



**TECHNICAL UNIVERSITY OF MOMBASA**  
**INSTITUTE OF COMPUTING AND INFORMATICS**  
**UNIVERSITY EXAMINATION FOR:**  
**BACHELOR OF SCIENCE IN information technology**  
**BIT 2319: ARTIFICIAL INTELLIGENCE**  
**END OF SEMESTER EXAMINATION (PAPER 2)**

**SERIES: AUGUST2017**

**TIME: 2HOURS**

**DATE:** Pick Date Select Month Pick Year

**Instructions to Candidates**

You should have the following for this examination

*-Answer Booklet, examination pass and student ID*

This paper consists of **five** questions. Attempt question ONE (Compulsory) and any other TWO questions.

**Do not write on the question paper.**

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**Question 1**

- a) Outline the tasks that artificial intelligence is designed to achieve (5 marks)
- b) Illustrate the areas of AI and some dependencies (5 marks)
- c) Briefly describe the Turing Test. (4 marks)
- d) Differentiate between artificial and intelligence (4 marks)
- e) Explain the term Search in artificial intelligence (2 marks)
- f) Explain the fact that the space complexity of depth first search is much better compared to breath breadth first search (4 marks)
- g) Explain the three main differences between searching algorithm and a planning algorithm (4 marks)

h) What are the two components of the decision making apparatus of a logical AI agent?  
(2 marks)

## Question Two

Artificial intelligence has found a lot of use in business organizations. Discuss the use of AI in the following areas.

i) The web (4 marks)

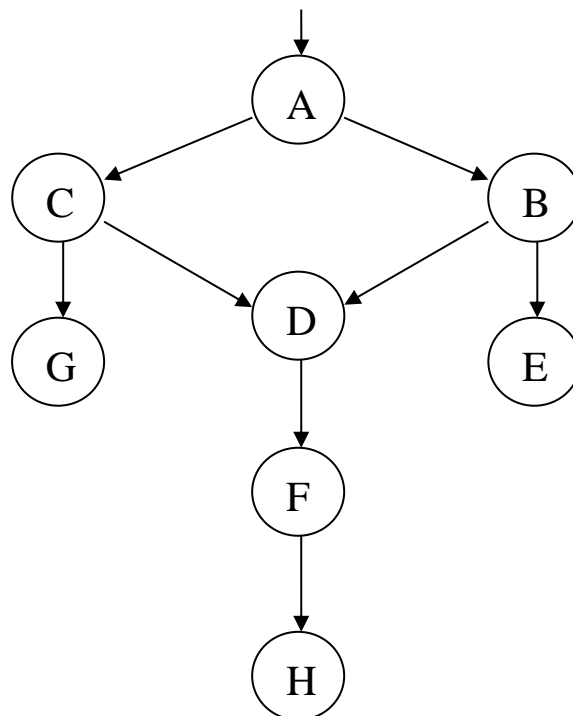
ii) In finance (4 marks)

iii) In e-commerce (4 marks)

iv) In medical applications (4 marks)

v) In education (4 marks)

## Question Three



a) Consider the following graph.  
Starting from state A, execute DFS. The goal node is G. Show the order in which the nodes are expanded. Assume that the alphabetically smaller node is expanded first to break ties.  
(10 marks)

b) Suppose you have the following search space as given in the table:

State	next	cost
A	B	4
A	C	1
B	D	3
B	E	8
C	C	0
C	D	2
C	F	6
D	C	2
D	E	4
E	G	2
F	G	8

- i) Draw the state space of this problem. (4marks)
- ii) Assume that the initial state is A and the goal state is G. Show how each of the following search strategies would create a search tree to find a path from the initial state to the goal state using:
- a) Breath first search (3marks)
- b) Iterative deepening search (3marks)

### Question Four

- a) Define the following terms as used in expert systems
- i) System (2 marks)
- ii) Expert (2 marks)
- iii) Expert system (2 marks)
- b) Draw the structure of an expert system and explain the different components (10 marks)
- c) State four benefits of expert systems (4 marks)

## Question Five

a) Explain the following terms:

i) Supervised learning (2 marks)

ii) Reinforcement learning (2 marks)

iii) Unsupervised learning (2 marks)

b) Discuss the application of machine learning (6 marks)

c) i) Explain the term neural networks (2 marks)

ii) With a suitable diagram, explain how the human brain works (3 marks)

iii) Describe with the aid of a diagram the working of an artificial neuron (3 marks)