

TOM MBOYA UNIVERSITY
UNIVERSITY EXAMINATIONS
2023/2024 ACADEMIC YEAR
FIRST YEAR FIRST SEMESTER EXAMINATION FOR THE DEGREE OF
BACHELOR OF GEOGRAPHY
COURSE CODE: NGE 103
COURSE TITLE: INTRODUCTION TO STATISTICAL TECHNIQUES
(MAIN EXAM, 2023)

INSTRUCTION TO CANDIDATES

Answer **ALL** questions from section A and **ANY THREE** from Questions in section B.

All questions in section B carry Equal Marks

Duration of the examination: 3 hours

SECTION A (30 marks):

QUESTION ONE

- a) Let a distribution from some research by a teacher be as shown in the table below.

Time (minutes)	128-130	131-133	134-136	137-139	140-142	143-145
No. of jets	3	1	4	3	7	12

- (i) Use the data to compute the mode of the distribution (5 Mks)
(ii) Let the assumed mean, A , be 138. Use this assumed mean to compute the actual arithmetic mean of the distribution. (5 Mks)
- b) A student got the data below on students' marks in MMA 104 unit. The data is to be represented in a histogram to help have a good visual interpretation. Draw a well-labelled histogram of the data. (5 Mks)

Marks	12-16	17-21	22-26	27-31	32-36	37-41
Frequency	3	6	4	10	8	12

- c) Given the weight of cars in a certain garage as in the table below, compute:

- (i) the class-marks (1 Mks)
(ii) relative frequencies (2 Mks)
(iii) percentage frequencies (2 Mks)

No. of cars	20	33	50	65	32
Weight (kg *1000)	1.8-2.0	2.0-2.2	2.2-2.4	2.4-2.6	2.6-2.8

- d) A student had some data on lengths of pieces of wood from a workshop. The lengths were grouped and the mid-points as well as the cumulative frequencies of the data are provided below.

Lengths' mid-points (cm)	37	45	53	61	69	77
Cumulative frequencies	3	7	10	20	25	36

- (i) Compute the class boundaries (2 Mks)
(ii) Compute the frequency of each class (2 Mks)
e) Consider data on students' heights in centimetres as given below. Use the data to construct a frequency polygon (ogive). (3 Mks)

Height (cm)	120-130	130-140	140-150	150-160	160-170
Frequency	6	10	6	5	8

- f) Consider the frequency distribution data below.

Cumulative frequencies	3	9	10	14	19	21
Weights (kg)	56	57	61	58	62	50

Use the data to compute the average weight.

(3 Mks)

SECTION B 40 MARKS

Question 2 (20 Marks)

- a) Differentiate between continuous and discrete measurement variables. (2 Mks)
b) Harmonic mean as well as geometric mean are useful in Statistics, just like any other measure of central tendency like mean, mode and so on. Use the data below to compute:
(i) Harmonic mean (6 Mks)
(ii) Geometric mean (6 Mks)

4, 1, 8, 2, 10, 5, 25

- c) Estimate the lower and upper quartiles for the frequency table below (6 Mks)

Class	1-4	5-8	9-12	13-16	17-20	21-24
Frequency	10	14	20	16	12	8

Question 3 (20 Marks)

Moments are used in Statistics to compute means, variances, skewness and kurtosis as the main measures that are useful in describing various distributions. A study was carried out and the distribution data from that study yielded the following quantities:

$$\bar{X} = 12, \sum_{i=1}^{50} X_i = 600, \sum_{i=1}^{50} X_i^2 = 8000, \sum_{i=1}^{50} X_i^3 = 9200, \sum_{i=1}^{50} X_i^4 = 25000$$

Use the quantities provided to compute the following:

- (i) First moment (4 Mk)
(ii) 2nd moment (4 Mk)
(iii) 3rd moment (6 Mks)
(iv) 4th moment (6 mks)

Question 4 (20 Marks)

- a) From research, a researcher got the following computations from the data she had:

$$\bar{X} = 12, \sum_{i=1}^{50} X_i = 600, \sum_{i=1}^{50} X_i^2 = 8000, \sum_{i=1}^{50} X_i^3 = 9200, \sum_{i=1}^{50} X_i^4 = 25000$$

- (i) Use the above computations to find the kurtosis of the researcher's data. (8 Mks)
- (ii) Interpret the kurtosis value obtained from (i) above. (2 mks)

- b) Consider an experiment which gave the following results

Length (cm)	1.1	1.2	1.3	1.4	1.5	1.6	1.7
Frequency	2	7	10	12	10	7	2

Calculate:

- i) The lower and upper quartile (2 mks)
- ii) The interquartile range (2 mks)
- iii) The quartile deviation (2 mks)
- iv) The mid quartile (2 mks)
- v) The trimean (2 mks)

Question 5 (20 Marks)

- a) Percentiles and deciles are useful in dividing a distribution into a number of parts. Study the data below and use it to answer the questions below.

Height (cm)	1.2	1.3	1.4	1.5	1.6	1.7	1.8
Frequency (f)	2	7	10	12	10	7	2

- (i) Compute the 12th percentile (4 Mks)
- (ii) Find the 8th decile (6 Mks)

- b) Consider the following data:

3, 6, 9, 10, 7, 12, 13, 15, 6, 5, 13

Calculate the lower and upper quartile (4MKS)

- c) An insurance company researcher conducted a survey on the number of car theft in large city for a period of 30 days last summer. Construct a stem and leaf plot by using classes 50-54, 55-59, 60-64, 65-69, 70-74, and 75-79.

52, 62, 51, 50, 69, 58, 77, 66, 53, 57, 75, 56, 55, 67, 73, 79, 59, 68, 65, 72, 57, 51, 63, 69, 75, 53, 78, 66, 55.

(3 MKS)

- d) Using the dataset from the following two cities construct a back-to-back stem and leaf plot. (3MKS)

ATLANTA

55, 70, 44, 36, 40, 63, 40, 44, 34, 38, 60, 47, 52, 32, 50, 53, 32, 28, 31, 52, 32, 34, 32, 30, 26, 29.

PHILADELPHIA

61, 40, 38, 32, 30, 58, 40, 40, 25, 30, 50, 38, 36, 54, 40, 36, 30, 30, 53, 39, 36, 34, 33, 39, 32