

M.Sc 3rd Semester Examination, 2011

COMPUTER SCIENCE

(Artificial Intelligence and Neural Network)

PAPER—COS-303

Full Marks : 50

Time : 2 hours

Answer any **two** questions from each Group

The figures in the right-hand margin indicate marks

Candidates are required to give their answers in their own words as far as practicable

Illustrate the answers wherever necessary

GROUP – A

Answer any *two* questions

1. In the missionaries and unbelievers problem, three missionaries and three unbelievers stand at the left bank of the river. They wish to cross the river. There is a small boat (without a boatman) to ferry them across, but it holds at most two persons. Whenever there are

more missionaries than unbelievers on either bank of the river, the missionaries will convert the unbelievers. The problem is to find out whether there is any possible sequence of ferrying for the six persons to cross the river without any of the unbelievers getting converted.

- (a) Formulate the problem as a statespace search problem.
- (b) Draw the implicit search graph.
- (c) Does there exist a solution to the problem ? If so specify the solution. Otherwise, clearly explain why there is no solution. 3 + 3 + 4

2. What is admissible heuristic ? Is it possible for A^* to output minimum cost solution path even if the heuristic is inadmissible ? Explain with example. 3 + 1 + 6

3. Compare between the following search algorithms : 5 + 5

- (a) Depth-first search and uniform cost algo.
- (b) A^* algorithm and uniform cost algorithm.

GROUP – B

Answer any *two* questions

4. Write short notes on the following learning laws : $2\frac{1}{2} \times 4$
- (i) Hebb's law
 - (ii) Instan learning law
 - (iii) Delta learning law
 - (iv) Perceptron learning law.
5. Explain the perceptron model with a diagram. 10
6. Implement the following logic circuits using the McCulloch-Pitts model : 5 + 5
- (a) $f(x) = \bar{X}_1 X_2 + X_1 \bar{X}_2$
 - (b) $f(X) = \overline{X_1 X_2 X_3}$

[*Internal Assessment* : 10 Marks]