



# MERU UNIVERSITY OF SCIENCE AND TECHNOLOGY

P.O. Box 972-60200 – Meru-Kenya.

Tel: +254 (0)799529958, +254 (0)799529959, +254 (0)712524293

Website: [www.must.ac.ke](http://www.must.ac.ke) Email: [info@must.ac.ke](mailto:info@must.ac.ke)

---

## University Examinations 2023/2024

SECOND YEAR, FIRST SEMESTER EXAMINATION THE DEGREE OF BACHELOR OF SCIENCE IN ACTUARIAL SCIENCE, BACHELOR OF SCIENCE STATISTICS

### SMS 3213: COMPUTER INTERACTIVE STATISTICS

DATE: DECEMBER 2023

TIME: 2 HOURS

---

**INSTRUCTIONS:** Answer question one and any other two questions

---

#### QUESTION ONE (30 MARKS)

- a) Differentiate between a sample and a parameter (2 marks)  
Differentiate between descriptive statistics and inferential statistics and give two examples of each (6 marks)
- b) Given the following line code; `mymat<-rbind(c(1, 3, 4), c(100, 20, 90))`,
- (i) Explain what it does and give the expected result (2 marks)
- (ii) Write an R code that indicates both the number of rows and columns of “mymat” and give the expected output (2 marks)
- c) Define a statistical report and its use in our modern society (2 marks)
- d) The data below shows the number of swarms of locust observed between the months of January and February 2020

County	Meru	Embu	Tharaka Nithi	Isiolo	Kajiado
Number of swarms	90	50	42	180	120

By writing commands in R;

- (i) That will plot a well labeled pie chart for the data above (8 marks)
-

- e) Suppose the food label on a cookie bag states that there is at most 2 grams of saturated fat in a single cookie. In a sample of 35 cookies, it is found that the mean amount of saturated fat per cookie is 2.1 grams. Assume that the population standard deviation is 0.25 grams. At .05 significance level, can we reject the claim on food label? (8 marks)

### QUESTION TWO (20 MARKS)

- a) Explain what is meant by non-sampling errors and explain three types of non-sampling errors (7 marks)
- b) Write an appropriate R code with the following elements 1, 2, 3, 4, 5, 6 which will
- (i) Create a 2 x 3 matrix by arranging the elements in rows and give the expected output (2 marks)
  - (ii) Create a 2 x3 matrix by arranging the elements in columns and give the expected output (2 marks)
- c) Outline the steps involved in evaluating a statistical report (9 marks)

### QUESTION THREE (20 MARKS)

- a) Explain what each of line of code does and write the expected output for each
- i) `sort(c(4.5, 1, -10,5.55), decreasing =FALSE)` (2 marks)
  - ii) `sort(c(1.5,-1,2.44,2.8), decreasing =TRUE)` (2 marks)
  - iii) `seq(from=3,to=27,by=3)` (2 marks)
- b) The following is a record of the number of students who entered the library on a particular day on hourly bases from 8am-5pm i.e 7,10,27,13,18,8,32,16,7. Write an R code that does the following
- i) records this data and stores it in an object named “students” (1 mark)
  - ii) determines the number of entries in “students” and also write the expected output (2 marks)
  - iii) retrieves the 5<sup>th</sup> entry in “students” and write the expected output (2 marks)
- c) (i) Write an appropriate R code that can be used to enter the following data into an object named “xdata” 13,14,15,16,17,18,19 (1 mark)
- (ii) Write an appropriate R code that can be used to enter the following data into an object named “ydata” 20,21,22,23,24,25,26 (1 mark)

- (iii) R code that calculates the combined total xdata and ydata (1 mark)
- (iv) R code that calculates the average of xdata (1 mark)
- (v) R code that calculates the highest value of ydata (1 mark)
- (vi) R code that calculates cumulative totals of ydata (1 mark)
- (vii) R code that calculates standard deviation of xdata (1 mark)
- (viii) R code that calculates variance of ydata (1 mark)

**QUESTION FOUR (20 MARKS)**

- a) Explain what each line of code does and give the expected output for each
  - (i) `M<-cbind (A = 1:4, B=5:8, C=800)` (3 marks)
  - (ii) `M<-cbind (A=1:4, B=5:8, C=800)` (3 marks)
- b) Differentiate between a vector and a matrix (2 marks)
- c) Explain the use of `%%` and `% / %` in R and illustrate by giving an example (4 marks)
- d) Describe R environment and its application (8 marks)

**QUESTION FIVE (20 MARKS)**

- a) Define the term Data frame (1 mark)

Given a data frame called `our.data` with the following entries

Year	Mean_weight	Gender	Mean_height
1980	71.5	M	179.3
1988	72.1	M	179.9
1996	73.7	F	180.5
1998	74.3	F	180.1
2000	75.2	M	180.3
2002	74.7	M	180.4

- (i) Read the dataset in R into an object named `Griwth_rate` (5 marks)
- (ii) Display the Mean weight values only from the data frame (2 marks)
- (iii) Select the data for Males only (2 marks)
- (iv) Select the data that displays the `Mean_height` and `Mean_weight` only from the data set above. (2 marks)

- b) Write an appropriate R code with following elements 1,2,3,4,5,6 which
- i) Create a 2 x 3 matrix by arranging the elements in rows and give the expected output (2 marks)
  - ii) Create a 2x3 matrix by arranging the elements in columns and give the expected output (2 marks)
- c) Differentiate between point estimation and interval estimation and give examples (4 marks)