KISII UNIVERSITY
UNIVERSITY EXAMINATIONS
**THIRD YEAR EXAMINATION FOR THE AWARD OF THE DEGREE OF
BACHELOR OF SCIENCE IN APPLIED STATISTICS
FIRST SEMESTER 2022/2023
[SEPTEMBER-DECEMBER, 2022]**

STAT 341: SAMPLING METHODS

STREAM: Y3S1   **TIME: 2 HOURS**

DAY: FRIDAY, 9:00 – 11:00 AM   **DATE: 23/12/2022**

INSTRUCTIONS
1. *Do not write anything on this question paper.*
2. *Answer question ONE and any other TWO questions.*

SECTION: A (30 MARKS)

1. a) Define the following
    i)   Statistics
    ii)   Descriptive statistics
    iii)   Inference statistics   *6 marks*

    b) Differentiate between population and sample as used in research design *4marks*
    c) What is survey in research design   *2marks*
    d) What is standard error   *3marks*
    e) i. What is the point estimate of a population mean or any other parameter *1mark*
       ii. Define confidence limits   *2marks*
    f) Given that n=250 sample mean weight 60g and sample standard deviation 12g ,
        Calculate;
    i)   The best point estimate of the population mean
    ii)   The standard error of the sample mean
    iii)   The 95% confidence limits of the population mean

                                                                                              7marks
    g) Find the area under the normal curve for the following Z score   *3marks*
    i.   1.5<Z<3.0
    ii. -1.8<Z<2.5
    iii. Z>2.0   *5marks*

SECTION: B   (40 marks)

Answer any **Two** questions from this section

2 a). What is the definition of sample survey **2marks**

  b) i. Give the main steps followed in research design during a sample survey **9marks**

ii) Give advantages of sample survey to census numeration **5marks**

c) What is sampling error in research design? Give three main steps followed in controlling sampling errors **4marks**

3 a). What is the most critical requirement for probability sampling in research design

1mark

  b) Explain the procedure involved in

        i) Simple probability sampling method

5marks

  ii) Stratified random sampling method **5marks**

  iii) Explain when stratified random sampling is preferred **2marks**

  c) Explain what is meant by two stage sampling method. When is this method used

4marks

  d) Define systematic sampling **2marks**

4. Kenya Tea Developing Authority (KTDA) purchases a large quantity of firewood. They wish to know the average length of each piece of firewood. A random sample of 850 pieces of wood are measured and it is found that the mean length is 1000.4 cm with standard deviation of 28cm. calculate the population mean of the pieces of firewood at 95%   and 99% confidence levels.

  (b). A random sample of 24 packets was taken and found to have a mean weight of 100grams and standard deviation of 18 grams. What is the mean weight of the population at 95% confidence.

  c) What are the advantages if probability sampling techniques. **20marks**

5. a) What is the main feature of the Central Limit Theorem and why is it so important

3marks

b) What is the main difference between probability and non-probability sampling

5marks

c) Table 1 below show the concentration of Chlorhexidine (mg) in 15 1-ML samples that have been removed from a stock solution (5L) and assoyed by utra violet Spectroscopy. Calculate 95% and 99% confidence limits of the population mean.

12marks

Table 1 concentration of chlorhexidine (mg/ml) in 15 samples removed from a stock solution

0.201	0.205	0.205	0.205	0.200
0.212	0.210	0.211	0.209	0.199
0.209	0.211	0.215	0.216	0.205