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## M.Tech (ECE) (2018 Batch) (Sem.-3) PATTERN RECOGNITION AND MACHINE LEARNING Subject Code : MTEC-PE5B-18 M.Code : 76585 Date of Examination : 19-12-22

Time: 3 Hrs.

Max. Marks: 60

## INSTRUCTIONS TO CANDIDATES : 1.Attempt any FIVE questions out of EIGHT questions. 2.Each question carries TWELVE marks.

- 1. a) Explain Bayesian curve fitting function.
  - b) What is meant by parametric learning? Also explain discriminant functions.
- 2. a) Discuss the linear models for regression. Explain any one of the linear basis function model used in linear regression.
  - b) Explain backpropagation algorithm and various techniques for improving the backpropagation.
- 3. a) What is Deep Learning and write its various applications
  - b) What is AdaBoost algorithm? Write down the advantages of AdaBoost algorithm.
- 4. a) Suppose that we want to build a neural network that classifies two dimensional data (*i.e.*,  $X = [x_1, x_2]$ ) into two classes: diamonds and crosses. We have a set of training data that is plotted as follows:



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Draw a network that can solve this classification problem. Justify your choice of the number of nodes and the architecture. Draw the decision boundary that your network can find on the diagram.

- b) Explain the Support Vector Machine (SVM) for regression.
- 5. a) Explain the Ho-Kashyap classifier.
  - b) Explain Viterbi algorithm.
- 6. Explain the sum product algorithm for the hidden Markov model. Further write down various types of hidden Markov model.
- 7. a) What is meant by unsupervised learning? Explain k-means clustering in detail.
  - b) Write short notes on (a) bias and variance (b) combining classifier.
- 8. a) Explain polynomial regression using graphical model.
  - b) What is meant by principal component analysis (PCA)? Explain methods used in PCA.

NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.