Assignment MST-015

for

M.Sc. (Applied Statistics) (MSCAST)

Valid from January 2026 to December 2026

SCHOOL OF SCIENCES
Indira Gandhi National Open University
New Delhi - 110068

Dear Learner,

Welcome to the M.Sc. (Applied Statistics) Programme.

As per the university guidelines, you need to complete the assignment for each theory course. Note that there are no assignments for lab courses in the MSCAST programme, namely, MSTL-011, MSTL-012, MSTL-013, MSTL-014, and MSTL-015. You should remember that writing answers to an assignment's questions will improve your writing skills and prepare you for the term-end examination.

It is compulsory to submit the assignments within the stipulated time to be eligible to appear in the term-end examination. You will not be allowed to appear for the term-end examination for a course if you do not submit the assignment for that course by the due date. As per the University guidelines, if you appear in the term-end examination of a course without submitting its assignment, the result of the term-end examination is liable to be cancelled/ withheld.

The assignments constitute the continuous component of the evaluation process and have 30% weightage in the final grading.

Before you write the assignments, you are advised to first go through the self-learning material for that course and then prepare the assignments carefully by following the instructions pertaining to the assignments. Your responses should not be a verbatim reproduction of the textual materials provided for self-learning purposes, but it should be in your own words.

If you have any doubts or problems pertaining to the course material and assignments, contact the programme in charge or the academic counsellor at your study centre. If you still have problems related to this assignment, feel free to contact the course coordinator.

Wishing you all the best in successfully completing the programme.

(Dr. Taruna Kumari)
Course Coordinator, MST-015
Email: tarunakumari@ignou.ac.in

Instructions:

- Submit the assignments within the stipulated time. Otherwise, you will not be permitted to appear for the term-end examination.
- Solve the latest assignments uploaded for the current year/session.
- Read the instructions related to the assignments mentioned in the Programme Guide.
- Use only A-4 size paper to write your responses. It is mandatory to write all assignments neatly in your own handwriting. Typed or printed copies of the assignments will not be accepted. Note that you may use the printout only if a question specifically asks for the output of a program in MST-015 and MST-024.
- All questions given in the assignments are compulsory for each course.
- Express your response in your own words. You are advised to restrict your response based on the marks assigned to it. This will also help you to distribute your time in writing or completing your assignments on time.
- Securely fasten multiple pages together (you can staple or tie them) and number them carefully for each assignment separately.
- Do not forget to enclose the assignment question sheet of that course after the cover page of the assignment response (answer sheets). It is not compulsory to write each question separately before answering the question. Mention the question number for each answer.
- The solved assignment must be submitted at the Study Centre allotted to you before the due date set by the University. Please check the IGNOU website for updated information regarding the due date of assignment submission.
- You are advised to mention all information on the first page of the assignment response sheet, given on the next page.
- **Keep a copy of the assignment answer sheets with you before submission for future reference.**

ASSIGNMENT CODE: MST-015/TMA/2026

NAME: _____

ENROLLMENT NO: _____

ADMISSION CYCLE: _____

PROGRAMME CODE: MSCAST

COURSE CODE: MST-015

COURSE TITLE: INTRODUCTION TO R SOFTWARE

REGIONAL CENTRE CODE: _____

STUDY CENTRE CODE: _____

ADDRESS: _____

_____

_____

CONTACT NUMBER: _____

EMAIL ID: _____

DATE OF SUBMISSION: _____

School of Sciences

Indira Gandhi National Open University

Maidan Garhi, New Delhi-110068 (INDIA)

TUTOR MARKED ASSIGNMENT
MST-015: INTRODUCTION TO R SOFTWARE

Course Code: MST-015
Assignment Code: MST-015/TMA/2026
Maximum Marks: 50

Note: All questions are compulsory.

1. Attempt the following:

(a) Write the output of the following command:

```
y <- c(2.3, 4.5, 6.5, -1); y[y>3]
```

(b) Write the procedure for writing comments in R.

(c) Write the output of the following command:

```
table(c(5, 10, 8, 7, 8, 5, 8, 7, 5, 8, 9, 6, 8, 8, 8))
```

(d) Spot the error:

Input:

```
x <- c(-3, 5, 6, 0) ; sqrt(ifelse(x>0, x, NaN))
```

Output:

```
NA  2.236068  2.449490  NA
```

(e) Write an assignment statement equivalent to the following equation in R.

$$\text{Median} = l + \frac{h}{f}\left(\frac{N}{2} - C\right)$$

5x1

2. Create a data frame named `DFrame` of the following data:

Plant	Type	Treatment	conc	uptake
Qn1	Quebec	nonchilled	95	16.0
Qn1	Quebec	nonchilled	175	30.4
Qn1	Quebec	nonchilled	250	34.8
Qn1	Quebec	nonchilled	350	37.2
Qc1	Quebec	chilled	95	14.2
Qc1	Quebec	chilled	175	24.1
Qc1	Quebec	chilled	250	30.3
Qc1	Quebec	chilled	NA	34.6

Assuming each command is independent, write R commands to do the following:

(i) Drop a row consisting of `NA`.

(ii) Extract '`Type`' and '`uptake`' columns of `DFrame`.

(iii) Drop the rows corresponding to plant '`Qn1`'.

(iv) Replace '`Qn1`' with '`TQ1`' in first 4 rows.

(v) Extract 4^{th} element of the 6^{th} row.

(vi) Obtain the sum of the 4^{th} column.

(vii) Obtain the mean of the 5th column.

(viii) Obtain the ranks corresponding to the 4th column.

(ix) Extract those rows where '`Treatment`' is '`chilled`'.

(x) Extract those rows where '`uptake`' is more than 30.

(xi) Extract even rows of the data frame.

(xii) Append one more column with elements 0, 0, 0, 0, 1, 1, 1, 1.

(xiii) Create a list with two components '`Type`' and '`uptake`'.

2+13x1

3. **(a)** Write step-by-step execution of the following code:

```
y <- 4
p <- 1
if (y >= 0) {
while (y > 0) {
  p <- p*y; cat("p=", p, "\n")
  y <- y - 1; cat("y=", y, "\n")}
} else {
  while (y < 0) {
  p <- p/y; cat("p=", p, "\n")
  y <- y + 1; cat("y=", y, "\n")}
cat ("p =", p, "\n")
}
```

(b) Write a R command to generate the following date sequence:

```
"2024-08-10" "2024-12-09" "2025-04-10" "2025-08-10"
```

(c) Write R commands to create a matrix with following elements and hence extract the sub-matrix shown in the rectangular box.

$$\begin{pmatrix} 1 & 4 \\ \boxed{2} & \boxed{1} \\ \boxed{8} & \boxed{0} \end{pmatrix}$$

7+2x4

4. **(a)** Create two matrices with following elements:

$$A = \begin{pmatrix} 1 & 3 \\ 2 & 0 \end{pmatrix}, \; B = \begin{pmatrix} 13 & 11 \\ 12 & 10 \end{pmatrix}$$

Write R commands to:

(i) Create a list with components A and B.

(ii) Obtain the determinant of each matrix in a single command.

(iii) Create a function that computes $AB+A^2$.

(b) Create a user defined function to check whether a number is even or odd.

(c) Create a user defined function to compute and print variance and range of any arbitrary data say, x.

7+2x4