

Code No.: CS58101PC

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CMR ENGINEERING COLLEGE: : HYDERABAD
UGC AUTONOMOUS
I-M.TECH-I-Semester End Examinations (Regular) - April- 2022
MATHEMATICAL FOUNDATIONS OF COMPUTER SCIENCE
(CSE)

[Time: 3 Hours]

[Max. Marks: 70]

Note: This question paper contains two parts A and B.

Part A is compulsory which carries 20 marks. Answer all questions in Part A.

Part B consists of 5 Units. Answer any one full question from each unit. Each question carries 10 marks and may have a, b, c as sub questions.

PART-A

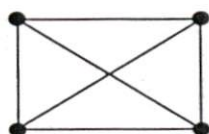
(20 Marks)

1. a) What are the applications of the univariate distributions? [2M]
- b) Write all the cumulative distribution functions. [2M]
- c) Write a formula for mean, variance. [2M]
- d) Define hypothesis testing. [2M]
- e) What are the fundamental notions of linear algebra? [2M]
- f) Give the names of various dimensionality reduction techniques. [2M]
- g) Define planar graph. [2M]
- h) Write an example for Euler cycles. [2M]
- i) What are the applications of Bioinformatics? [2M]
- j) Define soft computing. [2M]

PART-B

(50 Marks)

2. Find the Cumulative Distribution Functions (CDF) of X. If I toss a coin twice. Let X be the number of observed heads. [10M]
- OR**
3. State and prove Multivariate Central Limit Theorem. [10M]
 4. Find the mean, variance and standard deviation of the following scores on an exam: 92, 95, 85, 80, 75, 50. [10M]
- OR**
5. Define Methods of Moments. What are the multivariate normal distributions applications? [10M]
 6. What is linear dependence and linear independence in vectors? Check whether $V_1=(2,2,1)$, $V_2=(-4,6,5)$, $V_3=(1,0,0)$ vectors are linear independent or not? [10M]
- OR**
7. Illustrate the step by step process of Principal Component Analysis. [10M]
 8. a) Write short notes on the following: [6M]
 - i) Complete Bipartite graph
 - ii) Euler's Theorem
 - iii) Chromatic Number
 - b) What do you mean by Graph isomorphism? Are the following graphs isomorphic? [4M]



OR

9. Write short notes on Mathematical applications in machine learning. [10M]

10. What are the properties of multivariate normal distribution? [10M]

OR

11. Explain Linear Regression with example. [10M]
