

Code No: 155DY**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD****B. Tech III Year I Semester Examinations, March - 2024****ARTIFICIAL INTELLIGENCE****(Common to CE(SE), CSE(CS), CSE(DS))****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) Define the term “Artificial Intelligence”. [2]
- b) Write short notes on cross over and mutation. [3]
- c) What is horizon effect? How can it be eliminated? [2]
- d) List three components of Constraint Satisfaction Problems. [3]
- e) What is an atomic sentence? Give an example. [2]
- f) Represent the following sentence in CNF.
“ $\forall x \text{ American}(x) \wedge \text{Weapon}(y) \wedge \text{Sells}(x, y, z) \wedge \text{Hostile}(z) \Rightarrow \text{Criminal}(x)$ ” [3]
- g) Describe the differences and similarities between problem solving and planning. [2]
- h) What is critical path? [3]
- i) What is uncertainty? [2]
- j) Define supervised and semi-supervised learning. [3]

PART – B**(50 Marks)**

- 2.a) Give the detailed PEAS description of the task environment for an automated taxi.
- b) Suggest the solution for 8-Queen’s problem using hill climbing algorithm. [5+5]

OR

- 3.a) How depth limit search can solve the infinite-path problem of depth first search? Explain.
- b) Explain about AND-OR graph search algorithm. [5+5]

- 4.a) Explain MinMax algorithm for two players.
- b) What is The Wumpus World problem? Describe Wumpus world using proportional logic. [5+5]

OR

- 5.a) How Job-shop scheduling problem can be represented with Constraint Satisfaction Problem? Explain.
- b) Convert the sentence $B_{1,1} \Leftrightarrow (P_{1,2} \vee P_{2,1})$ into Conjunctive Normal Form (CNF). [5+5]

- 6.a) Represent the following statements in predicate logic.
i) One's mother is one's female parent.
ii) One's husband is one's male spouse
iii) Male and female are disjoint categories
iv) Parent and child are inverse relations
b) Explain about unification process. [4+6]
- OR**
- 7.a) Write about forward chaining algorithm.
b) Discuss various Resolution strategies which help in finding proofs efficiently. [5+5]
- 8.a) Write the planning steps involved on Blocks-World problem.
b) Draw the planning graph for the "have cake and eat cake too" problem. [5+5]
- OR**
- 9.a) Explain about Backward (regression) relevant-states search.
b) Give the PDDL description for the spare tire problem. [5+5]
- 10.a) Explain about Bayes' rule in detail.
b) Discuss about Dempster Shafer theory of evidence. [5+5]
- OR**
- 11.a) Describe about the variable elimination algorithm.
b) How Markov Chain Monte Carlo (MCMC) algorithm differs from rejection sampling method? [5+5]

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