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KIRIRI WOMENS' UNIVERSITY OF SCIENCE AND TECHNOLOGY UNIVERSITY EXAMINATIONS, 2024/2025 ACADEMIC YEAR THIRD YEAR, SECOND SEMESTER EXAMINATION FOR THE DEGREE OF BACHELOR OF SCIENCE (COMPUTER SCIENCE) KCS 2309: ARTIFICIAL INTELLIGENCE

DATE: 4TH DECEMBER 2024 TIME: 11:30AM – 1:30PM

<u>INSTRUCTIONS TO CANDIDATES</u> <u>ANSWER QUESTION ONE (COMPULSORY)</u> AND ANY OTHER TWO QUESTIONS **QUESTION ONE: COMPULSORY (30 MARKS)**

a) Describe the Turing Test in as used in Artificial Intelligence (4 Marks) b) Giving one example for each, differentiate supervised unsupervised and Reinforcement learning as used in both machine learning and neural network (4 Marks) c) Describe FOUR application areas where natural processing Language (NPL) can be used (4 Marks) d) Explain the fact that the space complexity of depth first search is much better compared to breath breadth first search (4 Marks) e) Explain the three main differences between searching algorithm and a planning algorithm (4 Marks) f) Using a valid example, discuss the following heuristic search methods A* search algorithm i. (3 Marks) ii. Best First search (3 Marks) g) In relation to agent discuss PAGE (Percepts, Actions, Goals Environment) system (4 Marks) **QUESTION TWO: (20 MARKS)** a) Artificial intelligence has found a lot of use in business organizations. Discuss the use of AI in the following areas. The web i. (4 Marks) In finance (4 Marks) ii. iii. In e-commerce (4 Marks) In medical applications (4 Marks) iv. In education (4 Marks) v.

QUESTION THREE: (20 MARKS)



a) Consider the 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 lies.

(10 Marks)

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

State	next	cost
Α	В	4
Α	С	1
В	D	3
В	E	8
С	С	0
С	D	2
С	F	б
D	С	2
D	Ε	4
Е	G	2
F	G	8

- i. Draw the state space of this problem.
- Assume that the initial state is A and the goal state is G. Show how each of the following ii. search strategies would create a search tree to find a path from the initial state to the goal state using:

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a.	Breath first search	(3 Marks)

(3 Marks) b. Iterative deepening search

QUESTION FOUR: (20 MARKS)

a)	Intelligent agents interact with different types of environments. State and explain any FOUR of		
	these environments	(5 Marks)	
b)	Briefly explain any FOUR applications of robots in modern society.	(4 Marks)	
c)	Describe THREE machine learning algorithms that can perform binary classification	(5 Marks)	
d)	Represent the following sentences into a semantic network	(6 Marks)	
	Birds are animals.		
	Birds have feathers,		
	fly and lay eggs.		
	Albatros is a bird.		
	Donald is a bird.		
	Tracy is an albatros.		
0	TESTION FIVE: (20 MARKS)		

- a) Using relevant examples, explain the following terms:
 - Supervised learning i.
 - ii. **Reinforcement learning**
 - Unsupervised learning iii.
- b) Describe with the aid of a diagram the working of an artificial neuron network
- c) Using suitable set of examples, describe **SIX** applicable areas of artificial neural network

(4 Marks)

- (3 Marks)
- (3 Marks)
- (3 Marks) (5 Marks)

(6 Marks)