(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.

(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 α-β 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.

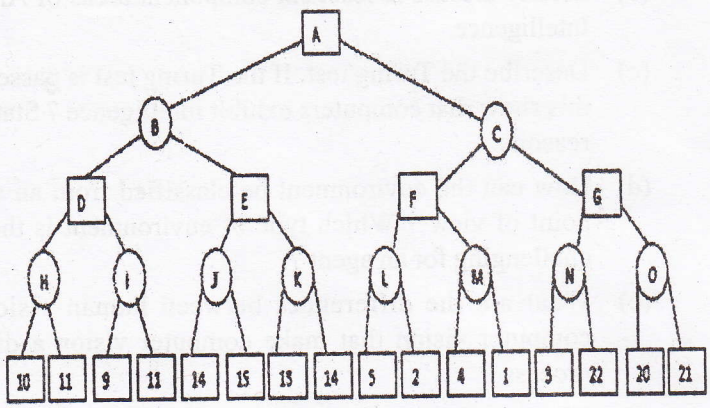

Figure 1

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

(a) Jacks owns a dog.

Every dog owner is an animal lover.

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.

(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.