Reg. No.										

MANIPAL INSTITUTE OF TECHNOLOGY

MANIPAL

(A constituent unit of MAHE, Manipal)

VI SEMESTER B.TECH
END SEMESTER EXAMINATIONS, APRIL/MAY 2019
SUBJECT: PROGRAM ELECTIVE: DATA SCIENTIST'S TOOLBOX AND R PROGRAMING [CRA 4009]
REVISED CREDIT SYSTEM
(30/04/2019)

Time: 3 Hours MAX. MARKS: 50

Instructions to Candidates:

- Answer ALL the questions.
- Missing data if any, may be suitably assumed.

1A. Explain the different types of operators that can be used to extract subsets of R objects. How can we retrieve a single element of a two dimensional matrix in the form of 1x1 matrix. Explain using a suitable code snippet. **5**

1B. What is the necessity of a repeat loop in R? Explain with an example. Write R program to print words residing at even number indices of a vector. Also, do not print the first two and the last three words from the vector. **3**

1C. Explain pushing and pulling in Git. **2**

2A. What is data? How are they measured? Write the differences between Raw data and Processed data. **5**

2B. Explain lazy evaluation with an example. Does the following code produce an error? Justify your answer. **3**

```
func1<-function(a,b,c){
        a=a+2
        print(b)
        b=b-2
        print(a)
       a=a*2
       b=b*3
       c=a+b
       print(c)
      }
func1(12,14)
```

2C. Simulate a Poisson log-linear model for 100 observations where $Y \sim Poisson(\mu)$ and $\log \mu = \beta_0 + \beta_1 x$, $\beta_0 = 0.5$ *and* $\beta_1 = 0.3$ **2**

3A. Writing **for** and **while** loops is useful when programming but not particularly easy when working interactively on the command line. Justify this statement with all compact forms of function present in R. **5**

3B. Mention any five important features of R. How do we create a vector in R? Explain with a suitable example. **3**

3C. What is version control? Explain the use of Git in version control. **2**

4A. What is a free variable? Illustrate with an example. How do we associate a value to a free variable? **5**

4B. What are the important commands with respect to working directory? Explain the ways in which a path can be passed in a function. **3**

4C How do you create binary variables in R? Explain with an example. **2**

5A. Explain the concept of Data Frames in R using a suitable example. Write an R code to create the following data frame as the output.

	emp_id	emp_name	salary	start_date
1	1	Rick	623.30	2012-01-01
2	2	Dan	515.20	2013-09-23
3	3	Michelle	611.00	2014-11-15
4	4	Ryan	729.00	2014-05-11
5	5	Gary	843.25	2015-03-27

5

Also, write a code snippet to append the following row to the data frame.

emp_id	emp_name	salary	start_date
6	John	672.50	2016-03-04

5B. Explain the difference between implicit coercion and explicit coercion in R with suitable examples. **3**

5C. Explain the following debugging tools with an example

i. Traceback()
ii. Recover() **2**