

Indian Institute of Engineering Science & Technology, Shibpur
M.TECH (Open Elective), 1st semester Mid- Terminal Examination, January, 2021

Soft Computing (CS- 5161)

Full Marks: 30

Time: 45 minutes

Answer any three(3) questions

1. Consider the function $f(x) = x^3 + 4x^2 - 4x + 1$.
 - a) How many local minima does $f(x)$ have? [4]
 - b) what are the locally minimizing values of x ? [3]
 - c) What are the limitations of 'Hill Climbing' procedure? [3]
2. a) What is fuzzy set? How is it different from classical set? [5]
 - b) What is a membership function of a fuzzy set? [3]
 - c) Can a fuzzy membership be 'True' and 'False' at the same time? [2]
3. a) What is ANN? Where we can apply pattern classification method? [6]
 - b) Can perceptron solve the non-linear problem? [1]
 - c) What is a fuzzy variable? [3]
4. a) What do you mean by 'outliers'? [2]
 - b) Cluster the following points by the k-means clustering method. Let $k=2$. [8]

Subject	x	y
1	1.0	1.0
2	1.5	2.0
3	3.0	4.0
4	5.0	7.0
5	3.5	5.0
6	4.5	5.0
7	3.5	4.5