School of Information Technology
Indian Institute of Technology Kharagpur
IT60108: Soft Computing Applications
Class Test - II

F.M. 20 | Session 2014 – 2015 | Time: 20 mins

I. **Read the following statements carefully and mark them as true (T) or false (F).**

1. A problem whose output is linearly separable can also be solved with MLFFNN.
   Correct answer: **(T)**
   Hint: A problem which can be solved with SLFFN also can not be solved with MLFFNN but the reverse is not true.

2. The output of the perceptron with hard limit transfer function is more accurate than it is defined with any sigmoid transfer function.
   Correct answer: **(F)**
   Hint: The Hard-limit transfer function produces binary output, whereas the output from sigmoid transfer functions are in continuous range.

3. The Tanh-sigmoid function is computationally more complex than the log-sigmoid transfer function.
   Correct answer: **(T)**
   Hint: Log-sigmoid function needs two multiplications and one subtraction whereas Tan-sigmoid function needs two multiplication, one addition and one subtraction.

4. The learning techniques based on the strategy "winner takes it all" is a supervised learning.
   Correct answer: **(F)**
   Hint: The strategy followed in competitive learning, which belongs to unsupervised learning

5. Number of the neurons needed to solve problem like 3-AND Boolean logic is three.
   Correct answer: **(F)**
   Hint:It requires single neuron with three weights(input link)and one output.

6. Number of neurons in an ANN architecture is an ANN parameter, whereas bias input is not.
   Correct answer: **(F)**
   Hint: Both number of neurons in a layer (and hence in the ANN)and bias input are ANN parameters.

7. Number of matrix data involved in a simple recurrent neural network is seven.
   Correct answer: **(T)**

Hint: A recurrent neural network can be generalized into a MLFFNN and the matrices involved as $[I][V][O^I][W][O^H][Y][O]$.

8. The error calculation which is followed in "Back-propagation algorithm" is the steepest descent method.
   Correct answer: **(T)**
   Hint: Any error correction method can be followed in Back-propagation algorithm.

9. It is never possible to realize an ANN with supervised learning which produces no error.
   Correct answer: **(T)**
   Hint: Zero error ANN with supervised learning theoretically possible but not practically as it is limited with training data size.

10. Simulated annealing approach is followed in unsupervised learning.
    Correct answer: **(F)**
    Hint: SA is used in stochastic method of learning which belongs to supervised learning.

II. **With reference to each question in the following, one or more option(s) is/are correct. Choose the correct option(s) only**.

1. Which of the following transfer functions produces binary output only.

   (a) Hard limit transfer function.

   (b) Liner transfer function.

   (c) Log-sigmoid transfer function.

   (d) Tanh-sigmoid transfer function.

   Correct options: **(a) and (b)**

2. Which of the following logic can not be modelled with a single neuron.

   (a) 3-AND

   (b) 3-XOR

   (c) NOT

   (d) (A XOR B) AND (A OR C)

   Correct options: **(b) and (d)**

3. The dimension of weight matrix of the inter connection among neurons between hidden layer and output layer of a $l - m - n$ neural network is

   (a) $l \times m$

   (b) $m \times n$

(c) $l \times n$

(d) $n \times m$

Correct options: **(b) and (d)**

4. For the same size of training data as input, the fastest learning techniques is

   (a) Supervised training with error correction.

   (b) Supervised training without error calculation.

   (c) Supervised training with stochastic method.

   (d) Supervised training with Hebbian method.

   Correct options: **(a)**

5. An ANN learn quickly if η, the learning rate assumes the following value(s).

   (a) $\eta = 1$

   (b) $\eta = 0$

   (c) $\eta < 1$

   (d) $\eta > 1$

   Correct options: **(d)**

6. Which of the following are not necessarily an essential neural network parameters.

   (a) Weight matrices.

   (b) Value of l, m and n in $l - m - n$ network.

   (c) Threshold values.

   (d) Transfer functions.

   Correct options: **(b), (c) and (d)**

7. Given a training data $< X, Y >$, the number of neurons in the input and output layers are

   (a) $|X|$ and $|Y|$

   (b) $|x|$ and $|y|$ where $x \Subset X$, $y \in Y$

   (c) l and n where $l, m \geq 1$ and are with arbitrary values.

   (d) $l \geq |x|$, $n \geq ||y$ where $x \in X$, $y \in Y$

   Correct options: **(c)**

8. If the problem is to classify input patterns, then the more preferred type of learning is/are is

   (a) Supervised with error calculation.

   (b) Unsupervised learning with Habbian method.

   (c) Reinforced learning.

   (d) Unsupervised learning with competitive method.

Correct options: **(b) and (d)**

9. In case of layer calculation, the maximum time involved in

   (a) Input layer computation.

   (b) Hidden layer computation.

   (c) Output layer computation.

   (d) Equal effort in each layer.

   Correct options: **(d)**

10. Both fuzzy logic and artificial neural network are soft computing techniques because,

    (a) In each, no precise mathematical model of the problem is required.

    (b) Both gives precise and accurate results.

    (c) Fuzzy gives exact result but artificial neural network does not.

    (d) Artificial neural network gives accurate result but fuzzy logic does not.

    Correct options: **(a)**