Code No: RR310502 **Set No.1**

III B.Tech. I Semester Regular Examinations, November -2005
ARTIFICIAL INTELLIGENCE
(Computer Science & Engineering)

Time: 3 hours **Max Marks: 80**

Answer any FIVE Questions
All Questions carry equal marks

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1. (a) Show that the **Tower of Hanoi** problem can be classified under the area of AI. Give a state space representation of the problem. [4+4]
   (b) What are the characteristics of a production system? [8]
2. State the traveling salesman problem and explain: Combinatorial Explosion, Branch and Bound Technique and Nearest Neighbour Heuristic. [5+6+5]
3. (a) Explain how knowledge can be represented using declarative and procedural representations. Give examples. [2+3+3]
   (b) Compare Forward Vs Backward reasoning. [8]
4. (a) What are Semantic networks? Explain its features with sample semantic net.
   (b) Explain the classification of nodes in Semantic net. [8+8]
5. (a) With neat diagram, explain the justification based truth maintenance system [2+6]
   (b) Explain the logic based truth maintenance system with an example [6+2]
6. (a) Illustrate the minimax search for the tic-tac-toe game, with initial position.
   (b) How Alpha-Beta method helps greatest pruning improvement in the above game? [8+8]
7. (a) Show a parse tree for "India wins third N-Power test after losing second one". Explain what knowledge is necessary to produce the correct parse. [4+4]
   (b) Show how the sentence "LAXMAN BATTED THROUGH THE INNINGS" would be represented in case grammar. Show how would it be represented in CD. [4+4]
8. (a) Describe and explain in detail, the "Blocks-World Domain" in Learning from Examples technique. [3+3+4]
   (b) What are decision trees. [6]

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1. (a) Analyse water jug problem with respect to the problem characteristics. [8]
   (b) Develop for an algorithm for Agenda-driven search and explain. [4+4]
2. (a) Explain with example AND / OR graphs.
   (b) Write down the algorithm for generate and test search. [12+4]
3. (a) Explain the algorithm for resolution in predicate logic. [8]
   (b) What is the need for natural deduction? Explain. [2+6]
4. Convert the following statements to Conceptual Dependencies
   I gave a pen to my friend
   Rama ate ice cream
   I borrowed a book from your friend
   While going home, I saw a frog. [4X4]
5. (a) What is default reasoning? What are the approaches to do default reasoning? List the common kinds of non-monotonic reasoning that can be defined in these approaches. [2+4+2]
   (b) Explain with example, the non-monotonic logic [6+2]
6. (a) Under what circumstances , would it be good idea to use search graph than a tree search in Minimax procedure?
   (b) How would the minimax procedure is to be modified for a program playing a three person game than a two person game? [8+8]
7. (a) Show a parse tree for "India wins third N-Power test after losing second one". Explain what knowledge is necessary to produce the correct parse. [4+4]
   (b) Show how the sentence "LAXMAN BATTED THROUGH THE INNINGS" would be represented in case grammar. Show how would it be represented in CD. [4+4]
8. (a) Define and Explain "Learning" . Describe in detail, the range of activities covered by the concept "Learning". Justify the statement -that "Learning is the most important characteristic of Intelligence" [2+2+4].
   (b) Describe and discuss in detail, the important aspects of
      i. Rote Learning

ii. Learning by taking advice. Illustrate answer with the help of relevant examples. [4+4]

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Code No: RR310502 **Set No.3**

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Time: 3 hours **Max Marks: 80**

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1. Describe with necessary diagrams, a suitable state space representation for 8 puzzle problem and explain how the problem can be solved by state space search. Show how heuristic can improve the efficiency of search. [2+6+4+4]

2. (a) What are the advantages of Heuristic search?
   (b) What is the constraints satisfaction?
   (c) Compare and contrast forward and backward reasoning. [5+5+6]

3. (a) What is the need to convert sentences to clause form? Suggest an algorithm to convert a given sentence to clause form. [2+10]
   (b) Convert the following sentence to clause form using the above algorithm. All the students of the class were either lovers of cricket or thought all those who loved cricket were crazy. [4]

4. Write short notes on:
   (a) Semantic net
   (b) Frames
   (c) Conceptual dependency
   (d) Scripts [4+4+4+4]

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
   -Its usually cold in the winter
   -Wear sandals if it's warm
   -Its 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) Illustrate the minimax search for the tic-tac-toe game, with initial position.

(b) How Alpha-Beta method helps greatest pruning improvement in the above game? [8+8]

7. (a) What is a simple transition network (STN)? [8]

   (b) Differentiate between Augmented transition network and STN with relevant examples in BNF Constructs. [6+2]

8. (a) Define and Explain "Learning" . Describe in detail, the range of activities covered by the concept "Learning". Justify the statement -that "Learning is the most important characteristic of Intelligence" [2+2+4].

   (b) Describe and discuss in detail, the important aspects of

      i. Rote Learning

      ii. Learning by taking advice. Illustrate answer with the help of relevant examples. [4+4]

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Code No: RR310502 **Set No.4**

III B.Tech. I Semester Regular Examinations, November -2005
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Time: 3 hours **Max Marks: 80**

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1. (a) Write down the state space representation, production rules, and any two solutions for the water jug problem. [2+4+2]
   (b) Explain problem characteristics with examples. [6+2]
2. State the traveling salesman problem and explain: Combinatorial Explosion, Branch and Bound Technique and Nearest Neighbour Heuristic. [5+6+5]
3. (a) What is resolution? How it is used in theorem proving? [2+4]
   (b) Explain the algorithm of converting well-formed-formulas to clause form. [10]
4. (a) What are Semantic networks? Explain its features with sample semantic net. [2+6]
   (b) Explain the classification of nodes in Semantic net. [8]
5. (a) What is default reasoning? What are the approaches to do default reasoning? List the common kinds of non-monotonic reasoning that can be defined in these approaches. [2+4+2]
   (b) Explain with example, the non-monotonic logic [6+2]
6. (a) Describe how Alpha-Beta search works with relevant examples. [6+2]
   (b) How does the minimax search helps in solving tic-tac-toe problem? [8]
7. (a) Differentiate between "Speech recognition" and "speech understanding".
   (b) Describe the various classes of Grammars. [8+8]
8. Discuss in a comparative manner (in detail) the important characteristics of
   (a) Deterministic Decision function approach
   (b) probabilistic Decision function approach in pattern Recognition problems. Give examples where each approach is more appropriate. [8+8]

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