Dr. Meenakshi Sood.

COURSE CODE: **13B1WEC831**   MAX. MARKS:25
COURSE NAME: **SOFT COMPUTING TECHNIQUES**
COURSE CREDITS: 3   •   MAX. TIME: 1:30 Hr

Note: All questions are compulsory. Carrying of mobile phone during examinations will be treated as case of unfair means.

Q1 Explain briefly the biological neuron and relate it with neural network and describe the function and structure of each unit   [3] [CO3]

Q2. Consider feed forward model of ANN . Suppose that the weights corresponding to the three inputs have the following values: [3] [CO4]
$w1 = 2$ $w2 = -4$ $w3 = 1$
and the activation of the unit is given by the step-function: $\varphi '(v) = 1$ if $v \geq 0$
                                                                  0 otherwise
Calculate what will be the output value y of the unit for each of the following input patterns:

Pattern	P1	P2	P3	P4
x1	1	0	1	1
x2	0	1	0	1
x3	0	1	1	1

Q3 Answer the following   [2+2+2+2] [CO3]
   a) Distinguish between Supervised and Unsupervised Learning.
   b) How will the learning rate parameter affect the learning process in NN?
   c) What are the stopping conditions used to stop the progress of the training algorithm?
   d) What is Gradient descent and its significance in learning of NN?

Q4. A fully connected feed forward network has 9 input feature sets, 3 hidden layers, one with 5 neurons and the others with reducing numbers by one neurons, and network is able to classify the input in two classes. Construct an architectural graph of this network.   [2] [CO4]

Q5. Explain the perceptron learning rule and provide the algorithm for the following problem: To Find the weights using perceptron network for NAND gate when the inputs are presented only ne at time. Use bipolar inputs and targets. Initialize the weights be zero, learing rate parameter be 1 and threshold value = 0.   [2+2] [CO4]

Q6. Consider the fuzzy sets A nad B defined on the interval X= [0,5] of real numbers, by the membership grade functions   [5] [CO2]

$$\mu_A(x) = \frac{x}{x+1} \qquad \mu_B(x) = 2^{-x}$$

Determine the mathematical formulae and membership function of each of the following sets

   (a) A^c, B^c
   (b) A U B
   (c) $(A \cap B)^c$