MODULE 3 – ARTIFICIAL NEURAL NETWORKS

1. What is Artificial Neural Network?
2. Explain appropriate problem for Neural Network Learning with its characteristics.
3. Explain the concept of a Perceptron with a neat diagram.
4. Explain the single perceptron with its learning algorithm.
5. How a single perceptron can be used to represent the Boolean functions such as AND, OR
6. Design a two-input perceptron that implements the boolean function A Λ $\neg$ B. Design a two-layer network of perceptron's that implements A XOR B.
7. Consider two perceptrons defined by the threshold expression $w_0 + w_1x_1 + w_2x_2 > 0$. Perceptron A has weight values

   $w_0 = 1, w_1=2, w_2=1$

   and perceptron B has the weight values

   $w_0 = 0, w_1=2, w_2=1$

   True or false? Perceptron A is more-general than perceptron B.
8. Write a note on (i) Perceptron Training Rule (ii) Gradient Descent and Delta Rule
9. Write Gradient Descent algorithm for training a linear unit.
10. Derive the Gradient Descent Rule
11. Write Stochastic Gradient Descent algorithm for training a linear unit.
12. Differentiate between Gradient Descent and Stochastic Gradient Descent
13. Write Stochastic Gradient Descent version of the Back Propagation algorithm for feedforward networks containing two layers of sigmoid units.
14. Derive the Back Propagation Rule
15. Explain the followings w.r.t Back Propagation algorithm
    - Convergence and Local Minima
    - Representational Power of Feedforward Networks
    - Hypothesis Space Search and Inductive Bias
    - Hidden Layer Representations
    - Generalization, Overfitting, and Stopping Criterion