

Code No: **R4205A****R10****Set No. 1****IV B.Tech II Semester Regular Examinations, April/May - 2014****ARTIFICIAL INTELLIGENCE****(Computer Science and Engineering)****Time : 3 hours****Max. Marks: 75****Answer any Five Questions****All Questions carry equal marks**

- 1 a) Discuss the areas of application of Artificial Intelligence.? [8]
b) Discuss the **tic-tac-toe** problem in detail and explain how it can be solved using AI techniques? [7]
- 2 a) Explain A* algorithm with an example. What are the limitations of A* algorithm? [8]
b) Describe different control strategies used in problem solving ? [7]
- 3 Consider the following sentences:
i. John likes all kinds of food.
ii. Apples are food
iii. Chicken is food
iv. Anything anyone eat and isn't killed by is food.
v. Bill eats peanuts and is still alive.
vi. Sue eats everything Bill eats.
a) Translate these sentences into formulas in predicate logic.
b) Convert the formulas into clause form.
c) Prove that John likes peanuts using Resolution. [15]
- 4 a) What are frames? Give a sample frame of a Computer department of a college? [7]
b) Explain reasoning using Semantic networks? [8]
- 5 a) With neat diagram, explain the justification based truth maintenance system? [7]
b) Explain the logic based truth maintenance system with an example? [8]
- 6 a) Define certainty factor. What are the components of certainty factor? [7]
b) Explain Bayesian method of reasoning? [8]

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- 7 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”. [7]
- 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. [8]
- 8 a) Define Artificial Neural Networks? Explain in brief about the design issues of artificial neural networks? [8]
- b) Explain the Forward and Backward Reasoning strategies with examples? [7]

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- 1 a) Distinguish between simple planning agent and problem solving agent.? [8]
b) Explain forward state space search with an example.? [7]
- 2 a) Define Heuristic search? What are the advantages of Heuristic search? [8]
b) Describe the minimax algorithm with an example.? [7]
- 3 a) What is Resolution? Suggest an algorithm to resolve a set of sentences given in propositional logic [7]
b) Look at the following sentences:
Ramu is a soldier
Ramu is a resident of Madras
Madras is in India
All Indian soldiers know Hindi
Convert them into predicate form and resolve to answer the question –
Does Ramu know Hindi? (What additional information is needed to answer the question?) [8]
- 4 a) Give semantic nets to describe the following:
Narayan is a writer
Narayan lives in Bombay
Ishwar is a teacher
Ishwar lives in Bangalore.
Narayan sent a copy of his book to Ishwar
Ishwar sent his thanks to Narayan. [8]
b) Describe your chair using a semantic net. [7]
- 5 a) Explain the process of knowledge acquisition and validation for expert systems? [8]
b) List out and explain the characteristics features of expert system? [7]

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- 6 a) Compare the conventional reasoning system with non-conventional reasoning system? [8]
b) Discuss the different key issues with respect to non-monotonic reasoning system? [7]
- 7 a) Explain in brief about Deduction method of learning? [8]
b) Explain in brief about Decision trees in learning? [7]
- 8 a) What is backward chaining? Explain basic algorithm and describe how it is used in logic programming? [8]
b) Distinguish between single layer and multi layer perception neural networks? [7]

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- 1 a) Define Artificial Intelligence. Explain the techniques of A.I. Also describe the characteristics of Artificial Intelligence? [8]
b) Explain the state space representation of Water – Jug problem ? [7]
- 2 a) Describe the heuristic search technique applied to a hill-climbing problem with an example ? [8]
b) A problem-solving search can precede either forward or backward. Discuss the factors that determine the choice of direction for a particular problem? [7]
- 3 a) What is predicate logic? Explain the predicate logic representation with reference to suitable example? [7]
b) Consider the following sentences:
 Marcus was a man
 Marcus was a Pompeian
 Marcus was born in 40 AD
 All men are mortal
 All pompeians died the Volcano erupted in 79 AD
 No mortal lives for more than 150 years
 i) Convert them to clause form
 ii) Answer the question “ is Marcus dead now “ in two different ways.
 Clearly state the assumptions made. [8]
- 4 a) Express the following statements using semantic nets.
 i) Every student has been hit by every teacher (atleast once)
 ii) Every student has been hit by some teacher (or the other)
 iii) Some students have been hit by some teachers. [8]
b) Suggest a semantic net to describe the main organs of the human body. [7]
- 5 a) Explain Justification-Based Truth Maintenance Systems with an example? [8]
b) Define Expert system? Explain in brief about applications of Expert systems? [7]

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- 6 a) Define Fuzzy Set? Explain in brief about Fuzzy set operations? [8]
b) Explain in brief about fuzzy propositions? [7]
- 7 a) What is pattern clustering? Explain the three basic competitive learning laws? [7]
b) Differentiate between Supervised and Unsupervised Learning? [8]
- 8 Draw state transition diagram for a feed back network. Explain how to derive it for a given network [15]

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- 1 a) Draw a state space representation of Towers of Hanoi problem? [8]
b) What do you mean by an AI technique? How will you know that your AI system readily works? [7]
- 2 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? [15]
- 3 a) Differentiate between Forward Vs Backward reasoning. [7]
b) Consider the following facts:
i) John likes anyone who likes playing tennis and football
ii) A is brother of B if A is a male, A has father F and mother M and B has the same mother and father as A does.
Translate these facts into formulae in predicate logic and propositional logic [8]
- 4 a) 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. [8]
b) Explain in brief about the issues in representation of knowledge? [7]
- 5 a) Differentiate between Expert and Traditional Systems? [7]
b) Explain in brief about Rule based expert systems? [8]

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- 6 a) Define Fuzzy Set? Explain in brief about Inference rules for Fuzzy Propositions? [7]
b) Explain in brief about Membership functions in Fuzzy systems?
- 7 Define and explain the concept of “Learning” Describe the features of the following methods of Learning.
(i) Memorization (Rote learning).
(ii) Direct Instruction (Taking advice).
(iii) Analogy (By example).
(iv) Induction.
(v) Deduction. [15]
- 8 a) Explain how you perform pattern recognition tasks by feedback neural networks? [8]
b) Differentiate between single layer feed forward and multi layered forward networks? [7]