Reg. No. ☐☐☐☐☐☐☐☐☐☐☐

BCACACN 502

V Semester B.C.A. Degree Examination, December 2024/January 2025
(NEP – 2020) (2023 – 2024 Batch Onwards)
STATISTICAL COMPUTING AND R PROGRAMMING

Time : 2 Hours

Max. Marks : 60

Instructions : 1) Answer **any six** questions from Part – **A** and **any one full**
question from **each** Unit in Part – **B**.
2) Scientific calculators are **allowed**.
3) Statistical chart will be **provided** by the college.

PART – A (6×2=12)

1. a) What is vector ? Give an example of how to create a vector in R.

   b) Construct a 4 × 2 matrix that is filled row-wise with the values 4.3, 3.1, 8.2, 8.2, 3.2, 0.9, 1.6 and 6.5 in that order using the R command.

   c) What is the purpose of write .table command ? Give an example.

   d) Differentiate boxplot and scatter plot.

   e) What is statistics ? Mention its types.

   f) Define range. Write the range of the following numbers :

   16, 28, 29, 13, 17, 20, 11, 34, 32, 27, 25, 30, 19, 18, 33

   g) What is a hypothesis ? Give an example.

   h) Define correlation analysis and regression analysis.

PART – B

Unit – I

2. a) Explain seq, rep and length functions on vectors with examples.

   b) Explain any 3 matrix operations using R commands with examples.

   c) List and explain any three graphical parameters used in plot function in R with example.

   (3+6+3)

P.T.O.

3. a) How do you create matrix in R ? Explain with its necessary attributes. Give an example.

   b) Explain 'any', 'all' and 'which' functions with example, on a logical vector.

   c) How do you set appearance constants and aesthetic mapping with geoms ? Explain with example.

   (3+6+3)

Unit – II

4. a) Explain if .... else and ifelse statements with syntax and example.

   b) How do you read external data files into R ? Explain any two types of files with necessary commands to read their characters into R, with an example.

   c) How do you draw a barplot and a pie chart in R ? Explain with examples.

   (4+4+4)

5. a) Explain three kinds of specialized user-defined functions in R, with examples.

   b) What is "masking" in R ? Explain the two most common masking situations in R, with examples.

   c) What is exception handling ? How do you catch errors with try Statements ? Explain with an example.

   (4+4+4)

Unit – III

6. a) Explain the four types of data and measurement scales with suitable examples.

   b) Compute the 35th percentile, the 55th percentile, Q1, Q2 and Q3 for the following data.

   16 28 29 13 17 20 11 34 32 27 25 30 19 18 33

   c) The sample is of six of the largest accounting firms in the United States and the number of partners associated with each firm, as reported by the Public Accounting Report. Calculate sample variance and sample standard deviation.

Firm	Number of Partners
Deloitte and Touche	2654
Ernst and Young	2108
Price water house Coopers	2069
KPMG	1664
RSM McGladrey	720
Grant Thornton	309

   (4+4+4)

7. a) A data set contains the following seven values 6 2 4 9 1 3 5. Find the range, population variance, population standard deviation, and z score for element 9.

b) Construct a stem and leaf plot using two digits for the stem.

212 239 240 218 222 249 265 224

257 271 266 234 239 219 255 260

243 261 249 230 246 263 235 229

218 238 254 249 250 263 229 221

253 227 270 257 261 238 240 239

273 220 226 239 258 259 230 262

255 226

c) A company has 140 employees of which 30 are supervisors. Eighty of the employees are married, and 20% of the married employees are supervisors. If a company employee is randomly selected, what is the probability that the employee is married and is a supervisor ? (4+4+4)

Unit – IV

8. a) A random of sample size 20 is taken resulting in a sample mean of 25.51 and a sample standard deviation of 2.1933. Assume data is normally distributed use this information and $\alpha = 0.05$ to test the following hypothesis.

$H_0 : \mu = 25$ pounds

$H_a : \mu \neq 25$ pounds.

b) From the following information, find the correlation coefficient between advertisement expenses and sales volume using Karl Pearson's coefficient of correlation method (Direct Method).

Firm	1	2	3	4	5	6	7	8	9	10
Advertisement Expenses (Rs. Lakhs)	11	13	14	16	16	15	15	14	13	13
Sales Volume (Rs. in Lakhs)	50	50	55	60	65	65	65	60	60	50

(6+6)

9. a) Suppose a store manager wants to find out whether the results of this consumer survey apply to customers of supermarkets in her city. To do so, she interviews 207 randomly selected consumers as they leave supermarkets in various parts of the city. Now the manager can use a chi-square test to determine whether the observed frequencies of responses from this survey are the same as the frequencies that would be expected based on the national survey. ($\alpha = .05$).

Results of a Local Survey of Consumer Satisfaction.

Response	Frequency (f_0)	Expected %
Excellent	21	8%
Pretty Good	109	47%
Only Fair	62	34%
Poor	15	11%

b) Use the chi-square test to determine whether the observed frequencies represent a uniform distribution ($\alpha = .01$).

Category	f_0
1	19
2	17
3	14
4	18
5	19
6	21
7	18
8	18

(6+6)