UNIVERSITY EXAMINATIONS

EXAMINATION FOR JANUARY-APRIL 2023/2024 FOR DIPLOMA IN INFORMATION TECHNOLOGY

RCS 019: INTRODUCTION TO STATISTICS

DATE: 8TH APRIL 2024 **TIME: 2 HOURS**

GENERAL INSTRUCTIONS:

Students are NOT permitted to write on the examination question paper during exam time.

This is a closed book examination. Text book/Reference books/notes are not permitted.

SPECIAL INSTRUCTIONS:

This examination paper consists Questions in Section A followed by section B.

Answer **Question 1 and any Other Two** questions.

QUESTIONS in ALL Sections should be answered in answer booklet(s).

1. **PLEASE start the answer to EACH question on a NEW PAGE.**
2. **Keep your phone(s) switched off at the front of the examination room.**
3. **Keep ALL bags and caps at the front of the examination room and DO NOT refer to ANY unauthorized material during the course of the examination.**
4. **ALWAYS show your working.**
5. **Marks indicated in parenthesis i.e. ( ) will be awarded for clear and logical answers.**
6. **Write your REGISTRATION No. clearly on the answer booklet(s).**
7. **For the Questions, write the number of the question on the answer booklet cover page in the order you answered them.**
8. **DO NOT use your PHONE as a CALCULATOR.**
9. **YOU are ONLY ALLOWED to leave the exam room 1hour to the end of the Exam.**
10. **DO NOT write on the QUESTION PAPER. Use the back of your BOOKLET for any calculations or rough work.**

SECTION A

(Compulsory) Question

One (30 marks)

a) Differentiate between Discrete and Continuous Variables giving examples in each
(4 Marks)

b) What is a Time Series?
(1 Mark)

c) State the differences between primary and secondary data. State the methods used to collect each type of data.
(4 Marks)

d) A set of values has a mean of 22 and a standard deviation of 3. Find the z-score for a value of 24. Interpret the z-score
(3 Marks)

e) A company is analysing the monthly incomes of its employees. They collect data from a random sample of 100 employees and find that the mean monthly income is Kshs 40,000, while the median income is Kshs 42,000.

i. Based on this information, do you think the income data is positively skewed, negatively skewed, or roughly symmetrical? Give a reason for your answer
(2 Marks)

ii. Explain why understanding the skewness of income data is important for the company's financial planning and employee compensation strategies.
(2 Marks)

f) Differentiate between Population and Sample giving an example in each
(4 Marks)

g) Briefly explain the four time series components in time series analysis
(4 Marks)

h) When Laspeyres is most appropriate and when is Paasche the better choice? Explain using their advantages and disadvantages.
(4 Marks)

i) Calculate the median value for the set: {1, 12, 13, 7, 8, 14, 2, 9, and 12}
(2 Marks)

SECTION B (Answer Any Two questions – Total: 30 Marks)

Question Two (15 Marks)

a) Distinguish the Exclusive Method from the Inclusive Method of class interval determination.
(4 Marks)

b) The following data represents coffee weights for 50 farmers in a particular week, weights range from 0 to 100.

57	44	80	75	00	18	45	14	04	64
72	51	69	34	22	83	79	20	57	28
96	56	50	47	10	34	61	66	80	46
22	10	84	50	47	73	42	33	48	65
10	34	60	53	75	90	58	46	39	69

c) Calculate class interval given that weights are grouped into 10 classes

(2 Marks)

d) Using the class width in (i) above, create a frequency distribution table. Use Exclusive Method

(5 Marks)

e) Differentiate between:
   i. Inferential Statistics and Descriptive Statistics
   ii. Chronological and Geographical Data Classification

(4 Marks)

Question Three (15 Marks)

a) Explain the significance of statistics in the fields of business, economics, and government

(5 Marks)

b) Here is a sample data in an ordered array: 21, 12, 11, 14, 5, 10, 15, 16, and 17.

c) Calculate:
   i. First quartile
   ii. Third quartile
   iii. Interquartile range

(5 Marks)

d) Imagine you are working as a data analyst for a marketing research firm. Your client is a company launching a new product in a competitive market. They have requested a comprehensive market analysis report. Explain the stages of statistical investigation you will use and how each stage is crucial in conducting a market analysis for your client. Provide specific examples and scenarios to illustrate each stage's significance in ensuring the product launch's success.

(5 Marks)

Question Four (15 Marks)

a) Using Sturge's rule $K=1+3.322\log(N)$ where N is the number of observations, calculate the class interval of the salary of 200 employees in a commercial undertaking in which it varies between Kshs. 400 and Ksh.8, 400.

(4 Marks)

b) Explain three key steps for analyzing the relationship between different series of data in correlation analysis

(3 Marks)

c) Explain Any Two methods for measuring the secular trend in a time series.

(4 Marks)

d) A large bag of sweets claims to contain 45 sweets, having a total mass of 852.4g. A small bag of sweets claims to contain 24 sweets, having a total mass of 282.8g. What is the mean mass of all the sweets together?

(4 Marks)

Question Five (20 Marks)

a) Outline three limitations of statistics

(3 Marks)

b) Distinguish between positive and negative correlation

(2 Marks)

c) The following scores represent students' marks in a statistics class; 55, 62, 60, 74, 86, 55, 48, 75

Determine the mode and state which type of mode it is

(2 Marks)

Calculate;

i. 50^{th} Percentile

(3 Marks)

ii. Mean

(2 Marks)

iii. Variance

(3 Marks)