

[Time:2.30 Hrs]

[Marks:75]

Please check whether you have got the right question paper.

- N.B:**
1. All question are compulsory.
 2. Figures to the right indicate full marks.

- Q.1 Attempt any Three of the following: 15**
- a. Explain supervised learning and unsupervised learning in detail.
 - b. Define and explain Machine Learning. Also explain its examples in brief.
 - c. What are various types of features available? Explain each one in Brief.
 - d. Write a short note on probabilistic models.
 - e. Explain training data and test data in detail.
 - f. Write a short note on learning verses designing.
- Q.2 Attempt any Three of the following: 15**
- a. Explain L1 and L2 regularization with suitable example.
 - b. Explain the growth bounding function with suitable derivation.
 - c. What is regression? Explain types of regression.
 - d. Explain the growth bounding function with suitable derivation.
 - e. Illustrate the assessment of classification with suitable example.
 - f. What is hypothesis? Explain different types of hypothesis.
- Q.3 Attempt any Three of the following: 15**
- a. What is the difference between Linear and non- linear least square.
 - b. Explain the working of Soft margin SVM.
 - c. Explain Multilayer perceptron with advantages and disadvantages.
 - d. How to obtain probabilities from linear classifiers using logistic regression?
 - e. Explain Kernel methods for non-linearity.
 - f. Explain support vector machines with example.
- Q.4 Attempt any three of the following: 15**
- a. Describe the essential steps of K-means algorithm for clustering analysis.
 - b. Write a short note on Hierarchical clustering?
 - c. Write short note on Issues in Decision Tree?
 - d. How is probabilities used in machine learning
 - e. Apply K-means algorithm algorithm on given data for k=3. Use c1(2), c2(16) and c3(38) as initial cluster centres.
 - f. What is the difference between deterministic and Probabilistic machine learning modes?
- Q.5 Attempt any Three of the following: 15**
- a. How a linear classifier construct decision boundary using linear separable data? Explain it in detail with respect to geometric models
 - b. Write a note on binary classification.
 - c. Explain the key terminologies of Support Vector Machine.
 - d. Give the illustration of VC Dimensions.
 - e. What is a Probabilistic model in information retrieval?
 - f. Explain in detail Boosting.

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