explain learning in Decision Trees. (10 marks)
- b) Describe Multilayer feed-forward networks. (10marks)

Question Six

- a) Describe the process involved in communication using the example sentence “The wumpus is dead”. (10marks)
- b) Write short notes on semantic interpretation (10 marks)

Question Seven

Discuss the following uniformed search Strategies

- a) Breadth-first search
- b) Uniform-cost search
- c) Depth-first search
- d) Depth-limited search
- e) Iterative deepening search

(20 marks)

END OF PAPER
