



ELIZADE UNIVERSITY, ILARA-MOKIN, ONDO STATE  
FACULTY OF ENGINEERING  
DEPARTMENT OF ELECTRICAL AND COMPUTER  
ENGINEERING

FIRST SEMESTER EXAMINATION, 2019/2020 ACADEMIC SESSION  
COURSE TITLE: ADVANCED PROGRAMMING AND STATISTICS

COURSE CODE: EEE 513

EXAMINATION DATE:

COURSE LECTURER: ENGR. O. O AFOABI

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HOD's SIGNATURE

TIME ALLOWED: 3 HOURS

**INSTRUCTIONS:**

1. ANSWER QUESTION **ONE** AND ANY OTHER **FOUR** QUESTIONS
2. SEVERE PENALTIES APPLY FOR MISCONDUCT, CHEATING, POSSESSION OF UNAUTHORIZED MATERIALS DURING EXAM.
3. YOU ARE **NOT** ALLOWED TO BORROW ANY WRITING MATERIALS DURING THE EXAMINATION.

### Question 1

- (a) Differentiate between matrix and array data types. [4marks]
- (b) Compare and contrast between arrays and data-frame data types. [4marks]
- (c) Perform the following procedures showing all codes in R: [12marks]
  - i. declare a vector as "printvector2" with values ranging from 1 to 5
  - ii. declare a c() function as "printnames1" with inputs: "Category 1", "Category 2", "Category 3", "Category 4", "Category 5".
  - iii. declare a dataframe as "printdataframe1" containing a column named "printvector2" as in (i) and the values of "printnames1" in (ii) as its row names.
  - iv. Export the table into "mysecondoutput.csv" file with values separated only with " ".

### Question 2

- (a) Declare a vector as "vector1" with 3 elements of logical class type. [3marks]
- (b) Declare a vector as "vector2" with 4 elements of numeric class type. [3marks]
- (c) Implement the graphical equivalence of the following set of R commands: [4marks]

```
> plotvector1 = 1:9
> plotvector2 = 9:1
> plot(plotvector1, plotvector2, xlab= "1:9", ylab= "9:1", main= "Plot of 1:9 versus 9:1",
col= "red", pch=3)
```

### Question 3

- (a) Differentiate between R 'built-in' and 'custom' functions. [3marks]
- (b) Write a R function named 'doubleip' with the following specifications: [7marks]
  - i. The function takes two arguments "x" and "y"
  - ii. Stores the product of "x" and "y" into a variable "temp1"
  - iii. Stores the square root of "temp1" into a variable "temp2"
  - iv. Stores the square root of "temp2" into a variable "z" and returns the value as "z".

### Question 4

- (a) Pictorially show the hierarchy of data structures as presented in R. [5marks]
- (b) Write the R program that produced the following output: [5marks]

```
      [,1] [,2] [,3]
[1,]    6    9   12
[2,]    7   10   13
[3,]    8   11   14

      [,1] [,2] [,3]
[1,]    1    4    7
[2,]    2    5    8
[3,]    3    6    9
```

### Question 5

- (a) State the advantage of list with respect to memory usage. [2marks]
- (b) Show the output of the following array definition:

array1 = array(1:16, dim = c(4, 2, 2)). [5marks]

(c) What is the function of the following R built-in function?: `> rm(samplevector)`. [3marks]

### Question 6

(a) State four general tips for writing good R code. [6marks]

(b) What is the difference between the following two R functions: `getwd()` and `setwd()`? [4marks]

### Question 7

(a) What are the three main types of output in R? [6marks]

(b) Update the graph below with the following R commands:

`> abline(coef = c(1, 1), v = 3, h += 5)`. [4marks]

