AFRICA UNIVERSITY
A United Methodist-Related Institution

*"Investing in Africa's Future"*

**COLLEGE OF ENGINEERING AND APPLIED SCIENCES**

**AIN I101-FUNDAMENTALS OF ARTIFICIAL INTELLIGENCE**

**END OF FIRST SEMESTER EXAMINATIONS**

**NOVEMBER 2025**

**LECTURER: MRS CAROLINE RUVINGA**

**TIME: 3 HOURS**

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## *INSTRUCTIONS*

Answer *all* questions in Section **A** and any *three* from Section **B**

Start **each** question on a new page in your answer booklet

Credit will be awarded for logical, systematic and neat presentations

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## SECTION A

Answer all questions in this section

## QUESTION 1

a) Compare and contrast the following terms
   i. Artificial Intelligence (AI) and machine learning [2 Marks]
   ii. Strong AI and weak AI [2 Marks]

b) Explain any two machine learning frameworks [6 Marks]

c) With the aid of a diagram explain the knowledge representation life cycle [15 Marks]

d) Discuss the Artificial Intelligence privacy and security issues [15 Marks]

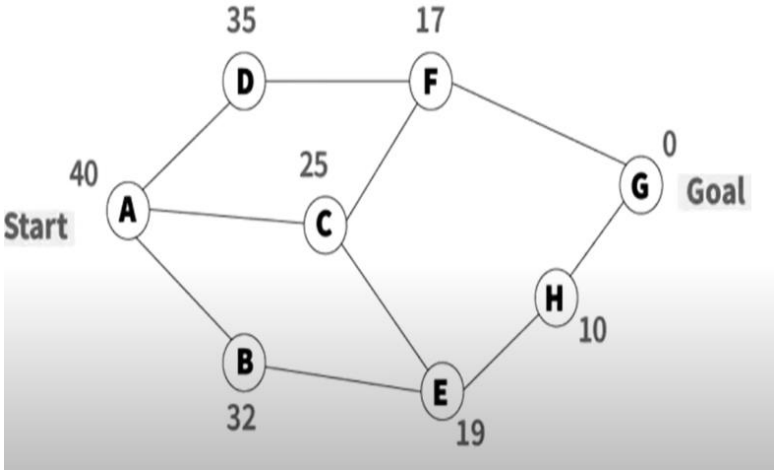
### SECTION B

Answer any three (3) questions in this section

## QUESTION 2

**a)** Differentiate between the Breadth First Search (BFS) and Depth First Search (DFS) algorithms. [10 Marks]

**b)** Apply the greedy best first search algorithm to solve problem below




[10 Marks]

## Question 3

a) List at least 5 advantages of frames. [5 Marks]
b) Draw semantic network to represent
    a. Roy is a student
    b. Roy is a boy
    c. Roy is a friend to Taona
    d. Roy is African
    e. All boys are humans. [5 Marks]

c) Highlight the limitations of propositional logic and how first order logic can resolve these.

[10 Marks]

## Question 4

a) Explain the process of data mining. [10 Marks]

b) Use K-means clustering algorithm to cluster the following data into two groups. Show all working
Data points: {2,3,11,12,3,20,30,1,25}
Distance measure: Use Euclidean
Initial cluster centroids M1=3 and M2 =11.

[10 Marks]

## Question 5

a) Discuss overfitting and under fitting in machine learning and strategies to overcome them. [10 Marks]
b) With aid of formulas, explain the confusion matrix metrics for performance evaluation. [10Marks]

**END OF EXAMINATION**