Candidate Seat no…….

CHAROTAR UNIVERSITY OF SCIENCE & TECHNOLOGY

Fifth Semester of B.Tech. (CSE) Examination
Nov - 2019
CS341 - Artificial Intelligence

Date: 09.11.2019, Saturday **Time: 10:00 a.m. To 01:00 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.

SECTION – I

Q - 1	**Answer the following questions.**	**[08]**
(a)	State four applications of Artificial Intelligence in the real world.	[02]
(b)	Define Non monotonic reasoning.	[02]
(c)	Draw partitioned semantic net for the following sentence: "Every student loves to party"	[02]
(d)	Define mutation and crossover operator.	[02]
Q - 2	**Answer the following questions. [Any Three]**	**[15]**
(a)	Solve the following crypt arithmetic problem using constraint satisfaction procedure.	[05]

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    B A S E
+   B A L L
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G A M E S
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(b) Consider the following axioms: [05]

1. Anyone whom Mary loves is a football star.
2. Any student who does not pass does not play.
3. John is a student.
4. Any student who does not study does not pass.
5. Anyone who does not play is not a football star.

Prove using Resolution "If John doesn't study, Mary doesn't love John."

(c)	Explain the different issues in Knowledge representation.	[05]
(d)	Explain steps of Natural Language Processing.	[05]
Q - 3	**Answer the following questions. [Any Three]**	**[12]**
(a)	Compare Fuzzy vs Crisp logic and their membership function.	[04]
(b)	Define forward and backward chaining. Differentiate the same.	[04]
(c)	Write a PROLOG program to find N^{th} element in the list.	[04]
(d)	Analyze the following problems with respect to the seven problem characteristics. a. Chess b. 8-Puzzle	[04]
(e)	Explain the Alpha-Beta Cutoffs Procedure in Game Playing with example.	[04]

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SECTION – II

Q - 4 **Answer the following questions.** **[08]**

(a) List the applications of Neural Networks. [02]

(b) Explain abductive reasoning using example. [02]

(c) What do you mean by the problem of plateau occurring in hill climbing? How can it be solved? [02]

(d) What is Semantic Web? How it is related with AI? [02]

Q - 5 **Answer the following questions. [Any Three]** **[15]**

(a) What are Bayesian networks? Give an example. [05]

(b) Describe the architecture of Expert System. Compare Expert System with Traditional Software System. [05]

(c) Solve following water jug problem using state space representation. [05]

You are given two jugs, a 4-gallon one and a 3-gallon one, a pump which has unlimited water which you can use to fill the jug, and the ground on which water may be poured. Neither jug has any measuring markings on it. How can you get exactly 2 gallons of water into the 4-gallon jug?

(d) Two Fuzzy Relations are given [05]

$$R = \begin{matrix} \\ x1 \\ x2 \end{matrix}\begin{matrix} \begin{matrix} y1 & y2 \end{matrix} \\ \begin{bmatrix} 0.6 & 0.3 \\ 0.2 & 0.9 \end{bmatrix} \end{matrix} \qquad S = \begin{matrix} \\ y1 \\ y2 \end{matrix}\begin{matrix} \begin{matrix} z1 & z2 & z3 \end{matrix} \\ \begin{bmatrix} 1 & 0.5 & 0.3 \\ 0.8 & 0.4 & 0.7 \end{bmatrix} \end{matrix}$$

Obtain Fuzzy Relation T as max-min composition between the fuzzy relations.

Q - 6 **Answer the following questions. [Any Three]** **[12]**

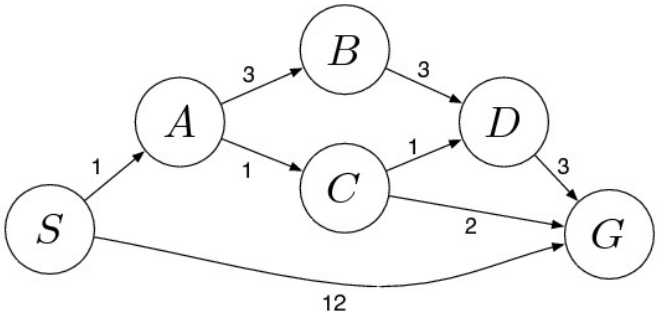
(a) Explain CUT and FAIL predicate in Prolog with example. [04]

(b) How predicate logic is powerful than proposition logic? What are the limitations of proposition logic? [04]

(c) Explain the algorithm for Backpropagation in Neural Networks. [04]

(d) Explain Semantic Network and Frame structure with suitable example. [04]

(e) Find the optimal path from source (S) to goal (G) using A* algorithm. Explicitly write down the queue at each step. [04]



State	h(n)
S	4
A	2
B	6
C	2
D	3
G	0

Figure: Q.6(e)

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