



**MURANG'A UNIVERSITY OF TECHNOLOGY**  
**SCHOOL OF COMPUTING AND INFORMATION TECHNOLOGY**

DEPARTMENT OF COMPUTER SCIENCE

UNIVERSITY ORDINARY EXAMINATION

2023/2024 ACADEMIC YEAR

**FIRST YEAR FIRST SEMESTER EXAMINATION FOR BACHELOR OF SCIENCE  
IN SOFTWARE ENGINEERING**

SCS 302 – ARTIFICIAL INTELLIGENCE

DURATION: 2 HOURS

**INSTRUCTIONS TO CANDIDATES:**

1. Answer question one and any other TWO Questions.
2. Mobile phones are not allowed in the examination room.
3. You are not allowed to write on this examination question paper.

**SECTION A – ANSWER ALL QUESTIONS IN THIS SECTION**

**QUESTION ONE (30 MARKS)**

- a) Define the following terminologies
  - i. Agent (2 marks)
  - ii. Rational behaviour (2 marks)
  - iii. Rational agent (2 marks)
  - iv. Performance measure (2 marks)
- b) Describe two reasons why pruning is necessary in decision trees. (4 marks)
- c) Differentiate between classification and clustering in machine learning. (4 marks)
- d) Fuzzy logic is useful for commercial and practical purposes. Explain why fuzzy logic is important in the field of Artificial intelligence. (2 marks)
- e) Highlight four use of intelligence agent in business today. (4 marks)
- f) Outline four search evaluation criteria for uniformed search method. (4 marks)
- g) Discuss two types of artificial neural network (4 marks)

**SECTION B – ANSWER ANY TWO QUESTIONS IN THIS SECTION**

**QUESTION TWO (20 MARKS)**

- a) Discuss three main differences between supervised and un supervised learning. (6 marks)
- b) Social media companies like meta and skype uses intelligence agents to implement some functionalities in relation to advertisement. Outline five features that makes intelligence agents ideal for this implementation. (5 marks)
- c) Study the diagram below showing entropy of a fair coin (Head and Tail) and answer the questions that follows.  
**Figure 2c (attached)**
  - i. Explain the term entropy (2 marks)
  - ii. Discuss two reasons for the distribution (2 marks)

**QUESTION THREE (20 MARKS)**

- a) With the help of a well labelled diagram, describe a Fuzzy logic system architecture. (6 marks)
- b) Consider the search graph shown below, S is the start node and G is the goal node. Arcs are labelled with the cost of traversing them and a heuristic cost approximation to goal is shown inside nodes.

**Figure 3b (attached)**

Describe the following algorithm and clearly show the order of how each of them reaches the goal node from S:

- i. Breadth first search (3 marks)
- ii. Depth first search (3 marks)
- iii. Best first search (3 marks)

**QUESTION FOUR (20 MARKS)**

- a) Discuss three major branches of artificial intelligence. (3 marks)
- b) Critic the downside of omniscience knowledge in an autonomous agent (4 marks)
- c) Highlight four basic agent types that are applicable in artificial intelligence. (4 marks)
- d) Describe the general steps in a searching process of an AI agent. (4 marks)