

[This question paper contains 4 printed pages.]

6136

Your Roll No.

B.Sc. (Hons.) / Computer Science / VI Sem. D

Paper 605 (ii) – ARTIFICIAL INTELLIGENCE

(Admissions of 2001 to 2010)

Time : 3 Hours

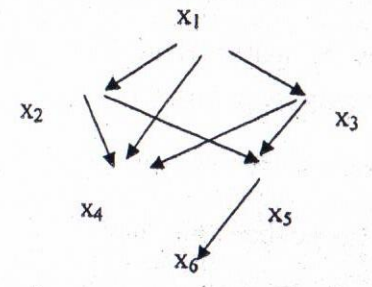
Maximum Marks : 75

(Write your Roll No. on the top immediately on receipt of this question paper.)

All questions in Section – A is compulsory. Attempt any four questions from Section – B.

SECTION – A

- 1. (a) What are the advantages of using an expert system shell ? (2)
- (b) Draw a pictorial definition for the linguistic variable TALL giving your own variables and their values. (4)
- (c) Write the joint distribution of x_1, x_2, x_3, x_4, x_5 and x_6 as a product of chain conditional probabilities for the following network : (4)



P.T.O.

2. (a) 8-Blocks world problem is not decomposable. Justify your answer by giving an appropriate heuristics for the same. (2+3)
- (b) What is a Truth Maintenance System? Discuss the importance of dependency directed backtracking in it with the help of a suitable example. (1+2+2)
3. (a) Differentiate between deductive and non-deductive approaches for inference mechanism. (3)
- (b) Transform the following into DNF :
- (i) $\sim(P \& Q) \& (P \vee Q)$
- (ii) $P \rightarrow ((Q \& R) \leftrightarrow S)$ (4)
- (c) Write the output of the following LISP statements :
- (i) `cadadr '(a (b e) d)`
- (ii) `reverse '(a (b c (d)) e f)`
- (iii) `member 'c' (a (b c) d e)`
- (iv) `(greater 2 4 17 9 20)` (4)
- (d) Express the sentences given below into conceptual dependency structure :
- (i) Ram drove the car fast
- (ii) Rita pushed the door (4)

SECTION - B

4. (a) What is Horn clause? Give suitable examples. (2+1)
- (b) Why we keep Knowledge Base separate from the control module in the Knowledge Base System. (3)
- (c) Explain the steps used in pattern recognition process in brief. (4)
5. (a) Define the sentences S_1, S_2 and S_3 . $S_1 = P, S_2 = Q$ and $S_3 = P \rightarrow Q$. Determine the probabilistic truth values of S_1, S_2 and S_3 when it is known that probabilities of the possible worlds are given by $P(W_1) = 1/4, P(W_2) = 1/8, P(W_3) = 1/8$ and $P(W_4) = 1/2$. (4)
- (b) Solve the given crypt arithmetic problem :
- $$\begin{array}{r} \text{TWO} \\ + \text{TWO} \\ \hline \text{FOUR} \end{array} \quad (6)$$
6. (a) Differentiate between rule based and non-production system architecture for expert system. (4)
- (b) Transform the following into clausal form :
- $$\exists x \forall y (\forall z P(f(x), y, z) \rightarrow (\exists u Q(x, u) \& \exists v R(y, v))) \quad (6)$$

7. (a) Describe Water-Jug problem and give suitable state space representation for it. (2+3+1)
- (b) Differentiate between decision-theoretic and syntactic classification approaches for recognizing a pattern. (4)
8. (a) Compare and contrast Depth first search and Breadth first search? (5)
- (b) Write a short note on Blackboard System Architecture. (5)
9. (a) Give the cons-cell representation of the following list:
 list :
 (a (b c (d (e) f) g h) i (j)) (5)
- (b) Consider the parse tree given below. Write a context free grammar for it. Draw a Recursive Transition Network for the grammar that can accept the sentence: "John hit the ball". (2+3)

