

(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 parameters.
- (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.

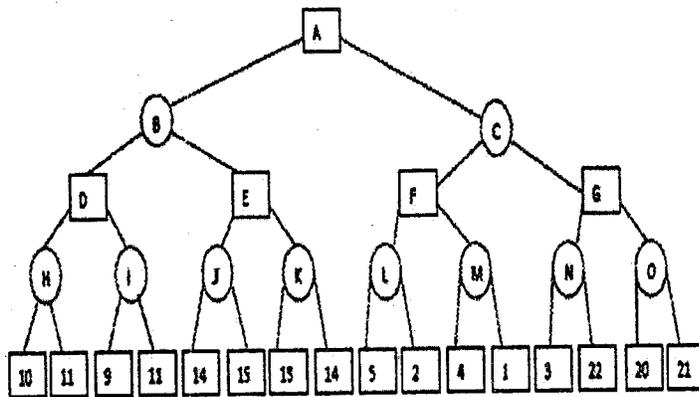


Figure 1

3. Attempt any two parts of the following : (10×2=20)
- (a) Jacks owns a dog.  
Every dog owner is an animal lover.

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.