Printed Pages: 02 **Sub Code: RCA403**

Paper Id: 214239 **Roll No.** | | | | | | | | | | |

MCA

(SEM IV) THEORY EXAMINATION 2018-19

ARTIFICIAL INTELLIGENCE

Time: 3 Hours ***Total Marks: 70***

Note: 1. Attempt all Sections. If require any missing data; then choose suitably.

SECTION A

1. Attempt *all* questions in brief. 2 x 7 = 14

(a)Name the elements of an agent.

(b) Summarize the factors that make up rationality.

(c) What do you infer from hill-climbing search algorithm?

(d) Compare propositional logic and predicate logic

(e) Justify the usage of universal and existential quantifier with an example.

(f) Give the heuristic function for shortest path problem.

(g) Which algorithm is more similar to backward chaining algorithm? Write its algorithm

SECTION B

2. Attempt any *three* of the following: 7 x 3 = 21

(a) You have three jugs measuring 12 gallons, 8 gallons, and 3 gallons, and a water faucet. You need to measure out exactly one gallon.

(b) Describe the planning method based on hierarchical task networks with an example.

(c) Discuss the different design issues to be solved to use hidden markov model for real world application.

(d) Assume two players, min and max, play nim (as described above). Min plays first' If a terminal state in the search tree developed above is a win for min, a utility function of zero is assigned to that state. A utility function of I is assigned to a state if max wins the game. Apply the minimax algorithm to the search tree to assign utility functions to all states in the search tree.

(e) Give the completeness proof of resolution.

SECTION C

3. Attempt any *one* part of the following: 7 x 1 = 7

a. Implement the Search Algorithms described in this lecture in LISP and/or C. Comment on how suited each language would be for each type of search?

b. How suited would PROLOG be in implementing the search algorithms? Comment on how this might be done and what difficulties might exist.

4. Attempt any *one* part of the following: 7 x 1 = 7

a. Trace the constraint satisfaction procedure to solve the following cryptarithmetic problem:

```
  CROSS
 +ROADS
 -------
DANGER
```

b. Discuss how constraint satisfaction might work it implemented its search strategy via:

i. depth first search
ii. breadth first search
iii. best first search

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5. **Attempt any *one* part of the following:** **7 x 1 = 7**

a. Represent the following in partitioned semantic networks:

i. Every player kicked a ball.
ii. All players like the referee.
iii. Andrew believes that there is a fish with lungs.

b. Pick a problem area and represent the knowledge in frame based system.

6. **Attempt any *one* part of the following:** **7 x 1 = 7**

(a) Describe a rational agent function for the modified performance measure that deducts one point for each movement. Does the corresponding agent program require internal state?

(b) Discuss possible agent designs for the cases in which clean squares can become dirty and the geography of the environment is unknown. Does it make sense for the agent to learn from its experience in these cases? If so, what should it learn?

7. **Attempt any *one* part of the following:** **7 x 1 = 7**

(a) Discuss back propagation algorithm for learning in multilayer neural network.

(b) Explain the concept of forward and backward state space search in detail.

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