Code No.: CS8101PC | R20 | H.T.No. | | | 8 | R | | | | | |

CMR ENGINEERING COLLEGE: : HYDERABAD
UGC AUTONOMOUS
I–M.Tech–I–Semester End Examinations (Regular) July- 2021
MATHEMATICAL FOUNDATIONS OF COMPUTER SCIENCE (PC – I)
(CSE)

[Time: 3 Hours] **[Max. Marks: 70]**

*1. Answer Any **FIVE** Questions. Each Question Carries 14 Marks*
2. Illustrate your answers with NEAT sketches wherever necessary.

5 x 14M=70M

1. a. What is the need of probability distributions? Briefly explain the families of probability distributions.
   b. Describe central limit theorem and its application.
2. a. Illustrate any five varieties of descriptive statistics.
   b. What is meant by hypothesis? How to test hypothesis? Discuss the two types of errors associated with it.
3. a. Elaborate maximum likelihood approach for parameter estimation.
   b. With an example explain two state Markov process.
4. a. Perform singular value decomposition of the following matrix:

   A=

3	1	1
-1	3	1

   b. Illustrate the steps involved in principal component analysis.
5. a. What is least square problem? Compare it with linear regression.
   b. Explain the importance of Eigen values in dimensionality reduction.
6. a. Show that the complete tripartite graph K 1,2,3 is nonplanar.
   b. How many different Hamiltonian cycles are there in K n , a complete graph of n vertices?
   c. Show that regions of a simple planar graph G can be 2-colored iff each vertex of G has even degree.
7. a. A group of 8 scientists is composed of 5 psychologists and 3 sociologists.
      (i) In how many ways can a committee of 5 be formed?
      (ii)In how many ways a committee of 5 be formed that has 3 psychologists and 2 sociologists?
   b. A teacher wishes to give an examination with 10 questions. In how many ways can the test be given a total of 30 points if each question is to be worth 2 or more points?
   c. How many integral solutions are there of $x_1 + x_2 + x_3 + x_4 = 20$ if $1 \leq x_1 \leq 6$, $1 \leq x_2 \leq 7$, $1 \leq x_3 \leq 8$, and $1 \leq x_4 \leq 9$?
8. Explain the recent trends in distribution functions in computer vision and soft computing fields.

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