

This question paper contains 4+2 printed pages]

Your Roll No. ....

1959

**B.Sc. (Hons.) Computer Science/VI Sem. C**

**Paper 605 (i) – 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 are compulsory.

Attempt any *four* questions in Section B.

### Section A

1. (a) When do you call a machine intelligent ? Name the criteria used for determining whether a machine is intelligent or not ? 1+2
- (b) Explain the physical symbol system hypothesis ? 3
- (c) Differentiate Depth first search and Best first search with the help of an example. 5

P.T.O.

(d) Express the sentences given below into conceptual dependency structure . 4

(i) Sushil ate soup with a spoon

(ii) Rita gave Sita a bunch of flowers.

2 (a) Write the output of the following LISP statements : 4

(i) `caddr '(a (b c) d)`

(ii) `reverse '(a(b c (d)) e f)`

(iii) `member 'c '(a (b (c))d e)`

(iv) `(lessp 22 44 17 9 20)`

(b) Transform the following into CNF : 3

(i)  $P \vee (\sim P \ \& \ Q \ \& \ R)$

(ii)  $(\sim P \ \& \ Q) \vee (P \ \& \ \sim Q) \ \& \ S$

(c) Draw a pictorial definition for the linguistic variable AGE giving your own subjective values for AGE variables and their values. 3

3. (a) Write a recursive LISP function to find the  $n$ th term of a Fibonacci series, where the number  $n$  is to be passed as an argument to a function. 4
- (b) Give the cons-cell representation of the following list . 6
- (a (b (c) (d (e) f) g h) i (j) ).

### Section B

1. (a) Describe the various problems associated with Hill climbing method and explain them. 6
- (b) Write a short note on Neural Network Architecture. 4
5. (a) How many types of non-deductive inference are there ? Explain. 4
- (b) Give an example of non-monotonic reasoning and describe it also. 3
- (c) Develop a parse tree for the sentence "Raja slept on the sofa". 3

6. (a) Write a script for going to a movie. 4

(b) Describe the admissibility condition for the A\* algorithm.

In what situations A\* will give an optimal solution ?

Give appropriate examples. 2+2+2

7. (a) Consider the following axioms : 4+3

(i) Every boy or girl is a child.

(ii) Every child gets a doll or a train or a lump of coal.

(iii) No body gets any doll.

(iv) No child who is good gets any lump of coal.

(M) (Conclusion) If no child gets a train, then no boy is good.

Prove that given conclusion using resolution technique.

- (b) Define the sentences S1, S2 and S3. S1 = P, S2 = Q and S3 =  $P \wedge Q$ . Determine the probabilistic truth values of S1, S2 and S3 when it is known that probabilities of the possible words are given by :

$$P(W1) = 1.4, P(W2) = 1.8,$$

$$P(W3) = 1.8 \text{ and } P(W4) = 1.2.$$

8. (a) Define a production system. What type of production system is appropriate for designing a chemical synthesis problem and why ?
- (b) Transform the following into clausal form :

$$\exists x \forall y (\forall z P(f(x), y, z)) \rightarrow (\exists u Q(x, u) \& \exists v R(y, v)).$$

9. Write short notes on the following : 10

- (a) Uninformed Search
- (b) Heuristic Search
- (c) Mean End Analysis
- (d) Resolution Principle.