CHAROTAR UNIVERSITY OF SCIENCE & TECHNOLOGY

Sixth Semester of B. Tech (CE) Examination
June 2022
CE357 Artificial Intelligence (AI)

Date: 21.06.2022, Tuesday **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 AI? What are the advantages and disadvantages of it?	**02**
b.	Analyze the 8-puzzle problem with respect to the seven problem characteristics.	**02**
c.	What are the uses of cut and fail predicate in prolog program? Explain them with example.	**03**

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

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

(i) Write a prolog program to find the nth element of a list L1? Also, perform concatenation operations for given lists L1 and L2.

(ii) Explain mean-end analysis approach to solve AI problems.

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

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

a. Consider the following sentences:
   a. Liquid CO_2, H_2SO_4, DDT, Caffeine and Ethylene Glycol are hazardous for health.
   b. If x contains something that is hazardous for health, then x is also hazardous.
   c. Coke contains all the items in fact – a. above.

   Prove by resolution that: "Drinking Coke is NOT good for health".

b. How do problem characteristics help in the selection of techniques? Explain these characteristics with possible examples. Analyze the "Missionaries and Cannibals"

problem with respect to the seven problem characteristics.

c. What are major the limitations of Hill Climbing Techniques? Explain in details the strategies to solve them with suitable example.

SECTION – II

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

a. Differentiate: Supervised Learning and Unsupervised Learning. **02**

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

"For every x, if x is a PhD student, then x has a master degree."

c. Why does the search in game-playing programs always proceed forward from the **03** current position rather than backward from a goal state?

Q – 5.a Compare Fuzzy Logic with Binary Logic. Give real-world applications of the Fuzzy **[04]** Logic.

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

(i) Draw the basic structure the of Neural Network. Give advantages and disadvantages of it.

(ii) Explain the Bayesian Network in detail with an example.

(iii) What are the basic characteristics of the Expert System? Describe the main applications of Expert Systems. What are the difficulties in developing an Expert System?

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

a. 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 suitable examples.

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

c. Explain the major phases involved in NLP. Describe the role of each phase in detail with an example.

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