USN

10CS/IS764

Seventh Semester B.E. Degree Examination, Dec.2016/Jan.2017
Artificial Intelligence

Time: 3 hrs.

Max. Marks:100

Note: *Answer any FIVE full questions, selecting atleast TWO questions from each part.*

PART – A

1   a.   Explain the properties of task environments with example.   (10 Marks)
    b.   Explain the structure of a model based reflex agent with a diagram.   (04 Marks)
    c.   Briefly explain the depth limited search and iterative deepening depth first search.
                                                                                                     (06 Marks)

2   a.   State and prove the conditions that heuristic function h(n) should satisfy so that A^* search is both complete and optimal.   (10 Marks)
    b.   Explain how backtracking search is used in solving constraint satisfaction problem with an example.   (08 Marks)
    c.   Define a game as a kind of search problem.   (02 Marks)

3   a.   Give the PEAS description of Wumpus world.   (05 Marks)
    b.   Illustrate the procedure of converting the following sentence into conjunctive normal form.
         $B_{1,1} \Leftrightarrow (P_{1,2} \vee P_{2,1})$ (06 Marks)
    c.   Write BNF grammar of sentences in propositional logic.   (06 Marks)
    d.   Define equivalence, validity and satisfiability in logic.   (03 Marks)

4   a.   Explain the knowledge engineering process for the domain of electronic circuits. [Refer Fig.Q4(a)]   (10 Marks)

Fig.Q4(a)

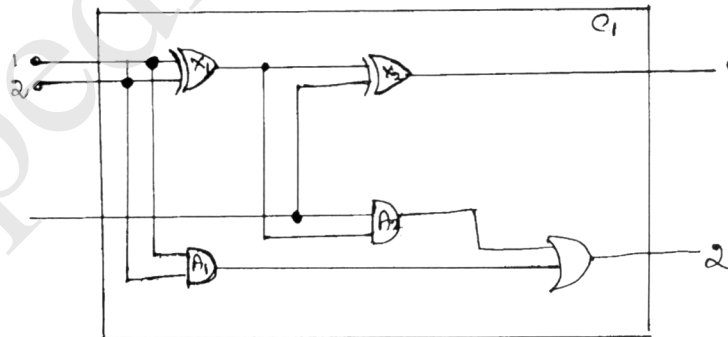   b.   Explain the syntax of first order logic with equality, specified in BNF. Give example for each word.   (10 Marks)

PART – B

5   a.   The law says that it is a crime for an American to sell weapons to hostile nations. The country Nano, an enemy of America, has some missiles and all of its missiles were sold to it by west, who is American. Prove that west is a criminal using resolution.   (12 Marks)

b. Determine the color of Fritz from the following knowledge base using (i) forward chaining (ii) backward chaining.

If x croaks and eats flies, then x is a frog. If x chirps and sings, then x is a canary. If x is a frog, then it is colored green if x is canary, then x is colored yellow. Fritz croaks and eats flies. **(08 Marks)**

6 a. Explain how categories and objects are represented and defined with suitable examples.
(06 Marks)

b. What is situation calculus? Explain the ontology of situation calculus. **(06 Marks)**

c. Write short notes on : (i) Semantic networks (ii) Truth maintenance systems. **(08 Marks)**

7 a. The full joint distribution for three variables Toothache, cavity and catch are given below.

	Toothache		¬ Toothache	
	Catch	¬ Catch	Catch	¬ Catch
Cavity	0.108	0.012	0.072	0.008
¬ Cavity	0.016	0.064	0.144	0.576

Find (i) P (cavity | toothache)

(ii) P (toothache $\wedge$ catch | cavity)

(iii) P (cavity) **(06 Marks)**

b. What is a Bayesian network? Explain the semantics of Bayesian network with an example.
(10 Marks)

c. Write ADL description of simple spare fire problem. **(04 Marks)**

8 a. Write the decision tree learning algorithm with an example. **(10 Marks)**

b. Explain the issues affecting design of a learning element. **(10 Marks)**

* * * * *