SEM-VII COMP (CBSGS) 25/5/16

Artificial Intelligence.

QP Code : 31334

(3 Hours) **[Total Marks : 80]**

N. B. : (1) **Each** question carry **20** marks.
(2) Question **1** is **compulsory**.
(3) Attempt any **three** (3) from the remaining questions.
(4) Assume suitable data wherever required.

1. Attempt any **four** (4) questions from the following: **20**
   (a) Draw and explain architecture of Expert System.
   (b) Explain Hill-climbing algorithm with an example.
   (c) Give PEAS description for a Robot Soccer player. Characterize its environment.
   (d) Explain Turing test designed for satisfactory operational definition of intelligence.
   (e) Prove that A* is admissible if it uses a monotone heuristic.
   (f) Compare and Contrast problem solving agent and planning agent.

2. (a) Explain decision tree learning with an example. What are decision rules? How to use it for classifying new samples? **10**
   (b) Write first order logic statements for following statements: **10**
      (i) If a perfect square is divisible by a prime p then it is also divisible by square of p.
      (ii) Every perfect square is divisible by some prime.
      (iii) Alice does not like Chemistry and History.
      (iv) If it is Saturday and warm, then Sam is in the park.
      (v) Anything anyone eats and is not killed by is food.

3. (a) Design a planning agent for a Blocks World problem. Assume suitable initial state and final state for the problem. **10**
   (b) Find the probabilistic inference by enumeration of entries in a full joint distribution table shown in figure 1. **10**
      (i) No cavity when toothache is there
      (ii) p (Cavity! toothache or catch)

	toothache		¬toothache	
	catch	¬catch	catch	¬catch
cavity	.108	.012	.072	.008
¬cavity	.016	.064	.144	.576

Figure 1.

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4. (a) Compare following informed searching algorithms based on performance measure with justification: Complete, Optimal, Time complexity and space complexity. 10

a) Greedy best first

b) A*

c) Recursive best-first (RBFS)

(b) Apply alpha-Beta pruning on example given in Figure 2 considering first node as max. 10

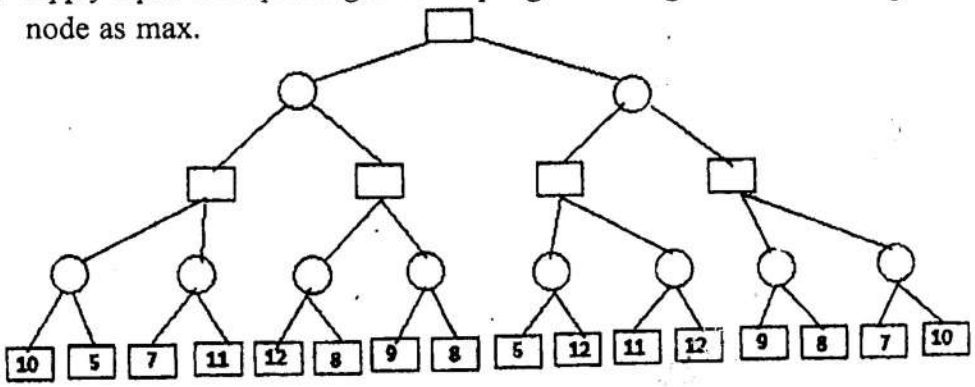

Figure 2.

5. (a) Explain how genetic algorithm can be used to solve a problem by taking a suitable example. 10

(b) Consider the graph given in Figure 3 below. Assume that the initial state is A and the goal state is G Find a path from the initial state to the goal state using DFS. Also report the solution cost 10

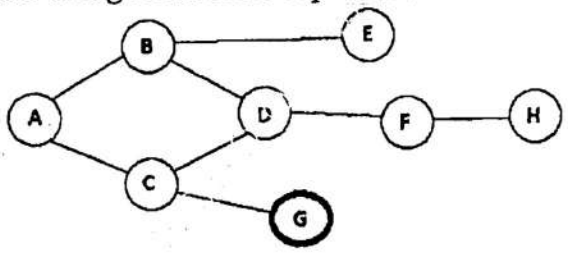

Figure 3.

6. (a) Explain the steps involved in converting the propositional logic statement into CNF with a suitable example 10

(b) What are the basic building blocks of Learning Agent? Explain each of them with a neat block diagram. 10