(*Knowledge for Development*)

KIBABII UNIVERSITY

UNIVERSITY EXAMINATIONS

2021/2022 ACADEMIC YEAR

FIRST YEAR SECOND SEMESTER

MAIN EXAMINATION

FOR THE DEGREE OF BACHELOR OF SCIENCE

COURSE CODE: STA 106

COURSE TITLE: BASIC STATISTICS

DATE: 18/05/2022   **TIME:** 2:00 PM – 4:00 PM

INSTRUCTIONS TO CANDIDATES

Answer Question One and Any other TWO Questions

TIME: 2 Hours

QUESTION ONE (30 MKS)

a) Distinguish between
      i)   Population and a sample   (2mks)
      ii)   Descriptive and inferential statistics   (2mks)

b) Define the term statistics.   (1mk)

c) State the applications, uses and limitations of statistics   (4mks)

d) Using the dataset from the following two cities construct a back-to-back stem and leaf plot. 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
(4MKS)

e) Find the moment coefficient of the following distribution   (3mrks)

X	f
12	1
14	4
16	6
18	10
20	7
22	2

f) In a given exam the scores for 10 students were as follow

Student	Mark (X)
A	60
B	45
C	75
D	70
E	65
F	40
G	69
H	64
I	50
J	80

Required

   i)   Determine the absolute mean deviation   (3mks)

   ii) Give two merits and demerits of the arithmetic mean, mode and median   (4mks)

   iii) The economic growth rates of five countries were given as 20%, 15%, 25%, 18% and 5%. Calculate the harmonic mean.   (2mks)

g) The following table shows the levels of retirement benefits given to a group of workers in a given establishment.

Retirement benefits £ '000'	No of retirees (f)
20 – 29	50
30 – 39	69
40 – 49	70
50 – 59	90
60 – 69	52
70 – 79	40
80 – 89	11

Required

i) Determine the semi- interquartile range for the above data (2mks)

ii) Determine the minimum value for the top ten percent. (10%) (3mks)

QUESTION TWO (20 MKS)

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. (8mks)

(ii) Interpret the kurtosis value obtained from (i) above. (2mks)

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 (2mks)

ii) The interquartile range (2mks)

iii) The quartile deviation (2mks)

iv) The mid quartile (2mks)

v) The trimean (2mks)

QUESTION THREE (20 MKS)

The price of ordinary 40 shares of Safaricom quoted on the security exchange, at the close of the business on successive Fridays is tabulated below.

126 120 122 105 129 119 131 138

125 127 113 112 130 122 134 136

128 126 117 114 120 123 127 140

124 127 114 111 116 131 128 137

127 122 106 121 116 135 142 130

Required

i)   Group the above data into eight classes   (3MKS)

ii)   Calculate the cumulative frequency, the median value, quartile values and the semi-quartile range   (5MKS)

iii)   Calculate the mean and standard deviation of your frequency distribution   (6MKS)

iv)   Compare and contrast the values that you have obtained for;
        a) The median and mean   (3MKS)
        b) The semi -quartile range and the standard deviation   (3MKS)

QUESTION FOUR (20MKS)

a) In given firm located in the UK the average salary of the employees is £3500 with a standard deviation of £150

The same firm has a local branch in Kenya in which the average salaries are Kshs.8500 with a standard deviation of Kshs.800

Determine the coefficient of variation in the 2 firms and briefly comment on the degree of dispersion of the salaries in the 2 firms.   (5 mks)

b) The quantity controller in a given firm had an accurate record of all iron bars produced in may 1997. The following data shows those records.

Bar length (cm)	No. of bars (f)
201-250	25
251-300	36
301-350	49
351-400	80
401-500	51
501-550	42

Calculate the standard deviation of the length of the bars.   (15 mks)

QUESTION FIVE (20MKS)

The following information was obtained from an NGO which was giving small loans to some small scale business enterprise in 2020. The loans are in the form of thousands of Kshs.

Loans	Units (f)
46-50	32
51-55	62
56-60	97
61-65	120
66-70	92
71-75	83
76-80	52
81-85	40
86-90	21
91-95	11

Required

i) Define the term skewness and explain its categories (4mks)

ii) Using the Pearson measure of skewness, calculate the coefficients of skewness and hence comment briefly on the nature of the distribution of the loans. (8mks)

iii) Calculate the quartile coefficient of skewness. (8mks)