



(Knowledge for Development)

KIBABII UNIVERSITY
UNIVERSITY EXAMINATIONS
2022/2023 ACADEMIC YEAR
SECOND YEAR FIRST SEMESTER
MAIN EXAMINATION

**FOR THE DEGREE OF BACHELOR OF EDUCATION AND
BACHELOR OF SCIENCE**

COURSE CODE: STA 212

COURSE TITLE: SAMPLE SURVEY II

DATE: 19/12/2022

TIME: 2:00 PM – 4:00 PM

INSTRUCTIONS TO CANDIDATES

Answer Question One and Any other TWO Questions

TIME: 2 Hours

This Paper Consists of 4 Printed Pages. Please Turn Over.

QUESTION ONE (30 MKS)

- a) Define the following terms (2mks)
- i. Sampling unit ii. Sampling frame
- b) What are the advantages of sampling over complete enumeration? (2mks)
- c) State the principles of sampling (2mks)
- d) Discuss the procedure of stratified random sampling. Give examples. (2mks)
- e) What are the conditions under which the cluster sampling is used (2mks)
- f) Define purposive sampling. Where is it used? (2mks)
- g) What is a random number table? How will you select the random numbers? (2mks)
- h) In an area there are 500 families. Using the following extract from a table of random numbers select a sample of 15 families to find out the standard of living of those families in that area. (5mks)
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|------|------|------|------|------|------|------|------|------|------|------|
| 4652 | 3819 | 8431 | 2150 | 2352 | 2472 | 0043 | 4890 | 1749 | 2030 | 7353 |
| 3488 | 9031 | 7617 | 1220 | 4129 | 7148 | 1943 | 6007 | 0641 | 2327 | 0385 |
| 9410 | 9179 | 2722 | 8445 | 8488 | 0422 | 7209 | 4950 | 1489 | 0828 | |
- i) Discuss disadvantages of systematic random sampling (2mks)
- j) A sample of 50 students is to be drawn from a population consisting of 500 students belonging to two institutions A and B. The number of students in the institution A is 200 and the institution B is 300. Draw the sample using proportional allocation (5mks)
- k) What difference is there between stratified and cluster sampling (4mks)

QUESTION TWO [20 MKS]

- a) i) What is sample survey? (2mks)
ii) Outline both the merits and demerits of sample survey. (4mks)
- b) Define a population and explain the three types of population citing examples. (4mks)
- a) Let the population consist of the elements 1,2,3,4 and 5. Selecting a simple random sample of size 3,

- i. Enumerate all possible samples (2mks)
- ii. Calculate the means of samples in (i) (3mks)
- iii. Verify that sample mean \bar{y} is an unbiased estimate of population mean \bar{Y} (5mks)

QUESTION THREE (20 MKS)

- a) Define a simple random sampling. (2mks)
- b) Explain the two methods of selecting a simple random sampling. (4mks)
- c) What are the merits and limitations of simple random sampling (3mks)
- d) Give illustrations of situations where systematic sampling is used. (3mks)
- e) A researcher wants calculate the sample size for a case control study to known a hint between childhood sexual disorder in adult group and want to fix a power of study at 80%, assuming the expected proportioning in case control and control group are 0.35 and 0.20 respectively and wants to have an equal number of cases as the control. Calculate the sample size for the researcher. (4mks)
- f) A placebo controlled randomized trial prepose to access the effectiveness of drug A in curing the infants suffering from sepsis. A previous study showed the proportion of subjects cured by drug A 50% and clinically important difference of 16% as compared to placebo is acceptable. Calculate the sample size required for the study. (4mks)

QUESTION FOUR (20 MKS)

- a) What are probability and non-probability sampling? (2mks)
- b) Distinguish between:
 - i. Target population and sample population (2mks)
 - ii. Lottery method and random number method of simple random sampling (2mks)
 - iii. Two stage and multistage random sampling techniques (2mks)
- c) Using the following dataset 1,2,3,4
 - i) Draw all possible sample of size $n=2$ without replacement (2mks)
 - ii) Verify that the sample mean \bar{x} is unbiased estimator of the population mean μ (4mks)
 - iii) Prove that the sample variance s^2 is unbiased estimator of the population variance δ^2 (4mks)
 - iv) Show that $\text{var}(\bar{x}) = \frac{N-n}{Nn} s^2$ (2mks)

QUESTION FIVE (20MKS)

- a) What circumstances stratified random sampling is used? (2mks)
b) What is the objective of stratification? (2mks)
c) What are the merits and limitations of stratified random sampling (3mks)
d) d) A sample of 30 students is to be drawn from population of 300 students belonging to two colleges A and B. The means and standard deviation of marks are given below

College	total no. of students	\bar{Y}_i	S_i
A	200	30	10
B	100	60	40

- i. How will you draw the sample using proportional allocation (3mks)
ii. How will you draw the sample using Neyman allocation technique (4mks)
iii. Verify that Neyman's allocation is more efficient than proportional allocation (2mks)