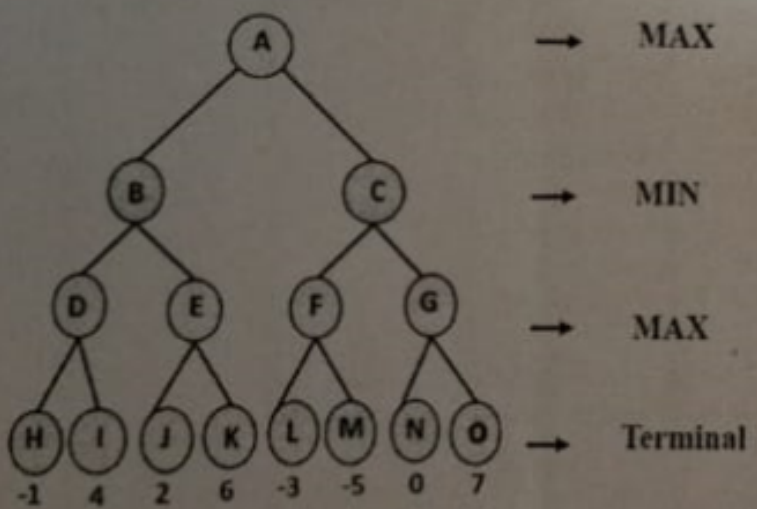
TERM END EXAMINATIONS (TEE) – May 2024

Programme	:	**B.Tech.**	**Semester**	:	**Winter Semester 2023-2024**
Course Title/ Course Code	:	Fundamentals in AI & ML/ **CSA2001**	**Slot**	:	**B24+E22+F21**
Time	:	**3 Hrs.**	**Max. Marks**	:	**100**

Answer ALL the Questions

Q. No.		Question Description	Marks
		PART A – (60 Marks)	
1	(a)	Illustrate the concept of Artificial Intelligence (AI) agents? Discuss the five classes of AI agents based on their degree of perceived intelligence and capability. Discuss the PEAS representation of AI agents, with appropriate examples.	12
		OR	
	(b)	Describe Model-based reflex agents, Goal-based agents, Utility-based agents.	12
2	(a)	Describe the MiniMax algorithm. Also, compare the advantages, benefits, and drawbacks of the algorithm? Write down a step-by-step procedure to find the optimal move using the following tree: Which move would you make as MAX considering that your opponent also plays optimally?	12



OR

(b) Relate constraint satisfaction problem (CSP). How is CSP formulated as a search problem? Explain with an example. 12

3 (a) Take an 8-puzzle problem as a domain that you are familiar with, and write a PAGE description of an agent for the environment. Characterize the environment as being accessible, deterministic, episodic, static, and continuous or not. What agent architecture is best for this domain? 12

OR

(b) How does first-order logic differ from propositional logic, and why is it considered more expressive for representing complex relationships and reasoning? 12

Give the solution for the following predicate logic, also evaluate the truth value for each element in the domain:

a). Evaluate the truth value of the predicate logic statement: $\forall x\ (P(x) \wedge Q(x))$, where the domain of discourse is {1, 2, 3} and P(x) is "x is even" and Q(x) is "x is odd."

b). Evaluate the truth value of the predicate logic statement: $\exists x\ (P(x) \wedge Q(x))$, where the domain of discourse is {2, 4, 6} and P(x) is "x is even" and Q(x) is "x is divisible by 2."

4 (a) In a multiagent system, how does interaction between the agents happen? Explain how the agents use their coordination, negotiation, and cooperation. 12

OR

(b) How do you represent knowledge across agents? Does communication between agents increase the individual agents' knowledge? How is the inference from the communication added as a knowledge component? 12

5 (a) Explain the variable elimination algorithm for answering queries on Bayesian networks. 12

OR

(b) Explain the generative machine learning model and analyze how it differs from the discriminative machine learning model. 12

PART B – (40 Marks)

6 Illustrate the differences between AI, ML, and DL. Explain their use with an appropriate example in the agriculture sector. 8

7 Explain how intelligent agents perceive their environment and make decisions based on the acquired information with a suitable example 8

8 Convert the following sentences to the FOPL. 8

a. Every gardener likes the sun.
b. All purple mushrooms are poisonous.
c. No purple mushroom is poisonous.
d. All birds can fly and few birds can run.
e. John is not tall.

9 Explain in detail the applications of learning-based agents. 8

10 Evaluate the machine learning process and the curse of dimensionality. 8

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