Neural Networks And Fuzzy Systems(CSE 431)

Assignment-1

1a. Draw neat diagrams and distinguish between the three neuron models.
1b. List all the benefits of artificial neural networks.

2a. Draw neat diagrams and explain learning with and without a teacher.
2b. What is learning? Distinguish between error correction learning and competitive learning.

3a. Consider a 3 input Perceptron neuron with a Heaviside activation function. Its threshold value is zero. Train the neuron such that it gives an output of 1 when the input pattern is [0 0 1]. In how many iterations did the neuron learn the input?
3b. Describe the terminology of artificial neural networks.

4a. Design a neural network using McCulloch-Pitts neurons to realize the logic function $s(a1,a2,a3)= (a2+a3)+a2(a1a3)^c+(a2+a3)^c a1$ using +1 or -1 for the synaptic weights. Write the truth table.
4b. What are the characteristics of biological neural networks?

5a. Define an artificial neural network. Distinguish between conventional computing and neuro-computing.
5a. A neuron k receives inputs from four other neurons whose activation levels are 2,-2, 3, and -3. The corresponding synaptic weights of neuron j are 0.5, 0.6, -1, and -0.2. Calculate the output of neuron j for a tanh() activation function. Assume the threshold is 1.