PAPER ID-310429

Roll No:

B TECH
(SEM-V) THEORY EXAMINATION 2020-21
STATISTICAL COMPUTING

Time: 3 Hours   *Total Marks: 100*

Note: **1.** Attempt all Sections. If require any missing data; then choose suitably.

SECTION A

1.   **Attempt *all* questions in brief.**   **2 x 10 = 20**

Qno.	Question	Marks	CO
a.	What are the measures of central tendency?	2	1
b.	Differentiate between linear regression and multiple regression.	2	1
c.	Discuss the 'Goodness of Fit' test.	2	2
d.	Explain bootstrapping.	2	4
e.	Explain stratified sampling.	2	3
f.	What is workspace in R language?	2	5
g.	Explain lists and data frames in R with proper example	2	5
h.	What is ANOVA?	2	2
i.	Explain antithetic variables.	2	3
j.	Explain central limit theorem.	2	1

SECTION B

2.   **Attempt any *three* of the following:**

Qno.	Question	Marks	CO
a.	What are the ways to represent data diagrammatically? explain with diagrams. Explain measures of skewness and kurtosis.	10	1
b.	Explain basic concepts of estimation with example.	10	2
c.	State and proof weak law of large numbers.	10	3
d.	Explain PCA algorithm for dimensionality reduction step by step.	10	4
e.	Explain different statistical libraries in R.	10	5

SECTION C

3.   **Attempt any *one* part of the following:**

Qno.	Question	Marks	CO
a.	Write an algorithm to compute the QR decomposition.	10	3
b.	In a volunteer group, adults 21 and older volunteer from one to nine hours each week to spend time with a disabled senior citzen. The program recruits among community college students, four-year college students, and nonstudents. The table below is a sample of the adult volunteers and the number of hours they volunteer per week. Number of Hours Worked Per Week by Volunteer Type (Observed)The table contains observed (O) values (data).	10	3

Type of Volunteer	1–3 Hrs	4–6 Hrs	7–9 Hrs	Row Total
Community College Students	111	96	48	255
Four-Year College Students	96	133	61	290
Nonstudents	91	150	53	294
Column Total	298	379	162	839

Is the number of hours volunteered independent of the type of volunteer?

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4. **Attempt any *one* part of the following:**

Qno.	Question	Marks	CO
a.	Explain different data structures in R language with suitable example	10	5
b.	(i) What attributes does a data frame possess? (ii) What does as.matrix() do when applied to a data frame with columns of different types?	10	5

5. **Attempt any *one* part of the following:**

Qno.	Question	Marks	CO
a.	Explain EM algorithm step by step with proper example.	10	4
b.	What is kernel smoothing? Explain different smoother in detail	10	4

6. **Attempt any *one* part of the following:**

Qno.	Question	Marks	CO
a.	Explain the properties of Monte Carlo integration in detail. What are the Advantages of Monte Carlo Integration over Deterministic Methods?	10	3
b.	Explain the different method of random number generation.	10	3

7. **Attempt any *one* part of the following:**

Qno.	Question	Marks	CO
a.	Write short notes on the following: (i) Chebyshev's inequality (ii) Bayes' theorem	10	1
b.	Explain inference procedure for correlation coefficient.	10	1