



Seat No. : _____

TB-142

April-2013

Five Year M.Sc. (C.A. & I.T.) Integrated (K.S.)

4th M.Sc.

Neural Network

Time : 3 Hours]

[Max. Marks : 100

Instruction : Each question carry equal marks.

1. Answer the following in brief (any **ten**) : **20**
- (1) Differentiate between Crisp set and Fuzzy set.
 - (2) Distinguish between Hamming network and Hop field network.
 - (3) Give any two methods to avoid overfitting.
 - (4) When is the training of a network stopped ?
 - (5) What is meant by local minima ?
 - (6) Broadly classify the streams of evolutionary algorithms.
 - (7) Define Euclidean distance and hamming distance with example.
 - (8) What are auto associative and hetero associative memory ?
 - (9) Differentiate between linearly separable and non-separable problems.
 - (10) Compare and contrast the biological neuron and artificial neuron.
 - (11) Distinguish between supervised and unsupervised learning.
2. (a) Explain in details the type of activation functions used in Ann. (any four). **5**
- (b) Explain briefly the perceptron learning algorithm. What are its applications ? What are its limitations ? **5**
- (c) Narrate error correction rule, gradient descent rule and principle of minimum disturbance. **5**
- (d) State and explain the Widro-Holf (α -LMS or delta) rule for supervised learning. **5**

3. (a) Explain in detail back propagation algorithm with diagram. How the error is propagated backs to update the weights ? Explain it with necessary equation. **10**

OR

Give any one application of neural network with precise design of network architecture, inputs and outputs. **10**

- (b) Explain Hopfield network. What are its characteristics ? How it supports content addressable memory ? **6**
- (c) Explain Cover's theorem of Separability. **4**
4. (a) What do you understand by Linear Associative Memory ? Obtain the connection matrix which encodes the following association :

$$A_1 (1\ 0\ 0\ 0)^T \leftrightarrow B_1 = (1\ 2\ 3)^T$$

$$A_2 (0\ 1\ 0\ 0)^T \leftrightarrow B_2 = (-2\ 3\ 1)^T$$

$$A_3 (0\ 0\ 1\ 0)^T \leftrightarrow B_3 = (4\ 0\ 4)^T$$

Also show that above vectors A_1, A_2, A_3 are orthonormal. **10**

OR

- (a) (i) Give some common operations carried out in Genetic Algorithm. **5**
- (ii) What is soft computing ? Explain. **5**
- (b) Explain briefly support vector machine. **5**
- (c) Show how simulated annealing technique can be used for optimization. **5**
5. (a) Explain in brief the operations on fuzzy sets like union, intersection, complementation, α -cut, support, core and cardinality. Give examples of any two. **10**
- (b) How the fuzzy logic helps in developing control system ? Draw the block diagram to describe it. **6**
- (c) Give the logic of Genetic Algorithm. **4**