

- (b) Draw a Scatterplot of Height versus Weight. Title this Scatterplot as 'Height~Weight'.
- (c) Consider 'Gender' as categorical data and create factors on it. Also, determine the factor levels.
- (d) Write an SQL query in R to find children having weight greater than 30 kgs. Write the name of the relevant R package/s used to manipulating data frames using SQL in R. (5)
6. Write R commands to perform the following operations : (5)

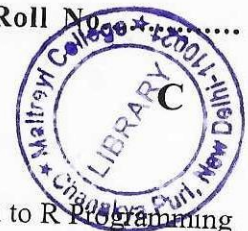
Create a 3×3 matrix 'mat' storing natural numbers from 1 to 9. Name the rows as ROW1, ROW2 and ROW3 and columns as COL1, COL2 and COL3. Find inverse of the matrix 'mat'. Perform matrix multiplication on 'mat' and its transpose 'tmat'.

(1500)

[This question paper contains 8 printed pages.]

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Your Roll No.



Sr. No. of Question Paper : 1670

Unique Paper Code : 42343308

Name of the Paper : Introduction to R Programming (SEC)

Name of the Course : B.Sc. (Prog.) Physical Science / Mathematical Science

Semester : III

Duration : 2 Hours

Maximum Marks : 25

Instructions for Candidates

- Write your Roll No. on the top immediately on receipt of this question paper.
- The paper has **two** Sections. **All** questions in **Section A** are compulsory. Attempt any **three** questions from **Section B**.
- All parts of a question must be attempted together.

SECTION A

- Answer the following by choosing the correct option. (1×10=10)

P.T.O.

- (i) What will be the output of the following code in R?

```
x <- c(2,4,6,8)
```

```
y <- c(TRUE, TRUE, FALSE, FALSE)
```

```
print(sum(x[y]))
```

- (a) 6
(b) 5
(c) 8
(d) 1
- (ii) Computation with vectors is achieved using an element-by-element vectorized operation for avoiding
- (a) Packages
(b) Loops
(c) Functions
(d) Environment

- (iii) `x <- list(1, a, TRUE, 1 + 4i, c(1,2,3))`

What will the length of created list 'x'?

- (a) 1
(b) 5

4. Answer the following :

(a) Write a for loop that iterates over the numbers 1 to 10 and prints the square root of each number.

(b) Consider a given vector `v1 <- c(1,2,3,NA,6,7,9,10,NA)`. Count NA values in the given vector and then replace NA with 0's in the given vector.

(c) Given `y <- matrix(rep(10,4), 2,2)`. What will be the output of `print(y)`? (5)

5. Write R command/s to convert the following 'Children_details.csv' file into a data frame. (5)

Children_details.csv

S.No	Name	Height(in cms.)	Weight(in kgs.)	Gender	Contact
1	Harry	121	28	Male	9810764959
2	John	115	22	Male	8675904321
3	Sarika	100	20	Female	8679302110
4	Payal	128	36	Female	6030323311
5	Aditya	125	32	Male	7902329111

Using the obtained data frame, write R commands to perform the following operations:

- (a) Find a correlation between Height and Weight.

named 'Column_2' must be generated using `seq()` function with the range starting from 10 to 18 and the difference between the elements as 2. Write appropriate R commands (using obtained data frame) to answer the following :

- (a) Calculate the sums and means of each column of the data frame.
 - (b) Display the first two rows of the data frame.
 - (c) Sort 'Column_1' in descending order. (5)
3. Consider the given string 'str_sample' and answer the following using the stringr library in R.
- ```
str_sample <- 'Welcome to R programming'
```
- (a) Write a R code-snippet to count the number of vowels in the given string 'str\_sample'.
  - (b) What will be the output of `str_detect(str_sample, "come")`?
  - (c) What will be the output of `str_fixed(str_sample, " ")`?
  - (d) Write R command to replace 'R' with 'Python' in the given string 'str\_sample'. (5)

(c) 4

(d) 6

(iv) What will be the output of the following?

```
hypotenuse <- function(x,y) {sqrt(x ^ 2 + y ^ 2)}
hypotenuse(3,4)
```

(a) 5

(b) 10

(c) 24

(d) 1

(v) Which R data-type is most appropriate for categorical value?

(a) integer

(b) character

(c) factor

(d) string

(vi) Consider the following code written in R language :

```
g <- function(x) {
a <- 3
```



```
x + a + y
```

```
}
```

```
y <- 3
```

What will be the output of `g(2)`?

- (a) 9
- (b) 8
- (c) Error
- (d) 45

(vii) Which function in R will give a five-point summary of input data?

- (a) `sum()`
- (b) `summary()`
- (c) `summarize()`
- (d) `outlier()`

(viii) Consider a given vector `x <- 1:5`. What will be the output of the following command in R?

```
(x + 2)[(! is.na(x)) & x > 0]
```

- (a) 3 4 5 67
- (b) 3 4 5 6

(c) 3 4 5 6 NA

(d) NA 3 4 5

(ix) What is the length of a 3-by-4-by-5 array?

- (a) 12
- (b) 60
- (c) 20
- (d) 15

(x) How would you change the shape of the points in a base plot in R?

- (a) By passing the `pch` ("plot character") argument
- (b) By passing the main argument
- (c) By Passing the "shape" argument
- (d) None of the above

## SECTION B

2. Create a data frame containing 5 rows and 2 columns where the first column named 'Column\_1' must be generated using `sample()` function with values ranging from 16 to 20 having no repetitions. Second column