

R16

Code No: 137AP

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B. Tech IV Year I Semester Examinations, January/February - 2023

ARTIFICIAL INTELLIGENCE

(Common to ECE, IT)

Time: 3 Hours

Max. Marks: 75

Note: i) Question paper consists of Part A, Part B.

ii) Part A is compulsory, which carries 25 marks. In Part A, Answer all questions.

iii) In Part B, Answer any one question from each unit. Each question carries 10 marks and may have a, b as sub questions.

PART – A

(25 Marks)

- 1.a) What is a rational agent? [2]
- b) Comment on “the completeness and optimality of breadth-first search”. [3]
- c) How is a constraint satisfaction problem defined? [2]
- d) How is a knowledge-based agent composed? [3]
- e) Comment on the expressiveness of propositional and predicate logic. [2]
- f) What do you mean by conceptualization? How is it composed? [3]
- g) Distinguish between a search-based problem solving agent and a planning agent. [2]
- h) What do you mean by hierarchical planning? [3]
- i) State Baye’s theorem. [2]
- j) What is a decision tree? [3]

PART – B

(50 Marks)

- 2.a) Explain utility-based agent along with the schematic diagram.
 - b) What are various properties of task environments? Explain. [5+5]
- OR**
- 3.a) Explain depth-first search with an example and describe the properties of the algorithm.
 - b) Give the algorithm for simulated-annealing and explain. [5+5]

- 4.a) Explain alpha-beta pruning algorithm with an example and comment on its completeness and time complexity.
- b) Explain back-tracking search for constraint satisfaction problems and the improvements to the basic backtracking search. [5+5]

- OR**
- 5.a) Give various rules of inference in propositional logic and explain proof by resolution.
 - b) Distinguish between the properties of forward and backward chaining. [5+5]

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6.

Consider the following facts:

The members of the bridge club are Joe, Sally, Bill and Ellen

Joe is married to Sally

Bill is Ellen's brother

The spouse of every married person in the club is also in the club

The last meeting of the club was at Joe's house

a) Translate the sentences into formulas in predicate logic.

b) Prove that the last meeting of the club was at Sally's house. Add the facts you need and then construct the proof. [5+5]

OR

7.a)

Give the set of predicates for representing events and time intervals along with interpretation.

b)

Give an overview of semantic networks with an example.

[5+5]

8.

What is a planning graph? How do you construct a planning graph? Give GRAPHPLAN algorithm and explain. [10]

OR

9.

Give an overview of planning and acting in non-deterministic domain.

[10]

10.

What do you mean by conditional independence? What is a Bayesian belief network? Explain the construction of a Bayesian belief network and inference in Bayesian networks. [10]

OR

11.a) Distinguish among various forms of learning.

b) Explain Dempster-Shafer theory for uncertain reasoning.

[5+5]

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