

M.Sc. Comp. Sci Part-II (Sem-IV) 75.125 dt 10/01/25

Time :2 ½ Hours

Marks: 75

- N.B.
- 1) All questions are compulsory.
  - 2) Figures to the right indicate marks.
  - 3) Illustration, I depth answers and diagram will be appreciated.
  - 4) Mixing of sub-questions is not allowed.
  - 5) Each question carries 5 marks.

Q.1 Attempt Any Three of the following.

15 Marks

- a) Elaborate the distance-based algorithms.
- b) Explain in detail Rule-based classifier.
- c) Explain Bayesian Network.
- d) Explain K-Mean Algorithm? Write Advantage and Disadvantages.
- e) What is DBSCAN? Explain the fundamentals of DBSCAN.
- f) State and explain in brief any one partitioning algorithm. What are its advantages.

Q.2 Attempt Any Three of the following.

15 Marks

- a) What is CART? Explain characteristics of CART.
- b) What is Regression? Explain different types of regression
- c) Explain in detail CHAID.
- d) Give the difference between Regression and Classification.
- e) What is support vector machine? Explain in detail different types of SVM.
- f) Explain Confusion matrix in detail.

Q.3 Attempt Any Three of the following.

15 Marks

- a) What do you mean by Efficient Computation of PageRank?
- b) Explain the PageRank iteration using MapReduce.
- c) Write a note on Link Spam.
- d) Explain the architecture of a spam farm.
- e) Describe Spam Mass.
- f) How will you represent transition matrices?

**Q4. Attempt Any Three of the following.**

**15 Marks**

- a) Explain the Eigen values and Eigen vectors of symmetric matrices.
- b) How you will find the eigen pairs by power iteration.
- c) Explain the Principal Component Analysis.
- d) Write a note on Singular value decomposition.
- e) Describe the dimensionality reduction using SVD.
- f) Discuss how you will use eigen vectors for dimensionality reduction.

**Q5. Attempt Any Three of the following.**

**15 Marks**

- a) How to computing the SVD of a matrix.
- b) Describe the matrix of eigen vectors.
- c) Explain the Eigen values and Eigen vectors of symmetric matrices.
- d) Explain the Hierarchical Algorithms: Agglomerative (AGNES), Divisive (DIANA)
- e) Explain with an example.
  - a. K-Means b. K-Medoids
- f) Briefly explain working of early search engine. State the issues related to these search engines. Explain how Google tries to overcome it.

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