**53 (IT 819) FLNN**

**2017**

# FUZZY LOGIC AND NEURAL NETWORKS

Paper : IT 819

*Full Marks : 100*

Time : Three hours

***The figures in the margin indicate full marks for the questions.***

*Answer* ***any five*** *questions out of* ***six.***

1. Show $\int_0^a f(u)du = \int_0^a f(a-u)du$. 20

Use this result evaluate

$$\int_0^{\pi/2} \frac{\sin^8\theta}{\sin^8\theta + \cos^8\theta} d\theta$$

2. First order auto-correlators obtain their connection matrix by multiplying by multiplay a pattern's element with every other pattern's elements. A first order correlator stores M bipolar pattern's $A_1, A_2, A_3, \ldots\ldots A_m$ by summing together in outer products as

$T = \sum_{i=1}^{m} \left[A_i^T\right][A_i]$ where $T = [t_{ij}]$ is a $(P \times P)$ connection matrix and $A_i \in \{-1, 1\}^P$ 20

3. Show that $sinh^{-1} x = ln\left(x + \sqrt{x^3 + 1}\right)$ 20

4. Sketch in Interval $0 \le x \le 5$ the function $f(x) = 4\sin x + x^2 + 8x + 10$ and indicate. Absolute maximum and minimum, and local maximum and minimum. 20

5. Explain membership function with an example. 20

6. Integrate $\int tan^3 x\, dx$. 20

---