Candidate Seat no……

CHAROTAR UNIVERSITY OF SCIENCE & TECHNOLOGY

Sixth Semester of B. Tech (CE) Examination

May 2022

CE357 Artificial Intelligence (AI)

Date: 05.05.2022, Thursday **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.
4. Rough work is to be done on the last page of the main supplementary, please don't write anything on the question paper.
5. Indicate clearly, the option(s) you attempt along with its respective question number.
6. Figures to the right indicate marks.

SECTION – I

Q - 1 **Do as directed:** **[07]**

a. What is the Turing test? Does AI aim at human-level intelligence? Are computers the right kind of machine to be made intelligent? **02**

b. What is the state-space representation of a problem? Show the state space of the water jug problem. **02**

c. What do you mean by the admissibility of an algorithm? Is A* algorithm an admissible one? When? **03**

Q – 2.a Trace the execution of the constraint satisfaction procedure in solving the crypt-arithmetic problem: TWO + TWO = FOUR. **[04]**

Q – 2.b **Answer the following questions (Any Two).** **[10]**

(i) What is the production system? Explain it with an example. Discuss the characteristics of a production system.

(ii) Explain cut and fail predicate in prolog program with example.

(iii) Write a prolog program to find the length of a list L_1? Also, perform concatenation operations for lists L_1 and L_2.

Q - 3 **Answer any two questions.** **[14]**

a. Consider the following sentences:

a. Amit only likes easy courses.

b. Science courses are hard.

c. All courses in Computer Department are easy.

d. AI is a computer department course

Find out by resolution: "What course does Amit like?". Show complete methodology.

b. What are the characteristics of the problem that are to be analyzed when choosing an appropriate method to solve the problem? Analyze the 8-puzzle problem with respect to the seven problem characteristics.

c. What are the limitations of Hill Climbing Techniques? Mention the strategies to solve them.

SECTION – II

Q - 4 **Do as directed:** **[07]**

a. Why does the search in game-playing programs always proceed forward from the current position rather than backward from a goal state? **02**

b. Convert the following statements into FOPL. **02**

1. All purple mushrooms are poisonous
2. Best score in English is always higher than the best score in Mathematics

c. How supervised learning approach is different from the unsupervised learning approach? **03**

Q – 5.a What are the basic characteristics of the Expert System? What are the difficulties in developing an Expert System? Describe the main applications of Expert Systems. **[04]**

Q – 5.b **Answer the following questions (Any Two).** **[10]**

(i) Draw a structure of the basic Neural Network. Where is the knowledge in Neural Network stored? List and Explain applications of Neural Networks?

(ii) Explain the key idea of Bayesian statistics for representing knowledge. How Bayesian Belief Nets are used to classify items for a given problem?

(iii) Compare Fuzzy Logic with Binary Logic. Give real-world applications of the Fuzzy Logic.

Q – 6 **Answer any two questions.** **[14]**

a. How the frames are organized? What are the advantages and disadvantages of frames and semantic nets? Why the scripts are required? Can it be considered as a variant of frames?

b. Why is NLP required? Which are the problems with Natural Language Understanding? Which are the ambiguities present in the language?

c. Which algorithm is a kind of backtracking algorithm that is used in decision making and game theory to find the optimal move for a player? What are the ALPHA cutoff and BETA cutoff? Explain the benefits of it in searching with example.

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