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## Sixth Semester B.E. Degree Examination, July/August 2022

### Artificial Neural Networks

Time: 3 hrs.

Max. Marks: 100

*Note: Answer any FIVE full questions, choosing ONE full question from each module.*

#### Module-1

- 1 a. What is Artificial Neural Network? Explain any four commonly used activation functions in ANN. (10 Marks)
- b. Define Convex sets, Convex Hulls and Linear separability with relevant diagrams. (10 Marks)

**OR**

- 2 a. State and prove perception convergence theorem. (10 Marks)
- b. State and explain, XOR is non-linearly separable. Also explain the implementation of XOR function using two layered network architecture. (10 Marks)

#### Module-2

- 3 a. Explain the learning algorithms in neural network and derive the expression for back propagation learning algorithm. (10 Marks)
- b. Explain the steepest descent search algorithm. (10 Marks)

**OR**

- 4 a. With example, explain the application of LMS algorithm to noise cancellation. (10 Marks)
- b. Discuss pattern mode training and batch mode training practical consideration of Back propagation algorithm. (10 Marks)

#### Module-3

- 5 a. Illustrate how support vector machines used for image classification. (10 Marks)
- b. Explain K-means clustering algorithm used in Radial Basis function network. (10 Marks)

**OR**

- 6 a. Illustrate how radial basis function is applied for face recognition. (10 Marks)
- b. Write a note on statistical learning theory. (10 Marks)

#### Module-4

- 7 a. Explain the concept of simulated annealing. Also write basic steps used in simulated annealing method. (10 Marks)
- b. With a neat architectural diagram, explain the relaxation procedure in Boltzmann machine. (10 Marks)

**OR**

- 8 a. Describe Linear Associative memory model with relevant diagram. (10 Marks)
- b. Explain how bidirectional associative memory can be used as hetero associative memory. (10 Marks)

#### Module-5

- 9 a. Explain supervised learning task using learning vector quantization algorithm. (10 Marks)
- b. Discuss any two application of SOM. (10 Marks)

**OR**

- 10 a. Explain in detail about Oja's Rule. (10 Marks)
- b. Write a short note on Growing Neural Gas algorithm. (10 Marks)