

CHAROTAR UNIVERSITY OF SCIENCE & TECHNOLOGY

Sixth Semester of B. Tech. Examination (IT/CE) (Elective-I)

Dec-2015

IT310 Artificial Intelligence (A.I.)

Date: 02.12.2015, Wednesday Time: 01:30 p.m. To 04:30 p.m. Maximum Marks: 70

Instructions:

1. The question paper comprises of two sections.
2. Section I and II must be attempted in separate answer sheets.
3. Make suitable assumptions and draw neat figures wherever required.
4. Rough work is to be done in the last page of main supplementary, please don't write anything on the question paper.
5. Indicate clearly, the option(s) you attempt along with its respective question no.
6. Figures to the right indicate marks.

SECTION-I

Q-1 Answer the following questions.

- a. What is AI (Define AI from your perspectives)? What are the advantages and disadvantages of it? 3
- b. Write and explain the Best First Search algorithm by taking suitable example. 3
- c. What is Heuristic Search? Explain: How to invent heuristic function for any problem. 2
- d. Explain A^* algorithm in brief. Trace the operation of A^* algorithm by taking a suitable example. 3

Q-2

- [A] Explain *cut* and *fail* mechanism in PROLOG. Differentiate *red cut* and *green cut*. 4
- [B] Explain Procedural knowledge and Declarative knowledge with example. 4
- [C] Solve the water jugs problem. Given two jugs of 4 l and 3 l respectively, fill the 4 l jug with 2 l of water. Find a good heuristic and perform hill climbing. 4

OR

Q-2

- [A] What are ALPHA cutoff and BETA cutoffs? Explain benefits of them in searching. Also give an example for the same. 4
- [B] What do you mean by *local maximum*? Does Simulated Annealing technique suffer from *local maximum*? Justify your answer. 4
- [C] Analyze the following problems with respect to the *seven problem characteristics*: 4
1. Chess
 2. 8-puzzle

Q-3

- [A] What are the conditions to be satisfied to find an optimal path to a goal, if any path to a goal exists? 4
- [B] What are the characteristics of the problem that are to be analyzed when choosing an appropriate method to solve the problem? Explain. 4
- [C] Draw the parse tree and write down the grammar rules for: 4
- The boy smoked a cigarette*

OR

Q-3

- [A] Prepare the partitioned semantic net for the following: 4
- Every batter hits a ball.*

- [B] Explain: Multilayer Feed Forward Networks. 4
 [C] What is the need for prototype construction phase in the development cycle of an Expert system? 4

SECTION-II

Q-4

1. Write a prolog program to find out maximum and minimum of three numbers. 3
2. Write a prolog program to join two lists of integer excluding common elements. 4
3. Write a prolog program to find factorial of a given number using recursion. 4

Q-5

- [A] What are the phases (steps) of *NLP*? Explain it in brief. 4
 [B] Explain Back (ward) Propagation Neural Network Learning Algorithm. 4
 [C] Write short note on: Architecture of an Expert system. 4

OR

Q-5

- [A] What are the advantages and disadvantages of frames and semantic nets? 4
 [B] Differentiate: *Forward Reasoning* versus *Backward Reasoning*. 4
 [C] Give advantages and disadvantages of Artificial Neural Networks. 4

Q-6

- [A] Convert the following sentences into Predicate Logic and convert it into Clausal Form. 8
1. Some airplanes are faster than every airplane.
 2. If an integer is not even, then it is odd.
 3. Every apple is either green or yellow.
 4. There is some table that doesn't have 4 legs.

OR

- [A] Solve the following crypt arithmetic problem: 8
- TWO
+ TWO

FOUR

- [B] Explain Bayes' Theorem. What is the significance of it in Naïve Bayesian Classification and Bayesian Belief Network? 4

OR

- [B] Explain fuzzy logic in brief and compare it with all other logics. 4