# GANPAT UNIVERSITY
## M. TECH SEM- I (Information Technology) REGULAR EXAMINATIONNOV-DEC 2016
## 3IT101: Soft Computing

MAX. TIME: 3 HRS                                             MAX. MARKS: 60

**Instructions:** (1) This Question paper has two sections. Attempt each section in separate answer book.
(2) Figures on right indicate marks.
(3) Be precise and to the point in answering the descriptive questions.

## SECTION: I

**Q.1**                                                                          (6)

(a) Classify the following problems according to AI problem characteristics. Consider only those characteristics which you find suitable. Justify your answers.
    (i)      India-Pakistan Dialogue (ii) Demonetization of currency

(b) You are given two jugs of each having capacity of 4 liters and 3 liters. You are required to     (4)
obtain 2 liters of water in 4 liters of jug. There are no any measuring markers on the jug.
Show the solution steps. Discuss on which strategy you recommend to solve the problem.

**OR**

**Q. 1**                                                                         (10)

(a) Consider the following 8 puzzle problem and derive its solution using BFS and heuristic search technique. Also compare which technique is found better. Elaborate your answer.

| 8 |   | 6 |
|---|---|---|
| 5 | 4 | 7 |
| 2 | 3 | 1 |
Initial State

|   | 1 | 2 |
|---|---|---|
| 3 | 4 | 5 |
| 6 | 7 | 8 |
Goal State

**Q.2**                                                                          (6)

(a) What do understand by Heuristic? Discuss Steepest Hill Climbing with an example.

(b) Compare Depth first search and Best first search with an example                            (4)

**OR**

**Q.2**                                                                          (8)

(a) Solve the following cryptarithmetic problem and also suggest the strategy. Also show the state space.

```
    B   A   S   E
+   B   A   L   L
---------------------
G   A   M   E   S
```

(b) State some demerits of Heuristic search techniques under certain circumstances.            (2)

**Q.3**                                                                          (4)

(a) Define the following terms
    (i)      Backtracking (ii) Soft Computing (iii) State Space (iv) Knowledge

(b) Describe the problem of overestimation and underestimation with A*.                         (6)

# SECTION: II

**Q.4** (5)

   **(a)** Define Learning in Neural Networks and briefly explain various architecture of Neural network.

   **(b)** Discuss various issues and challenges in back propagation learning (5)

**OR**

**Q.4** (6)

   **(a)** Explain various types of activation functions in neural networks

   **(b)** What is the importance of fuzzy logic? State few problems where fuzzy logic is essential compared to crisp logic. (4)

**Q.5** (8)

   **(a)** Descibe Perceptron learning. Also discuss its limitations

   **(b)** Define Mean squared error and its importance in Back propagation (2)

**OR**

**Q.5** Consider the OR gate problem with bipolar inputs($X1$ and $X2$) and outputs. Initial weights and bias are 0.4. Learning rate is 0.5. Develop a perceptron model and find out final weights. Continue up to 2 epochs (10)

**Q.6** Develop an Adaline network for given data with bipolar inputs and bipolar targets. Assume initial weights and bias as 0.4. Set learning rate 0.5. Continue up to 2 epochs and compute average mean squared error. (10)

| x1 | x2 | T |
|----|----|---|
| 1 | 1 | 1 |
| 1 | -1 | -1 |
| -1 | 1 | -1 |
| -1 | 1 | -1 |

-------------------------------------------------END OF PAPER-------------------------------------------------