



(Knowledge for Development)

KIBABII UNIVERSITY
UNIVERSITY EXAMINATIONS
2020/2021 ACADEMIC YEAR
THIRD YEAR SECOND SEMESTER
SPECIAL/SUPPLIMENTARY EXAMINATION
FOR THE DEGREE OF BACHELOR OF SCIENCE
MATHEMATICS

COURSE CODE: STA324/STA 348

COURSE TITLE: STATISTICAL COMPUTING

DATE: 20/01/2022

TIME: 2 PM -4 PM

INSTRUCTIONS TO CANDIDATES

Answer Question One and Any other TWO Questions

TIME: 2 Hours

QUESTION ONE (30 MARKS)

- a) Briefly describe how you can carry out the following procedure using SPSS (8 marks)
- (i) Descriptive
 - (ii) Explore
 - (iii) Cross-tabulation
 - (iv) ANOVA
- b) List with details ,three compulsory and five optional requirements in creating a data file (8 marks)
- c) Income can be measured on several levels. Describe how income could be measured as an ordinal, interval and ratio measure. (6 marks)
- d) The following data set shows how warming in w/m^2 varies with temperature

Serial number	Warming (w/m^2)	Temperature($^{\circ}C$)
1	1	20
2	3	22
3	2	21
4	3	22
5	2	21
6	1.5	20.5
7	1.6	20.8

- i) Describe how the above data can be entered in R (4 marks)
- ii) Explain steps you will use to plot and perform correlation test in R (4 marks)

QUESTION TWO (20 MARKS)

- (a). A function Y is given by $y=\sin(x)$ and another function z is given by $z= \cos(x)$
 Write m.scripts that can be executed in MATLAB to generate corresponding sine and cosine waves respectively (6 marks)
- (b).Discuss logical and relational operators as used in programming (4 marks)
- (c).The correlation coefficients of rows and columns in matrix B can be given by:

1.0000 -0.3149 -0.9685 0.4575
 -0.3149 1.0000 0.1325 -0.2294
 -0.9685 0.1325 1.0000 -0.5774
 0.4575 -0.2294 -0.5774 1.0000

- i) How much variance in Miles Per Gallon is explained by Car Weight? (1 mark)
- ii) Is this variance explained significantly different to 0? (1 mark)
- iii) What is the constant (1 mark)
- iv) What is the slope? (1 mark)
- v) Is the slope statistically significant? (1 mark)
- vi) Write out the model regression equation (2 marks)
- vii) What is the standardised regression coefficient for vehicle weight? (2 marks)
- viii) If a car weighed 1000 pounds, what would be the predicted miles per gallon? (2 marks)
- ix) What is the standard error of the estimate? (2 marks)
- x) What would be the approximate 95% confidence interval of our prediction (2 marks)

QUESTION FOUR (20 MARKS)

A market researcher is interested in the coffee drinking habits of males and females. He asks a sample of male and female office workers to record the number of cups of coffee they consume during a week.

- a) Which parametric statistical technique could the researcher use to determine if males and females differ in terms of the number of cups of coffee consumed in a week? Justify your answer and describe how you would obtain this statistic using SPSS. (8 marks)
- b) What are the key values you would look for in the output? (4 marks)
- c) What assumptions should you check for when using the technique that you chose in question (a), above. (6 marks)
- d) What non-parametric technique could be used to address this research question? (2 marks)

QUESTION FIVE (20 MARKS)

- a) The term "Vector" can have a mathematical Definition or as a data type. Explain (4 marks)
- b) Discuss inputs in R and how they can be read in R (10 marks)
- c) The weight of children at Kibabii clinic is between 2.1: 5 kilograms. Explain how you can generate a Histogram from the data set (3 marks)
- d) What are "Box plots" and how are they used in statistics? (3 Marks)

Illustrate the use of R programming to generate box plots

(2 Marks)