

GANPAT UNIVERSITY
M. TECH SEM. I (INFORMATION TECHNOLOGY)
CBCS REGULAR EXAMINATION NOV – DEC 2017
3IT101 : SOFT COMPUTING

Total Time: 3 hours

Total Marks: 60

- Instructions:** 1. Write each section in separate answer sheet.
 2. Figure to the right indicates full marks.
 3. Assume suitable data wherever necessary.

SECTION – I

- Q – 1 (a)** Explain the characteristics of following problems: (6)
 (i) 8-puzzle (ii) N-queens (iii) Chess
- (b)** Discuss the travelling salesman problem in the context of state space search problem. (4)

OR

- Q – 1 (a)** What is the role of a heuristic function? Attempt to describe good heuristic functions for the following problems: (6)
 (i) N-queens (ii) Blocks-world (iii) Tower of Hanoi
- (b)** Discuss the problem of over-estimation and under-estimation with A* algorithm. (4)

- Q – 2 (a)** What is constraint satisfaction? Solve the following crypt-arithmetic puzzle. (6)

$$\begin{array}{r} B E S T \\ + M A D E \\ \hline M A S E R \end{array}$$

- (b)** Discuss recoverable class of problems with the help of an example. (4)

OR

- Q – 2 (a)** Define the problem of water jug as a state space search problem. Design rules for the same. (4)
- (b)** When steepest-ascent hill climbing may fail? Also write the solutions to overcome it. (6)

- Q – 3 (a)** What is soft computing? Explain how it differs from traditional artificial intelligence with help of an example. (4)
- (b)** Differentiate between DFS and BFS. Discuss the scenario in which DFS works better than BFS. (4)
- (c)** Discuss the characteristics of a good control strategy. (2)

SECTION – II

Q – 4 (a) Discuss α - β pruning with appropriate example. (5)

(b) How fuzzy logic differs from crisp logic? State about any two problems where fuzzy logic works better than crisp logic. (5)

OR

Q – 4 (a) What is back-propagation in neural network? Why Log-sigmoid is taken as activation function for such networks? (5)

(b) Explain various membership functions used for fuzzy logic. (5)

Q – 5 Develop Perceptron model and obtain the final weights and bias after 2 epochs for the given parameters. Given Initial weights $W_1 = W_2 = W_3 = 0$ and $b = 0$. Learning coefficient $\eta = 1$ and node function is as follows: (10)

$$y = f(y_{in}) = \begin{cases} -1, & y_{in} < 0 \\ 0, & y_{in} = 0 \\ 1, & y_{in} > 0 \end{cases}$$

X_1	X_2	X_3	T
1	1	1	1
-1	1	1	-1
1	-1	1	-1
-1	-1	1	-1
1	1	-1	-1
-1	1	-1	-1
1	-1	-1	-1
-1	-1	-1	-1

OR

Q – 5 (a) Differentiate Adaline and Madaline networks. Write and explain the MRI learning rule for Madaline network. (6)

(b) Compare Biological neural network with Artificial neural network. (4)

Q – 6 (a) Explain various activation functions used in artificial neural network. (6)

(b) Prove Fuzzy Demorgan's law: $(A \cap B) = (A^c \cup B^c)^c$ (4)

END OF PAPER