MANICALAND STATE UNIVERSITY OF APPLIED SCIENCES

FACULTY OF APPLIED SCIENCES & TECHNOLOGY

DEPARTMENT OF APPLIED STATISTICS

MODULE: INTRODUCTION TO STATISTICS

CODE: ASTA 101

SESSIONAL EXAMINATIONS

OCTOBER 2021

DURATION: 3 HOURS

EXAMINER: MR I ZVAWANDA

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): *Graph paper, Non-programmable electronic scientific calculator, Statistical tables.*

SECTION A: ANSWER **ALL** QUESTIONS **[40 MARKS]**

A1. Define the following terms as used in Statistics:

a) parameter,
b) statistic,
c) qualitative data, and
d) quantitative data.

[2, 2, 2, 2]

A2. Two balls are drawn at random without replacement from a bag that contains 16 red balls and 4 blue balls. Find the probability that:

a) both are red,
b) they are of different colours, and
c) at least one is red.

[3, 3, 4]

A3.

a) Define the following:

i. Mutually exclusive events
ii. Independent events

b) The probability that Munoshamisa catches the bus is $\frac{1}{3}$ and the probability that Makomborero catches the bus is $\frac{1}{4}$. Find the probability that:

i. both catches the bus,
ii. both misses the bus, and
iii. just one misses the bus.

[2, 2 4, 4, 5]

A4. State and explain the three measures of central location. **[5]**

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

B5. The table below gives the ages in years and prices in thousand $ for 8 cars of a specific model.

Age	Sales(thousand
4	166
7	112
5	140
2	300
9	90
6	120
3	210
8	100

a) Identify the independent variable and the dependent variable. Explain.

b) Show the data graphically in a scatter plot. What relationship is observed?

c) Estimate the regression equation using the method of least squares and interpret the regression coefficients.

d) Compute the Pearson correlation coefficient between the advertising expenditure and sales generated. Comment on the strength of the association.

[3, 4, 7, 6]

B6. The weights measured to the nearest kilogram of 40 students were as follows:

69 70 59 62 66 58 73 65 64 80
59 71 64 70 67 79 51 67 67 62
66 68 83 83 71 54 65 54 67 70
58 74 64 61 59 78 72 77 63 76

a) Produce a tally showing a frequency distribution with seven classes 51 to 55, 56 to 60, 61 to 65, 66 to 70, 71 to 75 , 76 to 80 and 81 to 85.

b) Draw a histogram and a frequency polygon.

c) A company which supplies eggs receives an average six orders per day. What is the probability that:

i. no orders will be received in a given day, and

ii. exactly 2 orders will be received in a half day.

[6,8,3,3]

B7.

a) The ages of a random sample of MBA students at MSUAS are as follows:

34 28 46 37 33 24 29 45 37 34
32 25 50 54 32 36 38 41 38 44
28 43 40 49 30 46 27 34 61 33

Construct a stem and leaf diagram.

b) There are two methods of packing a product. The weight packed by each method were recorded over a period of time:

	Method X	**Method Y**
Mean weight	735	756
Standard deviation	14	12
Number of packets observed	125	100

Test to see if the difference between the means is significant at 5% level of significant.

c) Define and explain the following sampling techniques:

i. judgemental sampling,

ii. simple random sampling, and

iii. convienience sampling.

[3, 8, 3, 3, 3]

B8.

a) The table below shows a monthly wages received by 69 workers at Company X.

Rent in $	Number of workers
0 - <500	12
500 -<1000	18
1000 -< 3000	25
3000 -< 5000	6
5000 -< 7000	8
Total	**69**

Calculate

i. lower quartile
ii. upper quartile
iii. 65th percentile
iv. Variance
v. standard deviation
vi. pearson's coefficient of skewness

b) A survey of first year university students sought to establish any association between choice of degree programme and sex. Assuming two degree programmes were on offer , the following results were obtained:

Sex	Statistics	Business Management
Male	117	63
Female	24	56

Use a 5% level of significant to test an association between sex and choice of degree programme.

[3,3, 2,1,3, 8]

END OF QUESTION PAPER