



# MANICALAND STATE UNIVERSITY OF APPLIED SCIENCES

## FACULTY OF APPLIED SCIENCES & TECHNOLOGY

DEPARTMENT OF APPLIED STATISTICS

MODULE: SURVEY TECHNIQUES

CODE: HAST221

SESSIONAL EXAMINATIONS  
OCTOBER 2021

DURATION: 3 HOURS

EXAMINER: MR I. ZVAVANDA

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### *INSTRUCTIONS*

1. Answer **All** in Section A
2. Answer **three** questions in Section B.
3. Start a new question on a fresh page
4. Total marks 100

**Additional material(s):** Non-programmable electronic scientific calculator,  
Statistical tables, Survey Techniques tables.

**SECTION A: (ANSWER ALL QUESTIONS) [40 Marks]**

**A1.** Define the following terms as used in Survey Techniques

- (a). questionnaire
- (b). element
- (c). target population
- (d). sampling unit and
- (e). sampling frame

[2, 2, 2, 2, 2]

**A2.** There are various ways of collecting survey data. State and explain any two methods giving 3 merits and 3 demerits for each method [16]

**A3.** Distinguish between the following terms

- (a). overcoverage and undercoverage in the sampling frame
- (b). sampling errors and non-sampling errors

[2, 2]

**A4.** Surveys can be classified into four criteria. State and explain the four classification of surveys [10]

**SECTION B: (ANSWER ANY THREE (3) QUESTIONS) [60 Marks]**

**B5**

(a). Suppose we have a population of  $N = 4$ , measurements given by 30, 40, 50, 60

- i. List all possible simple random samples of size  $n = 2$  that can be selected from the population and state the probability of selecting any one of the samples
- ii. Compute  $E(\tilde{y})$  and  $V(\tilde{y})$
- iii. Questions for use in a survey interview can be of many types and is essential to distinguish between these types in order to prepare an effective questionnaire. State and explain the five types of data that can be collected

[5, 5, 10]

**B6.**

- (a). Training of enumerators is very important in survey fieldwork. Discuss the significance of training of enumerators.
- (b). A simple random sample of  $n = 10$  students at MSUAS is drawn to estimate the average weight of  $N = 500$  students. The sample values for the 10 students' weight are as follows  
**65 60 80 75 80 100 90 58 70 72**  
Estimate the sample mean and sample variance
- (c). Obtain the 95% confidence Interval for the population mean.

[10, 5, 5]

**B7.**

- (a). Enumerators are critical participants in a survey. Evaluate the critical roles that are carried out by enumerators in a survey.
- (b). The table below shows a summary of stratified sampling results

stratum	N	N	$\bar{y}$	$S^2$
1	1000	25	30.125	26.333
2	1200	35	35.725	14.667
3	900	20	25.125	19.111
4	1400	40	30.725	15.625

- i) Estimate the population mean and its associated variance
- ii) Estimate the population total and its associated variance

[10, 5, 5]

**B8.**

- (a). Outline the ethical considerations when carrying out survey fieldwork
- (b). Benwan Trading provides food for students at a certain University. A 1 in 100 systematic sample of the  $N = 2000$  students listed in the University register is taken to estimate the average amount of money spent on food per semester. The results of the sample are listed in the following table:

Student	Amount Spent
1	5.0
2	4.2
3	6.0
4	10.6
5	12.0
6	4.2
7	4.8
8	5.6
9	7.2
10	8.4
11	8.2
12	7.8
13	8.7
14	6.8
15	9.6
16	4.6
17	11.2
18	10.6
19	5.5
20	4.9

- i) Estimate the average amount of money spent on food per semester by a student
- ii) Estimate the corresponding variance
- iii) Hence place a bound on the error of estimation using  $\alpha = 0.01$

[10, 3, 4, 3]

**END OF QUESTION PAPER**