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OFFICE OF THE DEPUTY PRINCIPAL
ACADEMICS, STUDENT AFFAIRS AND RESEARCH

UNIVERSITY EXAMINATIONS

2019 /2020 ACADEMIC YEAR

FIRST YEAR SECOND SEMESTER REGULAR EXAMINATION

FOR THE DEGREE OF BACHELOR OF SCIENCE (APPLIED STATISTICS WITH COMPUTING)

COURSE CODE: STA113

COURSE TITLE: PRINCIPLES OF SAMPLE SURVEYS

DATE: 15TH OCTOBER, 2020 **TIME: 1400 – 1700 HRS**

INSTRUCTION TO CANDIDATES

- **SEE INSIDE**

THIS PAPER CONSISTS OF 4 PRINTED PAGES **PLEASE TURN OVER**

REGULAR – MAIN EXAM

STA 113: PRINCIPLES OF SAMPLE SURVEYS

STREAM: ASC **DURATION: 3 Hours**

INSTRUCTION TO CANDIDATES

Answer **ALL** questions from section A and **ANY THREE** Questions in section B.
All questions in section B carry Equal Marks

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SECTION A (31 marks)

QUESTION ONE

a) Differentiate between the following terms as used in statistics

I. Statistics and parameter (4MKS)
II. Sample and sampling distribution (4MKS)
III. Finite population and infinite population (4MKS)
IV. Census and survey (2 MKS)

b) Explain how sample bias can be eliminated in a survey study. (2MKS)

QUESTION TWO

a) Explain the difference between stratified sampling and multi stage sampling (4MKS)
b) State the factors to consider in choosing a sampling frame (2MKS)
c) Given two samples A and B of 100 and 400 items respectively, they have the means of 7 and 10 respectively and standard deviations of 2 and 3 respectively. Construct the confidence interval for the means at $\alpha = 95\%$ (4MKS)
d) In a sample of 800 candidates, 560 were male. Estimate the population proportion at 95% confidence level. (3MKS)
e) Explain how random numbers can be used to draw samples (3MKS)

SECTION B (39 marks):

Answer any THREE questions. All Questions carry equal marks

QUESTION THREE (13MARKS)

a) Explain four advantages of non-probability sampling techniques (3MKS)

b) Explain four probability sampling techniques giving an example for each. (4MKS)

c) In a town containing 20,000 houses, a simple random sample of 40 houses was collected and number of persons recorded as follows;

Number of persons	1	2	3	4	5	6	8
Number of houses	5	8	12	6	4	3	2

Calculate the estimates of population:

a) Mean (3MKS)
b) Total (3MKS)

QUESTION FOUR (13MARKS)

a) State and explain the steps in sampling process (6 MKS)
b) Give and explain two procedures of collecting a simple random sample of say size, n (7MKS)

QUESTION FIVE (13MARKS)

Given a population of size N = 4 consisting of elements 1,2,3,4

Calculate:

a) How many simple random samples of 2 can be drawn from the population (2MKS)
b) Give all the possible simple random samples in (i) (2MKS)
c) Sample means and variances for samples in (ii) (4MKS)
d) Show that: $E(\bar{y}) = \bar{Y}$ and $E(s^2) = S^2$ (3MKS)

QUESTION SIX (13MARKS)

To investigate voting irregularities, a simple random sample of size 60 was drawn from a list of 1024 registered voters in a certain ward. It was found that 12 persons in the sample were registered in non-existence addresses.

a) Calculate the estimate for the population proportion for persons registered in non-existence addresses (3 MKS)
b) Compute 95% confidence limits on population proportion (3MKS)
c) Calculate an estimate for the total number of persons registered in non-existence addresses (3MKS)
d) Compute 95% confidence on the total in (iii) above (4MKS)

QUESTION SEVEN (13MARKS)

a) Using a diagram, give the general representation of a sampling process (5MKS)

b) A sample of 40 students has a mean final exam score of 70.7. Past experience suggest that the distribution of final exam scores is normally distributed with standard deviation 13. Calculate a confidence interval for the population mean using a confidence interval of 90% (3MKS)

c) The weights of 16 three month old babies attending clinic are:
4.68, 4.13, 4.80, 4.63, 5.08, 5.79, 6.29, 6.79, 4.93, 4.25, 5.70, 4.74, 5.88, 6.77, 6.04, 4.95.
Compute the 95% confidence interval for the mean (5MKS)

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