# 2008

## M.Sc.

## 3rd SEMESTER EXAMINATION

### Computer Science

**PAPER—CS-2103**

*Full Marks :* 50

*Time :* 2 Hours

*The figures in the margin indicate full marks.*

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

*Illustrate the answers wherever necessary.*

### Group—A

### (*Artificial Intelligence*)

Answer *Q. No. 1* and any *one* from the rest.

**1.** What will be the output of the following program segment? 5

```
a(x, y, z) : - b(X), c(Y), d(Z).
a(999, 999, 999).
b(1) : - not(f).
b(2) : - fail.
```

b(3).

b(u).

c(1) : – h, i, j, k.

c(2).

f.

h.

j.

k.

d(1) : – fail.

d(2).

**2.** What are Q-paths? Do you agree with the statement — "A* algorithm outputs optimal solution path, in general"? Give reasons behind your answer. Show that A* may output an optimal solution path in case where the heristics are inadmissible. 3+1+5+6

**3.** 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 (with 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.

(i) Formulate the problem as state-space search problem.

(ii) Draw the implicit search graph.

(iii) Does there exist a solution of the problem? If so, specify the solution. Otherwise, clearly explain why there is no solution.

(iv) What is expected to happen if you apply Depth-first search method?

3+2+2+8

[ Internal Assessment — 5 ]

## Group—B

## (*Neural Network*)

Answer *Q. No. 4* and any *one* from the rest.

**4.** Design the networks using M–P neurons to realize the following logic function using $\pm 1$ for the weights.

$s(a_1, a_2, a_3) = \overline{a_1}a_2\overline{a_3}$. 5

**5.** Write short note on : 5×3

Hebb's Law, Detla learning law, Outstar learning Law.

**6.** (i) Compare the performance of a computer and that of a biological neural network in terms of speed of processing, size and complexity, storage, fault tolerance and control mechanism.

(ii) Explain Perception mode. 5+10

[ Internal Assessment — 5 ]