

III B.Tech I Semester Regular Examinations, November 2006

**ARTIFICIAL INTELLIGENCE
(Computer Science & Engineering)**

Time: 3 hours

Max Marks: 80

**Answer any FIVE Questions
All Questions carry equal marks**

1. (a) Give a good state space representation for missionaries and cannibals problem.
(b) What are the chief characteristics of producer system. [8+8]
2. (a) In what kind of a problem space would a depth first search be better than a breadth first one?
(b) A problem-solving search can precede either forward or backward. Discuss the factors that determine the choice of direction for a particular problem. [8+8]
3. (a) What are Normal forms in Propositional logic? Explain the procedure for converting a prepositional logic into normal form. [4+6]
(b) Convert the formula $(A \rightarrow ((B \& C) \rightarrow D))$ into Disjunctive Normal form Convert the formula $((A \rightarrow B) \rightarrow C)$ into Conjunctive Normal form. [3+3]
4. (a) Define certainty factor? What are the components of certainty factor? [2+6]
(b) Explain Bayesian method of reasoning. [8]
5. (a) What is default logic? Explain with an example. [2+6]
(b) Briefly explain the following:
 - i. Abduction
 - ii. Inheritance[4+4]
6. (a) What is hierarchical planning?
(b) Explain with relevant examples.
(c) What is constraint satisfaction? [5+6+5]
7. (a) Elaborate the difference between “Isolated word recognition” and “continuous speech recognition”.
(b) Describe the role of ATN in semantic analysis? [8+8]
8. Write short notes on any two of the following:
 - (a) Decision trees in learning
 - (b) Riddle of the utility problem
 - (c) Rote learning-checker’s game
 - (d) Knowledge system Building tools. [8+8]

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1. (a) Distinguish between problem tree and problem graph. [2+2]
(b) What are the major steps that are required to build a system to solve a particular problem. [4]
(c) Discuss the meaning of "The first requirement of a good control strategy is that it causes motion". [4]
(d) Give the Turing test to find out whether a machine is intelligent or not. [4]
2. (a) In what kind of a problem space would a depth first search be better than a breadth first one?
(b) A problem-solving search can precede either forward or backward. Discuss the factors that determine the choice of direction for a particular problem. [8+8]
3. (a) Explain the various knowledge level of representation involved in the reasoning process.
(b) Explain the characteristics of procedural representation. [10+6]
4. (a) Define certainty factor? What are the components of certainty factor? [2+6]
(b) Explain Bayesian method of reasoning. [8]
5. (a) Consider the problem of finding clothes to wear in the morning. The knowledge's are
-Wear jeans unless either they are dirty or you have a job interview today.
-Wear a sweater if it's cold
-It's usually cold in the winter
-Wear sandals if it's warm
-It's usually warm in the summer
 - i. Build a JTMS-style database of the necessary facts to solve this problem.
 - ii. Show how the problem can be solved and how the solution changes as the relevant facts change.[5+5]
(b) TMSs are useful tools in solving constraint satisfaction problems. Give your opinion. [6]
6. (a) What is hierarchical planning?
(b) Explain with relevant examples.
(c) What is constraint satisfaction? [5+6+5]

7. (a) What are the three general approaches to Natural Language Processing ? [8]
(b) Describe systemic grammars and semantic grammars. [4+4]
8. Write short notes on any two of the following:
- (a) Decision trees in learning
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1. (a) What is Artificial Intelligence? Mention some of the applications that fall within the scope of AI. [2+6]
(b) Explain the state space representation of water jug problem. [8]
2. Discuss the following in detail.
 - (a) Hill Climbing
 - (b) Best ? First search
 - (c) Constraint satisfaction [5+6+5]
3. (a) What are the uses of combining forward and backward reasoning? Justify your answer [4+4].
(b) What is meant by matching? Explain complex and approximate matching. [2+3+3]
4. (a) Define certainty factor? What are the components of certainty factor? [2+6]
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5. (a) Consider the problem of finding clothes to wear in the morning. The knowledge's are
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 - ii. Show how the problem can be solved and how the solution changes as the relevant facts change.[5+5]
- (b) TMSs are useful tools in solving constraint satisfaction problems. Give your opinion. [6]
6. (a) Search in game playing programs always proceed forward from current state to goal state. Why? Explain. [2+6]
(b) The minimax procedure is depth first and depth limited. Explain examples. [4+4]

7. (a) What is top-down parsing and how it contrasts with bottom-up parsing. [2+6]
(b) Write a possible bottom up parsing of the sentence “The Sun rises in the East”. [8]
8. (a) What is “unsupervised learning” in which objects are recognized through clustering. Explain why the nature of the “goal” affects the process of learning. [4+4]
(b) Describe in detail, the design of a pattern Recognition program for validating “hand- writing”. Discuss the inherent problems in detail. [4+4]

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3. (a) What are the uses of combining forward and backward reasoning? Justify your answer [4+4].
(b) What is meant by matching? Explain complex and approximate matching. [2+3+3]
4. Suggest a semantic network to describe the following:
(a) Suresh, who was driving a blue car, picket up his son Ramesh, who had come to Hyderabad from Bangalore by Train.
(b) Iqbal's forefinger of right hand got struck in the left back door of his car. [8+8]
5. (a) What is default logic? Explain with an example. [2+6]
(b) Briefly explain the following:
 i. Abduction
 ii. Inheritance [4+4]
6. (a) Differentiate between hierarchical planning and opportunistic planning with suitable examples. [6+4]
(b) What is "frame problem"? [6]
7. (a) What are the three general approaches to Natural Language Processing ? [8]
(b) Describe systemic grammars and semantic grammars. [4+4]
8. (a) What is "unsupervised learning" in which objects are recognized through clustering. Explain why the nature of the "goal" affects the process of learning. [4+4]

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- (b) Describe in detail, the design of a pattern Recognition program for validating “hand- writing”. Discuss the inherent problems in detail. [4+4]

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