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(Following Paper ID and Roll No. to be filled in your Answer Book)

PAPER ID : 113701 Roll No. | | | | | | | | | | |

## B.Tech.

(SEM. VIII) THEORY EXAMINATION 2013-14

## ARTIFICIAL INTELLIGENCE

*Time : 3 Hours* *Total Marks : 100*

**Note :–** Attempt **all** questions.

1. Attempt any **four** parts of the following : **(5×4=20)**
   (a) What is Artificial Intelligence ? Why do we need it ?
   (b) Briefly discuss at least six component areas of Artificial Intelligence.
   (c) Describe the Turing test. If the Turing test is passed does this show that computers exhibit intelligence ? State your reasons.
   (d) How can the environment be classified from an agent's point of view ? Which type of environment is the most challenging for an agent ?
   (e) What are the differences between human vision and computer vision that make computer vision a difficult process ?
   (f) What is Natural Language Understanding ? List the features that make Natural language understanding hard.
2. Attempt any **four** parts of the following : **(5×4=20)**
   (a) Formulate the Vacuum Cleaner problem with the help of its various components. Also draw the state space for vacuum cleaner problem.



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(b) Compare the Depth Limited Search and Iterative Deepening Depth First Search on the basis of problem solving performance parmeters.

(c) Explain the A* algorithm and illustrate the over-estimation and under-estimation of heuristics.

(d) Explain the Simulated Annealing algorithm. How is it different from hill climbing algorithm ?

(e) Explain $\alpha$-$\beta$ pruning procedure. Mark the nodes in the figure 1 which will prune out.

(f) Explain the minimax procedure for game playing. Find out the values of the nodes starting from node A to O as shown in figure 1 using minimax procedure assuming that root node is max node.

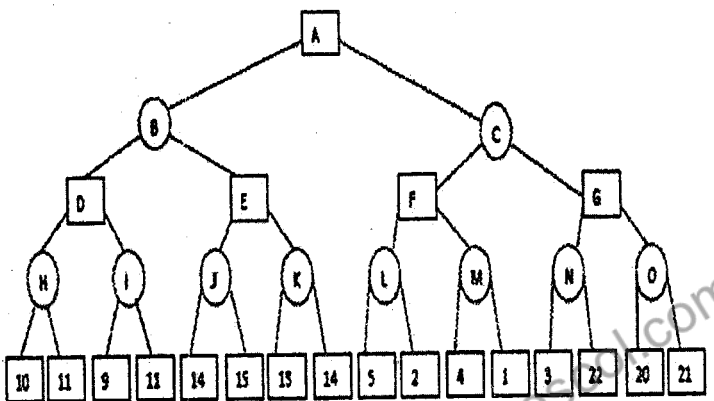



**Figure 1**

3. Attempt any **two** parts of the following : **(10×2=20)**

(a) Jacks owns a dog.

Every dog owner is an animal lover.



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No animal lover kills an animal.

Either Jack or Curiosity killed the cat, who is named Tuna.

By using Resolution prove that

**"Did Curiosity kill the cat".**

(b) (i) What is Bayesian network ? How is the Bayesian network used in representing the uncertainty about the knowledge ?

(ii) Explain the difference between forward and backward chaining. Under what conditions each will be best to use for a given set of problems.

(c) Convert the following English statements to statements in First order logic :

(i) Every boy or girl is a child.

(ii) Every child gets a doll or a train or a lump of coal.

(iii) No boy gets any doll.

(iv) No child who is good gets any lump of coal.

(v) Jack is a boy.

4. Attempt any **two** parts of the following : **(10×2=20)**

(a) (i) What is Machine Learning ? Differentiate between supervised and unsupervised learning techniques.

(ii) What is the role of "Decision Tree" in inductive learning ?

(b) Explain the Expectation and Maximization (EM) algorithm for finding the maximum likelihood with hidden variables.



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(c) What are the assumptions taken for Naïve Bayes Model ? Explain the Naïve Bayes Model for learning process with complete data.

5. Attempt any **two** parts of the following : **(10×2=20)**

(a) Discuss the various components of a typical pattern recognition system.

(b) Compare PCA with LDA. When is PCA better than LDA ?

(c) Explain how classification is done by using Bayes Classifier.

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