2137

M. Tech. (CSE) EXAMINATION, Dec. 2023

(First Semester)

MATHEMATICAL FOUNDATION OF COMPUTER

SCIENCE

MT-CSL-101

Program Core–I

Time : 3 Hours   *Maximum Marks : 80*

Note : Attempt *Five* questions in all, selecting *one* question from each Unit. Q. No. **1** is compulsory. All questions carry equal marks.

1. Explain the following in brief :   **4×4=16**

    (a) Markov Chains

    (b) Random Samples

    (c) Planar Graphs

    (d) Machine Learning.

Unit I

2. Explain Central Limit theorem. Discuss its applications and probabilistic inequalities.   **16**

3. What do you understand by cumulative distribution functions ? Discuss parametric families of distributions. Give suitable example. **16**

Unit II

4. (a) Explain the problem of over fitting model assessment. **8**

   (b) What is principal component analysis ? Discuss its applications. **8**

5. (a) Explain multivariate statistical model. Discuss regression problems. **8**

   (b) Explain the methods of moments and maximum likelihood in brief. **8**

Unit III

6. (a) What is graph coloring ? Give an example of Hamilton circuit and write its importance. **8**

   (b) Explain about isomorphism. Discuss its applications. **8**

7. What is Enumeration ? Discuss about specialized techniques to solve combinatorial enumeration problems. **16**

Unit IV

8. Explain the following : **16**

   (a) Bioinformatics

   (b) Network Protocols.

9. (a) What do you understand by Operating System ? List its features. **8**

   (b) Discuss in brief about features and applications of data mining. **8**