

Nirma University

Institute of Technology

Semester End Examination (IR), December - 2018

B. Tech. in Computer Engineering, Semester-VII

IT724 Artificial Intelligence

Roll /

Exam No.

Supervisor's Initial
with Date

Time: 3 Hours

Max Marks: 100

- Instructions:
1. Attempt all questions of Section I and II separately in same Answerbook.
 2. Figures to right indicate full marks.
 3. Draw neat sketches wherever necessary.

Section I

Q-1 Do as directed [18]

- a) List out the task domains of Artificial Intelligence. [3]
- b) How can a possible win be checked in a "Tic-Tac-Toe" game using the "magic-square" configuration? [3]
- c) Describe: - Physical Symbol System. Also state its hypothesis. [3]
- d) Classify production systems along with suitable examples. [3]
- e) How does the role of knowledge differ based on different problems? Explain with examples. [3]
- f) What is meant by "Graceful Decay of Admissibility"? [3]

Q-2 Do as directed [16]

- a) Taking an example of Blocks-World Problem, explain how does a local maxima problem occur using "local" heuristic? Rewrite the heuristic function in such a way that the local maxima is resolved. [6]

OR

- a) Discuss "Missionaries and Cannibals" problem with respect to seven problem characteristics. [6]
- b) Illustrate the working of A* algorithm with the help of a weighted graph $G = (V, E, w)$ and heuristic values (h') for each node of G . [6]
- c) Explain "Steepest Ascent Hill Climbing" method through a suitable example. [4]

Q-3 Do as directed [16]

- a) What is meant by "Annealing Schedule"? What are its components? Under which situation, Simulated Annealing behaves as Simple Hill Climbing method? [6]

OR

- a) What do you understand by "Operator Subgoalings"? Illustrate the mechanism through which subgoalings of operators is carried out in the context of Means-Ends-Analysis technique. [6]
- b) Discuss Inheritable knowledge and Procedural knowledge with suitable examples. [6]
- c) Which four questions need to be addressed/discussed before embarking on the study of any specific AI problem? [4]

Section II**Q-4 Do as directed****[18]**

- a) Draw figures to depict the following situations:- [3]
- 1) A longer path may be better
 - 2) Interacting sub-goals
 - 3) Unnecessary backward propagation
- b) Which four properties must be possessed by a good knowledge representation system? Also explain those properties. [3]
- c) Justify the statement: - "FOPL is powerful than propositional logic." [3]
- d) Explain the process of reasoning in frames. [3]
- e) Write a program in PROLOG to generate Fibonacci series up to n terms. Read n from the user. [3]
- f) Write a program in PROLOG to remove the n^{th} element from the list of integers. Read n from the user. [3]

Q-5 Do as directed**[16]**

- a) What are Alpha-Beta cutoffs in the context of Minimax search algorithm? What are its significance? How are they beneficial? Discuss with a suitable example. [6]

OR

- a) Draw a neat sketch of a typical Expert System and explain the working of each block. State the purpose of the following expert systems: - MYCIN, DENDRAL, PROSPECTOR. [6]
- b) Write following sentences in clausal form :- [6]
- i) Mary likes anybody who likes to play chess.
 - ii) People only try to assassinate rulers they are not loyal to.
 - iii) John is sure to carry an umbrella when it rains.
 - iv) All yellow mushrooms are poisonous.
- c) Differentiate between monotonic and non-monotonic reasoning. [4]

Q-6 Do as directed**[16]**

- a) Explain the following terms with respect to Uncertainty: [6]
- 1) Statistical reasoning
 - 2) Default assumption based reasoning

OR

- a) Describe the perceptron model for OR and XOR logical operations with binary inputs. [6]
- b) Solve the following crypt arithmetic problem step-by-step: [6]

$$\text{KANSAS} + \text{OHIO} = \text{OREGON}$$

- c) Explain Discourse and Pragmatic processing with an example. [4]